Distribution Agreement

In presenting this thesis as a partial fulfillment of the requirements for a degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis in whole or in part in all forms of media, now or hereafter know, including display on the World Wide Web. I understand that I may select some access restrictions as part of the online submission of this thesis. I retain all ownership rights to the copyright of the thesis. I also retain the right to use in future works (such as articles or books) all or part of this thesis.

Jay A. Kroll March 29, 2012

Investigating the Molecular Complexity of the Interstellar Medium

by

Jay A. Kroll

Susanna L. Widicus Weaver
Adviser

Department of Chemistry

Susanna L. Widicus Weaver

Adviser

Michael C. Heaven

Committee Member

Connie Roth

Committee Member

2012

Investigating the Molecular Complexity of the Interstellar Medium

By

Jay A. Kroll

Susanna L. Widicus Weaver

Adviser

An abstract of
a thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
of the requirements of the degree of
Bachelor of Sciences with Honors

Department of Chemistry

2012

Abstract

Investigating the Molecular Complexity of the Interstellar Medium
By Jay A. Kroll

A new supersonic expansion source has been developed to produce unstable molecules of astrochemical interest through O(^{1}D) insertion reactions. This source has been designed to allow for the production of O(^{1}D) through photolysis of Ozone (O_3) without photolyzing the precursor organic molecules. In addition the rotational spectrum of methyl ethyl ketone (MEK) has been acquired from 8GHz to 1THz. The spectrum has been analyzed using three spectral fitting programs – the CALPGM suite of programs, XIAM, and ERHAM. The current prediction had been obtained using ERHAM and fits the 2904 assigned transitions reasonably well. This fit, however, fails to match several previously assigned E state transitions in the cm-wave region that arise due to splitting from the internal motion of the methyl group. It also fails to extrapolate and match the laboratory well beyond ~500 GHz. It is believed the fit has converged to a non-physical local minimum and requires further refinement in order to accurate fit the entire ground state. Observational spectra of 6 interstellar sources have been collected using the Caltech Submillimeter Observatory (CSO). These spectra were examined for evidence of coincidental transitions with the strongest assigned MEK lines. None were observed. However, due to the incomplete nature of the fit for MEK it should not be ruled out as a potential interstellar molecule.

Investigating the Molecular Complexity of the Interstellar Medium

By

Jay A. Kroll

Susanna L. Widicus Weaver

Adviser

A thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
of the requirements of the degree of
Bachelor of Sciences with Honors

Department of Chemistry

2012

Acknowledgements

First, I would like to acknowledge and thank my research advisor, Dr. Susanna Widicus Weaver, for four amazing years of research, learning, and experience. It has been truly amazing and I do not know how I would have survived without your guidance and help. I am incredibly grateful for the opportunities I have had to learn both chemistry and astronomy as I worked in your lab. I never could have imagined how far I have come from the day I chased you back to your office to ask just what you meant when you said “astrochemistry.”

I would also like to thank the members of my committee Dr. Michael Heaven and Dr. Connie Roth for their valuable input and advice. I am honored to have had you on my committee and for the opportunity to both be tested by and learn from you.

I am especially thankful for all the help I have received from Dr. Steven Shipman who has taught me more about spectral fitting programs than I thought possible and has answered my endless emails.

To all the members of the Widicus Weaver research group I owe you a debt too great to describe for all the help, guidance, and fun. I owe a special thanks to Jim Sanders for his work in the deconvolution of the astronomical data. And to Mary Radhuber, my lab buddy and partner in crime for the last four years, I don’t know what I will do without you by my side in the lab every day.

I would like to thank my family for their words of encouragement and for teaching me to always reach for the impossible. And finally, I would like to thank Kóvonn, my best friend and companion who has taught me to keep a balance between research and life. Thank you for making sure I took a break along the way and played a game or two.

Table of Contents

Figures

Tables

Introduction

Over 165 molecules have been detected in the interstellar medium (ISM; Müller et al. 2005). As new far-infrared telescopes such as the Herschel Space Telescope, the Stratospheric Observatory for Infrared Astronomy (SOFIA), and the Atacama Large Millimeter/submillimeter Array (ALMA) come online over the next few years, the number of molecules detected in the ISM will continue to climb. Along with this, the number of unidentified transitions observed in interstellar sources will become even greater. The extreme line confusion already faced in molecular astronomy is illustrated by spectra taken of the Orion KL star forming region by the Widicus Weaver group at Emory. In an approximately 29 GHz wide spectral window from 223 - 251 GHz, there are over 3000 spectral transitions observed. However, only 44.5% of these transitions can be assigned to molecules previously identified in this region. In order to identify the molecules to which these as-of-yet unidentified transitions belong, laboratory spectra and spectral assignments are needed for comparison to interstellar spectra. The experiments I have conducted at Emory have been motivated by this problem. In particular, the work presented herein describes the design of a new supersonic expansion source to produce and analyze unstable molecular species that are predicted to be present in the interstellar medium; the acquisition and initial analysis of the rotational spectrum of methyl ethyl ketone (MEK) for comparison to interstellar spectra; and the observational spectral survey of various interstellar sources to compare with laboratory spectra. Each of these projects will be described in detail below.

$O(^1D)$ Insertion Reactions

Of the approximately 165 detected molecules in the ISM, a great fraction of them are unstable species such as ions, radicals, and reactive intermediates. It is suspected that a large percentage of the molecules present in the ISM are unstable. However, due to the difficulty of obtaining spectra of unstable, reactive molecules in the lab, we are severely limited in our ability to accurately identify unstable species of interest in the ISM. Therefore, new ways of creating and investigating unstable molecules of interest in the laboratory are needed in order to obtain the rotational spectrum of these molecules so that their presence in the ISM can be tested.

Three molecules of particular interest in our lab are methoxymethanol (CH_3OCH_2OH), methanediol ($HOCH_2OH$), and aminomethanol (NH_2CH_2OH**).** In astrochemistry, these molecules are of utmost importance as they are created in the initial steps of interstellar prebiotic molecular evolution. The radical reactions predicted to form these species occur on the surfaces of water ices that coat interstellar grains in dense clouds (Garrod et al. 2008). These reactions are:

$$\cdot CH_2OH + CH_3O\cdot \rightarrow CH_3OCH_2OH \qquad \text{Eq. 1}$$

$$\cdot CH_2OH + \cdot OH \rightarrow HOCH_2OH \qquad \text{Eq. 2}$$

$$\cdot NH_2 + \cdot CH_2OH \rightarrow NH_2CH_2OH \qquad \text{Eq. 3}$$

Once these molecules are liberated from interstellar ices during the warm-up phase of star-formation, they can undergo gas-phase ion-molecule reactions to create more complex organics such as amino acids and sugars. These biologically relevant molecules are crucial in the formation of life. Astronomical investigations can trace the chemical pathways taken to form these molecules, and may offer clues about the chemical processes that lead to the formation of life. However, a rotational spectrum is required before any comparison to astronomical spectra can be performed. Laboratory studies are therefore crucial to the astronomical search for these molecules. Such studies have been limited because these molecules are difficult to produce in laboratory experiments under terrestrial conditions.

One potential way of creating these molecules is through $O(^1D)$ insertion reactions, where electronically excited oxygen atoms efficiently insert into the C-H bonds of stable organic molecules. Methanediol and methoxymethanol have been observed to form from $O(^1D)$ reactions in low-temperature matrix isolation experiments (Wrobel et al. 1999, Lugez et al. 1994), but these specific reactions have not been studied in the gas phase. Other studies have examined gas-phase $O(^1D)$ insertion reactions with small molecules such as H_2, CH_4, and small alkanes (Wang et al., 2002), but no gas-phase study has examined an insertion reaction to form a molecule as large as the molecular targets here. Our goal is to use stable organic precursor molecules, i.e. methanol, methylamine, and dimethyl ether, to form the species of interest through gas-phase reactions with $O(^1D)$ as shown in Figure 1.

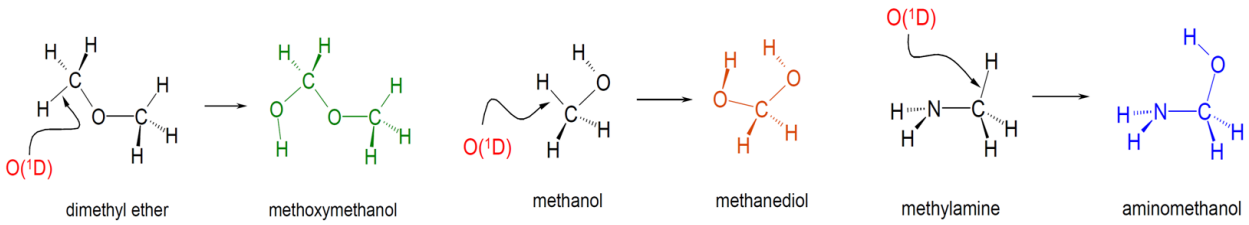

Figure 1. Formation of Unstable Molecules of Interest Through O(^{1}D) Insertion into C-H Bonds

These insertion reactions are highly exothermic, leading to unstable energetic products. It has been shown through the studies of O(^{1}D) insertion into larger alkanes (Yang, 2006) that the excited product molecules undergo unimolecular dissociation reactions. Therefore, some means of quenching the excess energy needs to be introduced into the experiment before gas-phase studies can be conducted with larger molecules. Because the product molecules will tend to break apart immediately after they are formed, they must be produced in an environment that allows for them to be stabilized quickly, and remain stable long enough to be analyzed in the laboratory. This is a challenge for laboratory techniques because the most common quenching technique used is matrix isolation. The target molecules here must be probed through gas-phase spectroscopy so that their high-resolution spectroscopic signatures can be recorded for comparison to astronomical observations. One potential method to stabilize these molecules is to form them in a supersonic expansion through a pinhole into a vacuum chamber. In supersonic expansions, the excess energy can be transferred via collisions with an unreactive carrier gas such as argon. These collisions quench the excess energy and stabilize the newly created molecules, preventing dissociation. As the gas expands into the vacuum chamber, the number of collisions with other molecules is reduced, limiting further reaction. These properties of a supersonic expansion make it an ideal environment for studying unstable reactive species such as those of interest to the astrochemistry community.

There are several designs for sources that enable reactions in supersonic expansions. One such supersonic expansion source used for studying molecular reactions is the fast mixing nozzle described by Emilson et al. (1990). In this source, a pulsed valve is used with a syringe needle attached to face plate of the valve. Gas flows through this needle, and a reactant is added through an injection tube made of needle stock that is inserted through the side of the needle. The two gases mix in an adjustable-length reaction region before expanding into a vacuum chamber, where they are subsequently analyzed in a supersonic jet.

The challenge in adapting the fast mixing nozzle for $O(^1D)$ reactions is that the $O(^1D)$ must be produced via UV photolysis, which will destroy the organic precursor molecules. A second source design, a photolysis nozzle described by Konen et al. (2005), offers a possible solution for this problem. This source uses a quartz tube attached to the faceplate of a pulsed valve. Gas is pulsed through the quartz tube, and a laser is used to photolyze the precursor molecules. The gas is then expanded out of the pinhole at the end of the quartz tube into the vacuum chamber, forming a supersonic expansion that could then be probed spectroscopically.

Neither the fast mixing nozzle nor the photolysis nozzle can be used individually to produce the molecules of interest for this project. Therefore, we designed a new source that combines these two techniques in order to produce the desired products of astrochemical interest. This source is described below.

Source Design

We designed a new mixing source which allows for O(^{1}D) production through photolysis coupled with gas-phase mixing with organic molecules. This design prevents the photolysis of the molecules of interest while allowing for the insertion reactions to occur. The new source design combines elements of the two previous expansion sources – the photolysis nozzle (Konen et al. 2005) and the fast mixing nozzle (Emilson et al. 1990) – into a fast-mixing-photolysis supersonic expansion source. A schematic of this source design is shown in Figure 2.

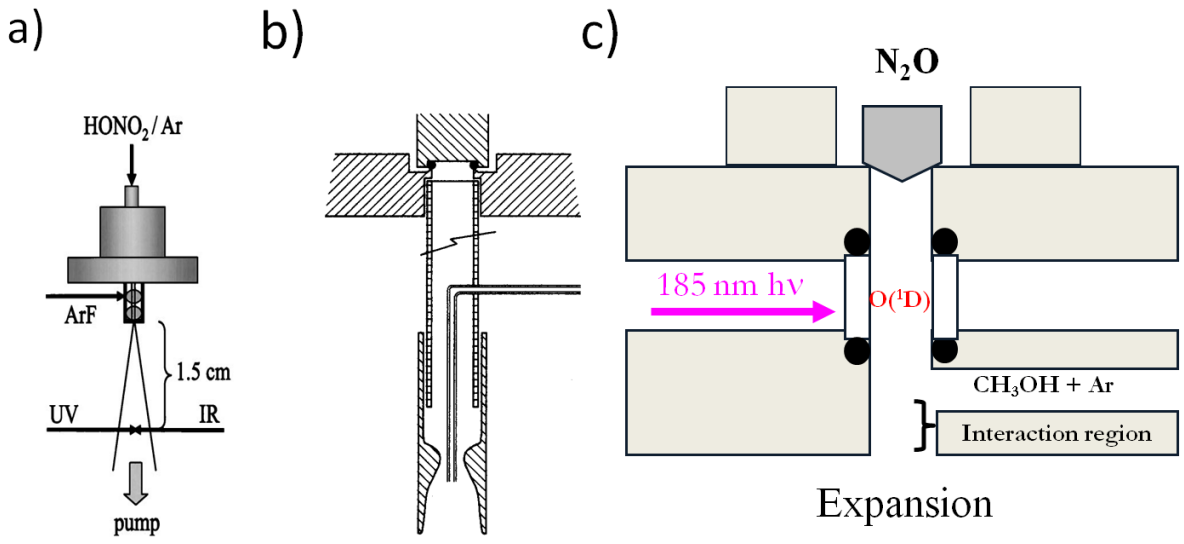

Figure 2. a) Photolysis Nozzle b) Fast Mixing Nozzle c) New Fast Mixing Photolysis Supersonic Expansion Source

In this design, a vacuum ultraviolet photolysis lamp is used to generate UV light to photolyze nitrous oxide (N_2O), leading to the formation of O(^{1}D) and N_2 gas (Felder et al, 1991). The organic precursor molecule is introduced downstream from the photolysis region. The precursor and the O(^{1}D) are then allowed to mix in a variable-length interaction region, and the

mixture is expanded into the vacuum chamber through a 1 mm diameter pinhole. Once the molecules expand into the vacuum chamber, they can then be spectroscopically probed.

The first research project that I conducted at Emory focused on the implementation of this source design. The initial source that was constructed, pictured in Figure 3, used a quartz tube for the photolysis region. A needle-stock injection tube was inserted into a channel between two stainless steel plates, which were subsequently sealed together using high vacuum epoxy. This tube was used to introduce the organic precursor molecules after the photolysis region. A stainless steel screw with a 1 mm hole drilled through the barrel was used as the cap at the end of the tube to create a variable-length mixing region.

Figure 3. First Fast Mixing Photolysis Supersonic Expansion Source

Ultimately the needle-stock injection tube proved to be too fragile to be implemented effectively in the vacuum chamber, where the source position needed to be adjusted on-the-fly. Because of this problem, the source was then redesigned using a plexiglass cube in place of the two stainless steel plates. The quartz tube was sandwiched between the pulsed valve and the plexiglass cube. Rather than using needle-stock for the injection tube, a 1 mm hole was drilled through the plexiglass. This hole

Figure 4. Second Fast Mixing Photolysis Supersonic Expansion Source with Plexiglass Faceplate

intersected the main gas channel at a 90 degree angle, so that the organic molecules could be injected directly into the gas pulse. It should be noted that the reaction region on this source is fixed in length. The plexiglass cube was fitted with an NPT adapter that allowed for a ¼'' tube to be directly attached to the source. This enabled delivery of the precursor organic after the photolysis region, but through a more robust feedthrough mechanism, and using tubing that was directly compatible with the gas lines used throughout the laboratory. An image of this source is shown in Figure 4.

Although mixing experiments were possible with this most recent photolysis-fast-mixing source design, a recent analysis of the reactions involved to produce $O(^1D)$ has led to some changes in the design of the supersonic expansion source. The initial design called for a 193 nm excimer laser to be used to photolyze the nitrous oxide. When the experiment was changed to use a UV photolysis lamp, the decrease of photon flux led to much less $O(^1D)$ being produced. This reduced the amount of products potentially produced, and called into question the feasibility of the experiment. The challenge faced here is that the N_2 molecules produced during the photolysis of N_2O will quench the $O(^1D)$ that is produced before the gas exits the quartz tube and has a chance to react with the organic precursor.

In light of these challenges, a new experimental design is being implemented in which a UV photolysis lamp is filtered to select the 253 nm wavelength light. This wavelength can be used to photolyze ozone (O_3) to produce $O(^1D)$, but avoids photolysis of methanol. Now the output of the arc lamp can be focused directly onto the throat of the supersonic expansion, and the quartz tube is no longer required. This new design dramatically increases the potential amount of product formed, because the quartz tube induced a 90% loss of UV flux. This design also eliminates the concern about quenching the $O(^1D)$, as the collisions in the expansion will primarily be with argon carrier gas atoms. The new source design which is currently being tested is shown in Figure 5. Experiments using this source design to produce $O(^1D)$ have recently been undertaken by a graduate student in the group, and no preliminary results are available at this time.

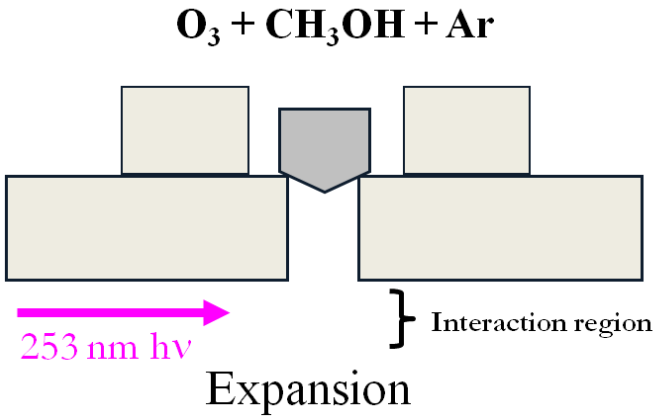

Figure 5. New Supersonic Expansion Source for an Ozone Precursor

Methyl Ethyl Ketone

Of the approximately 165 molecules that have been observed in the interstellar medium (Müller et al. 2005), almost half of them are complex organic molecules (COMs). COMs are defined by van Dishoeck and Herbst (2009) as an organic molecule containing 5 or more atoms. There are an increasingly greater number of COMs being detected in the ISM as the sensitivity of observational instrumentation continues to increase. The recent detection of the fullerenes C_{60} and C_{70} (Cami et al., 2010) demonstrates the level of molecular complexity that can be reached. It is clear from the increasing number of COMs being detected that more laboratory studies of potential COMs need to be carried out before the chemistry in the ISM can be fully understood. This motivated my study of the rotational spectrum of methyl ethyl ketone (MEK). This molecule is of particular interest in interstellar chemistry because it contains a carbonyl bond as well as methyl and ethyl groups. This makes MEK a potentially unique tracer of certain chemical reaction pathways in the ISM that involve these functional groups. It is reasonable to suspect MEK as a candidate for detection in the ISM due to its similarity to a number of previously detected interstellar molecules, including acetone (Combes et al. 1975), acetaldehyde (Fourikis et al., 1974), ethanol (Zuckerman et al. 1975), and propanal (Hollis et al. 2004) (see Figure 6).

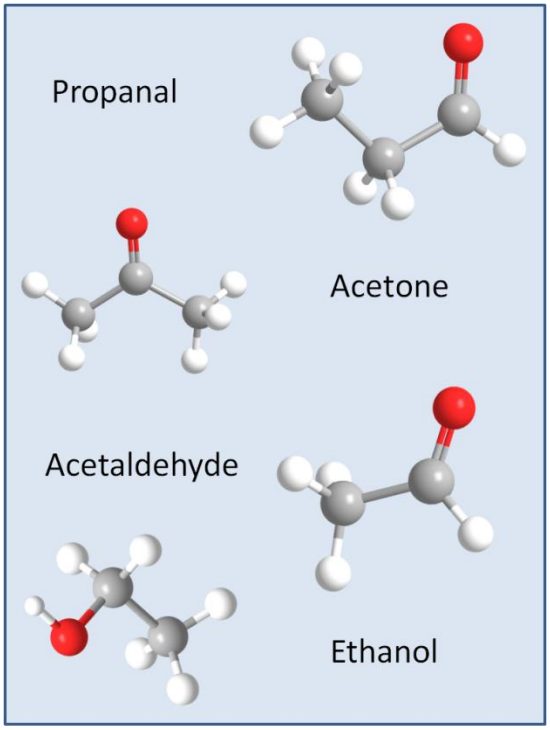

Figure 6. Molecules Known to be Present in the ISM with Chemical Groups Related to MEK

MEK is a stable molecule that is a liquid at room temperature. This combined with its strong dipole moment makes collection of its spectrum straightforward. Some previous laboratory studies had been performed in both the microwave and the infrared regions. Work in the microwave region was performed by Pierce (1969) and Pozdeev (1988) covering the range of ~9 to 33 GHz. Pierce's work (1969) was on the rotational spectrum of the ground vibrational state, and included treatment of effects that arose due to the rotation of the methyl group nearest to the carbonyl bond. Pozdeev's work (1988) involved analysis of the rotation of the methyl group furthest from the carbonyl bond, and the first excited state of the torsional vibration about the central C-C bond. Neither Pierce nor Pozdeev observed spectral evidence of the high energy confirmer (cis-MEK), and Pozdeev calculated the barrier to rotation about the central C-C bond to be approximately 5500 cm^{-1}. Therefore, the rotational spectrum of MEK can reasonably be attributed to the trans-MEK confirmer. The Raman and infrared spectra were acquired and analyzed by Durig in 1991. These previous studies resulted in a total of 22 A state and 14 E state rotational transitions (resulting from the internal rotation of the methyl group nearest the carbonyl group) assigned in the ground vibrational state with a maximum J value of 21 (Pierce et al. 1969, Pozdeev et al. 1988). MEK has not been studied in the millimeter/submillimeter range, where a molecule of this size is expected to have its Boltzmann peak under interstellar conditions. MEK is also expected to exhibit non-rigid behavior due to the internal motion of both methyl groups. The previous lower-frequency laboratory studies therefore do not provide sufficient information to provide a reliable spectral prediction to guide mm/submm observations. I therefore focused the bulk of my laboratory efforts on the acquisition and analysis of the MEK rotational spectrum in the mm/submm ranges.

MEK Spectral Acquisition

The methyl ethyl ketone sample used for the experiments was obtained from Mallinckrodt Chemicals, and had a purity of 99.0 %. The MEK spectrum was acquired using two different methods for spectral collection. The centimeter-wave spectrum from 8.7 to 18.3 GHz was collected in the Shipman Laboratory at New College of Florida using a chirped-pulse microwave (CP-FTMW) waveguide spectrometer. The spectrum was collected at a temperature of 298 K, achieved by packing the spectrometer waveguide with water ice.

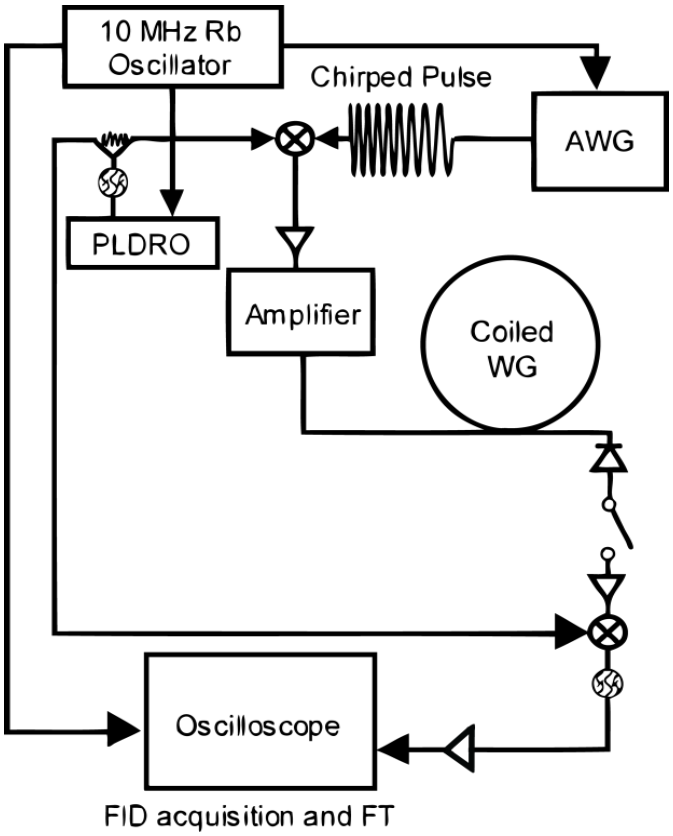

Figure 7. Diagram of CP-FTMW Spectrometer at New College Florida

A diagram of the CP-FTMW spectrometer is shown in Figure 7. This instrument is described in full by Reinhold et al. (2011). The CP-FTMW waveguide spectrometer uses an arbitrary waveform generator (AWG) to produce a chirped pulse from 0.1 to 4.9 GHz. This pulse is filtered, and the output from a phase-locked oscillator (PLDRO) is subsequently mixed with the filtered signal. The resultant signal is filtered again, and a pre-amplifier and a solid state amplifier are used to amplify the pulse power. The pulse is then coupled into the waveguide that contains the molecular sample. A sample pressure of approximately 10 mTorr

is maintained throughout the experiment. After the molecules interact with the pulse, the signal arising from molecular free induction decay (FID) is collected at the other end of the waveguide. This signal passes through a protective diode limiter and an SPST switch and is then amplified with a low-noise amplifier. The signal is mixed with a phase-locked oscillator to downconvert the pulse in frequency, is amplified using an IF amplifier, and then filtered again. The FID is detected by a high speed oscilloscope which digitizes the signal and takes a Fourier transform to produce a frequency domain absorption spectrum. An external 10 MHz reference is used to lock the oscilloscope, PLDRO, and AWG (Reinhold et al. 2011).

In addition to the CP-FTMW spectroscopy, the millimeter and submillimeter spectra of MEK were collected from 33 to 129.5 GHz and 135 GHz to 1 THz using a long-pathlength direct absorption spectrometer at Emory University. This instrument has been described in detail by Carroll et al. (2010). The spectrum was collected at room temperature. The light source for the spectrometer is a Schottky diode frequency multiplier chain (Virginia Diodes, Inc.) driven by the output of an Agilent E8257D microwave frequency synthesizer (1-50 GHz). Each multiplier component has a frequency output corresponding to certain bands in the mm/submm window, and full spectral coverage is achieved by combining various frequency doublers and triplers and appropriate power amplifiers to reach the desired frequency range. A schematic of the multiplier setup along with the frequency coverage of the bands available with this system is shown in Figure 8.

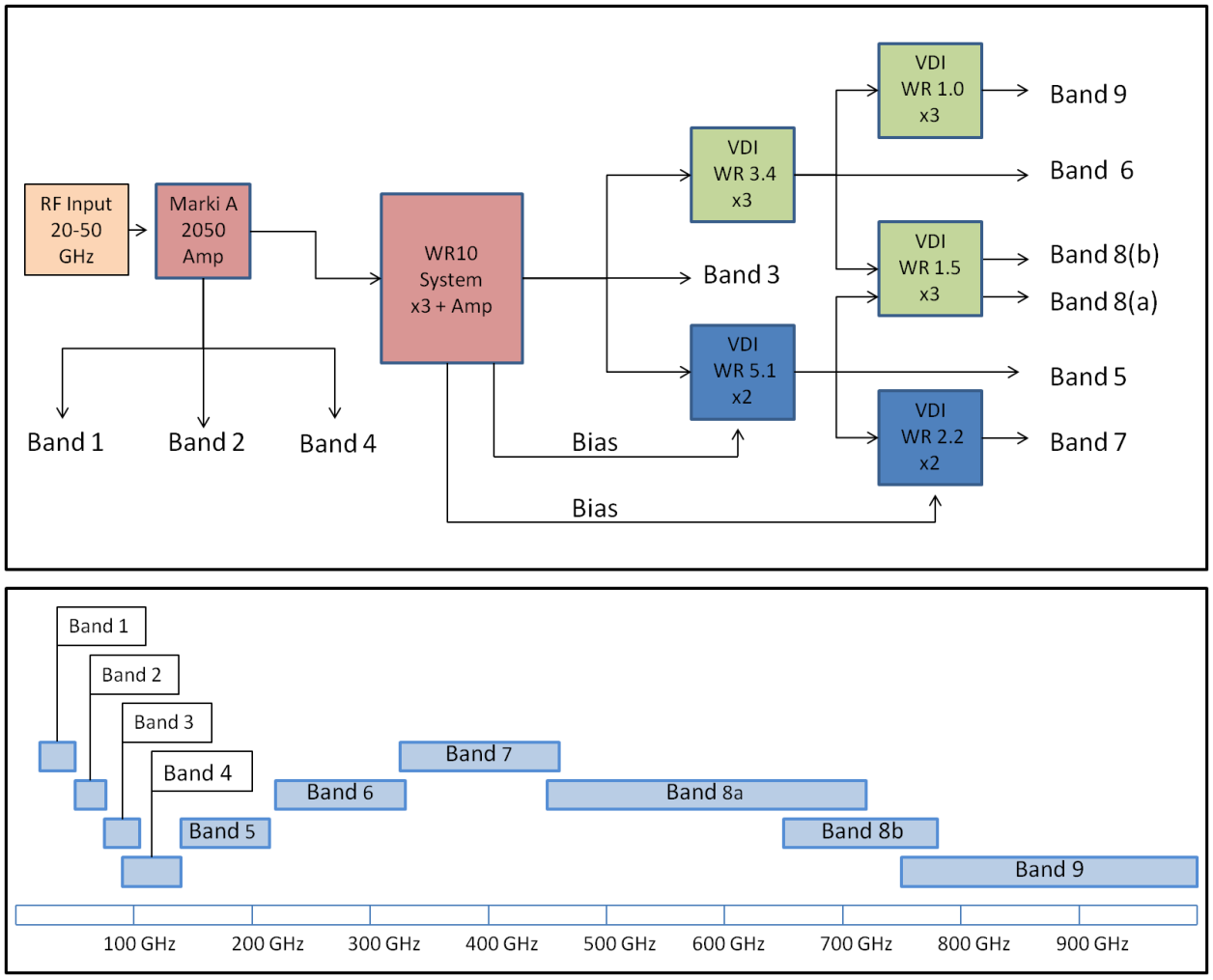

Figure 8. Schematic of VDI Multiplier Setup and Spectral Coverage of Bands 1 through 9 of the VDI multiplier system

The cell has a path length of 2.1 meters, and the signal was detected using solid state zero-biased detectors (Virginia Diodes, Inc.) from 33 to 300 GHz. The spectra from 300 GHz to 1 THz were collected using a QMC Instruments QFI/2BI InSb hot electron bolometer (HEB). The input signal from the Agilent synthesizer was modulated at 15 kHz using an internal reference in the synthesizer, and the output signal was rectified via 2f detection using a Stanford Research SR830 lock-in amplifier. A diagram of the spectrometer is shown in Figure 9.

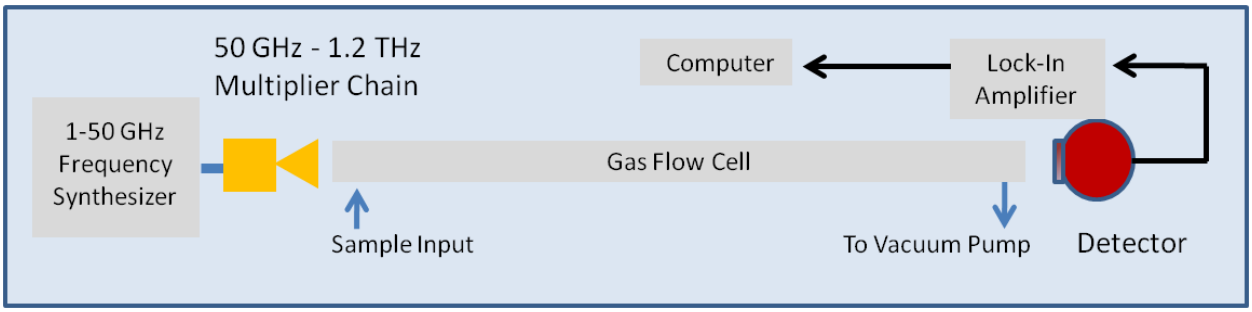

Figure 9. Diagram of Direct Absorption Flow Cell Spectrometer

MEK Hamiltonian

Thousands of spectral lines were measured for MEK, and a complicated spectral pattern arising from internal rotation of the methyl group was observed. A Hamiltonian that includes terms to treat the internal rotation in addition to the standard asymmetric top Hamiltonian was therefore required for spectral analysis. In order to more fully understand the parameters included in the Hamiltonians of various fitting programs that I used to analyze the MEK spectrum, it is useful to review some of the key concepts of rotational spectroscopy. The following descriptions are adapted from McQuarrie and Simon (diatomics), Bernath (asymmetric rigid rotors), Kroto (internal rotors) and Gordy and Cook (internal rotors).

A basic diatomic molecule may be treated as a rigid rotator, where 2 masses at a fixed distance from one another are rotating about the center of mass. The Hamiltonian operator for this system is relatively simple:

$$\hat{\mathrm{H}} = -\frac{\hbar}{2\mu}\nabla^2 \qquad \text{Eq. 4}$$

where μ is the reduced mass of the system and ∇ is Laplacian operator in the coordinate system of choice (spherical harmonics for the purpose of rotational spectroscopy). In this coordinate system, the Hamiltonian can be written as

$$\hat{H} = -\frac{\hbar}{2I}\left[\frac{1}{\sin\theta}\frac{\partial}{\partial\theta}\left(\sin\theta\frac{\partial}{\partial\theta}\right)+\frac{1}{\sin^2\theta}\frac{\partial^2}{\partial\varphi^2}\right]E \qquad \text{q. 5}$$

where I is the total angular momentum of the system and θ and φ are Euler angles.

Solving the Schrödinger equation, $\hat{H}\Psi=E\Psi$, using this Hamiltonian gives the energy levels of the rigid rotor,

$$F(J) = \frac{\hbar^2}{2I}J(J+1) \quad J = 0, 1, 2 \ldots \qquad \text{Eq. 6}$$

where J is the quantum number corresponding to the total angular momentum of the molecule. The selection rules for transitions within the rotational energy levels of the diatomic molecule are $\Delta J = \pm 1$ and $\Delta M = 0$. Therefore the frequency of the light absorbed during excitation of the molecule from one rotational level to the next is given by

$$\nu = \frac{\Delta E}{h} = \frac{F(J+1)-F(J)}{h} = \frac{h}{4\pi^2 I}(J+1) \quad J = 0,1,2 \ldots \qquad \text{Eq. 7}$$

This expression is often simplified to be:

$$\nu = 2B(J+1) \qquad \text{Eq. 8}$$

where B is referred to as the rotational constant of the molecule and is given by the relationship:

$$B = \frac{h}{8\pi^2 I} \qquad \text{Eq. 9}$$

Methyl ethyl ketone is an asymmetric top, and therefore the moment of inertia about each primary axis is different ($I_A \neq I_B \neq I_C$). The energy expression for an asymmetric top rigid rotor is given by

$$E = \frac{J_a^2}{2I_A} + \frac{J_b^2}{2I_B} + \frac{J_c^2}{2I_C} \qquad \text{Eq. 10}$$

and the resulting Hamiltonian is

$$\hat{H} = \frac{\hat{J}_a^2}{2I_A} + \frac{\hat{J}_b^2}{2I_B} + \frac{\hat{J}_c^2}{2I_C} \qquad \text{Eq. 11}$$

where $\hat{J}_n$ is the angular momentum operator along the a, b, or c axis of the molecule, and I_n is the moment of inertia along the a, b, or c axis. The expression can be simplified by defining the rotational constants A, B, and C as:

$$A = \frac{\hbar^2}{2I_A} \quad B = \frac{\hbar^2}{2I_B} \quad \text{and} \quad C = \frac{\hbar^2}{2I_C} \qquad \text{Eq. 12.1, 12.2, 12.3}$$

resulting in the Hamiltonian

$$\hbar\hat{H} = A\hat{J}_a^2 + B\hat{J}_b^2 + C\hat{J}_c^2 \qquad \text{Eq. 13}$$

Additional terms must be added to the Hamiltonian to account for centrifugal distortion effects, arising from the fact that the molecule is not a truly rigid rotor. The Schrödinger equation for this type of molecule has no analytical solution, and thus must be solved numerically. Most fitting programs solve the Schrödinger equation using the Watson A reduction of the Hamiltonian (Watson, 1968) for an asymmetric top including centrifugal distortion effects. Watson's reduced Hamiltonian is an elegant solution designed to take advantage of the ability to evaluate the matrix elements of a Hamiltonian in a basis set of symmetric top wave functions. The resulting matrix can then be diagonalized to solve for the eigenvalues of the system (Watson, 1968). The Watson A reduced Hamiltonian including quartic and sextic distortion constants is written as

$$\hat{H} = \left\{\frac{1}{2}(X+Y)\hat{J}^2 + \left[Z - \frac{1}{2}(X+Y)\right]\hat{J}_z^{\,2} - \Delta_J\left(\hat{J}^2\right)^2 - \Delta_{JK}\hat{J}^2\hat{J}_z^{\,2} - \Delta_K\hat{J}_z^{\,4} + \Phi_J\left(\hat{J}^2\right)^3 + \Phi_{JK}\left(\hat{J}^2\right)^2\hat{J}_z^{\,2} + \Phi_{KJ}\hat{J}^4\hat{J}_z^{\,4} + \Phi_K\hat{J}_z^{\,6}\right\} + \left\{\frac{1}{2}(X-Y)\left(\hat{J}_x^{\,2} - \hat{J}_y^{\,2}\right) - 2\delta_J\hat{J}^2\left(\hat{J}_x^{\,2} - \hat{J}_y^{\,2}\right) - \delta_K\left[\hat{J}_z^{\,2}\left(\hat{J}_x^{\,2} - \hat{J}_y^{\,2}\right) + \left(\hat{J}_x^{\,2} - \hat{J}_y^{\,2}\right)\hat{J}_z^{\,2}\right] + 2\varphi_J\left(\hat{J}^2\right)^2\left(\hat{J}_x^{\,2} - \hat{J}_y^{\,2}\right) + \varphi_{JK}\hat{J}^2\left[\hat{J}_z^{\,2}\left(\hat{J}_x^{\,2} - \hat{J}_y^{\,2}\right) + \left(\hat{J}_x^{\,2} - \hat{J}_y^{\,2}\right)\hat{J}_z^{\,2}\right] + \varphi_K\left[\hat{J}_z^{\,4}\left(\hat{J}_x^{\,2} - \hat{J}_y^{\,2}\right) + \left(\hat{J}_x^{\,2} - \hat{J}_y^{\,2}\right)\hat{J}_z^{\,4}\right]\right\} \quad \text{Eq. 14}$$

where X, Y, and Z are the rotational constants of the molecule, $\hat{J}$ is the total angular momentum of the molecule $\hat{J}_n$ is the angular momentum along the n-axis, the Δ and δ terms are quartic distortion constants, and the Φ and ϕ terms are sextic distortion constants.

For any general asymmetric top molecule, there are three potential components of the dipole moment along the a, b, and c axes (μ_a, μ_b, μ_c). Each component of the dipole moment allows for certain transitions to be possible and thus each has its own set of selection rules. For every transition the value for ΔJ is 0 or ±1, and the value of ΔM is 0 or ±1. For a molecule with $\mu_a \neq 0$, a-type transitions are allowed with the selection rules ΔKa=0 (±2, ±4, …) and ΔKc= ±1 (±3, ±5, …). If $\mu_b \neq 0$, then b-type transitions are allowed with the selection rules ΔKa=±1 (±3, ±5…) and ΔKc= ±1 (±3, ±5, …). If If $\mu_c \neq 0$, then c-type transitions are allowed with the selection rules ΔKa=±1 (±3, ±5…) and ΔKc= 0 (±2, ±4, …).

If the molecule undergoes internal motion, such as the torsion involved in hindered rotation of a methyl group as is found in MEK, the total molecular Hamiltonian must be modified to include terms for the torsional energy. Because there are three equivalent positions for the methyl rotor, the internal motion of the methyl rotor is periodic and threefold, and the associated torsional Hamiltonian is given by

$$\hat{H} = \frac{1}{2I_\tau}p^2 + \frac{1}{2}V_3(1 - \cos 3\tau) \quad \text{Eq. 15}$$

where p is the internal angular momentum of the rotor, I_τ is the reduced moment of inertia of the group undergoing internal rotation, τ is the angle of the rotation, and V_3 is the energy barrier to the hindered rotation. The barrier resulting from the periodic rotation of the methyl group is shown in Figure 10.

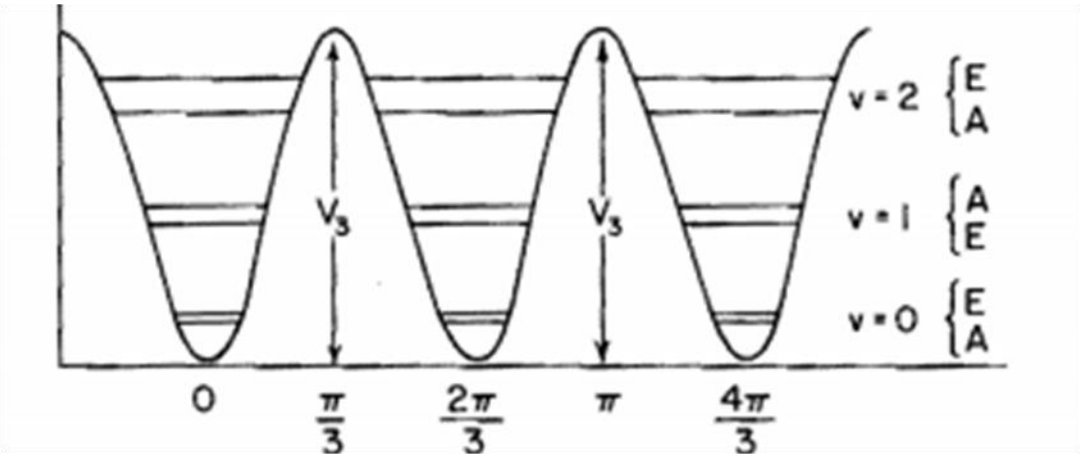

Figure 10. A depiction of a finite V_3 barrier resulting from rotation of a methyl group with each torsional level labeled with the quantum number v and the torsional sublevels labeled with the A/E notation. Figure from Gordy and Cook (Figure 12.3).

In the case of an infinite barrier to rotation ($V_3 \rightarrow \infty$) the torsional energies of the molecule resulting from rotation of the methyl group are triply degenerate and given by the equation

$$E=3(V_3F)^{1/2}(v+1/2) \qquad v=0,1,2,3.....$$

where $F=\hbar^2/2I_\tau$ and v is a quantum number. In the case of a finite barrier, spectral splitting of the rotational transitions arises due to the quantum mechanical effect of tunneling through the barrier. This splits the triply degenerate v quantum level into two states, a non-degenerate state designated A, and a doubly degenerate state designated E. The frequency splitting between the A and E states is correlated with the rate of tunneling, i.e. the faster the rate of tunneling, the greater the splitting. Thus as the energy of the level increases as v increases in

value, the rate of tunneling increases and the splitting of the two states is greater. When the energy of the level is greater than the barrier height, the methyl group behaves as a free rotor with the energies given by the equation

$$E=Fm^2 \quad m=0, \pm1,\pm2,\pm3....$$

where m is the quantum number describing the free rotor states, which are doubly degenerate (except for m=0, which is nondegenerate). Figure 11 shows the energy levels of a molecule with a rotor and how the splitting varies depending on the height of the V_3 barrier.

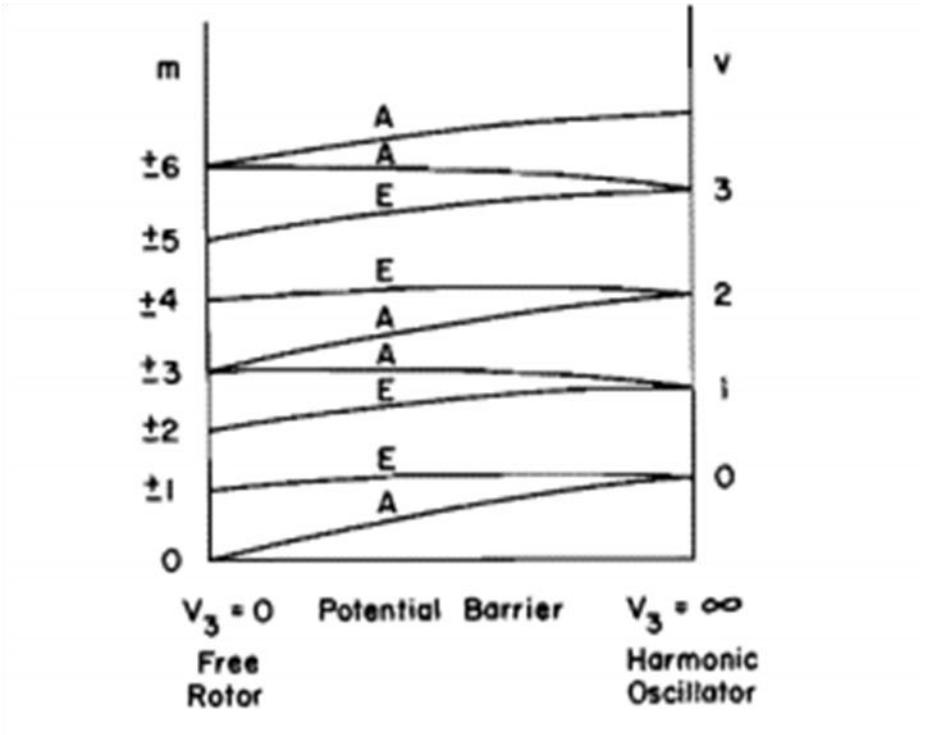

Figure 11. Diagram showing the change from doubly degenerate states of a free rotor to the triply degenerate states when the V_3 barrier approaches infinity. Figure from Gordy and Cook (Figure 12.4).

There are several spectral fitting programs that can deal with asymmetric tops that display internal rotation. The CALPGM suite of programs (Pickett et al., 1991) can be used to fit spectra of non-rigid rotors using the Watson A reduced Hamiltonian including the A, B and C

rotational constants, quartic distortion constants, sextic distortion constants, and octic distortion constants. An extension of this program can treat the internal rotation, but the approach used in this program is cumbersome and difficult to relate to the physical parameters used in the above equations.

XIAM (Hartwig, 1996) is another spectral fitting program which can be used to fit spectra of molecules with internal rotors. The program uses parameters that are directly related to the above equations, and the parameters used are listed in Table 1. XIAM is limited in its applicability to higher frequency spectra like those acquired for MEK because the centrifugal distortion constants are limited to sextic terms. Higher-order corrections require the use of other fitting routines.

Table 1

Constant	Description
B_J	0.5(A+B)
B_K	C-(0.5(A+B)
B_-	0.5(A-B)
Δ_J	quartic distortion constant
Δ_{JK}	quartic distortion constant
Δ_K	quartic distortion constant
δ_J	quartic distortion constant
δ_k	quartic distortion constant
Φ_J	sextic distortion constant
Φ_{JK}	sextic distortion constant
Φ_{KJ}	sextic distortion constant
Φ_K	sextic distortion constant
ϕ_j	sextic distortion constant
ϕ_{jk}	sextic distortion constant
ϕ_k	sextic distortion constant
V_{1n}	V_3 barrier
F	inverse moment of inertia of the internal rotor
delta	angle of the internal rotor in respect to the rest of the molecule
epsil	angle of the internal rotor in respect to the rest of the molecule

ERHAM is a program developed by Groner (1997) which can also be used to fit spectra of molecules with internal rotors. This program relies on the rotational constants A,B, and C, the quartic, sextic, and octic centrifugal distortion constants, and tunneling parameters (ϵ). Similarly to XIAM, ERHAM also fits the angles of the rotor. ERHAM uses the parameters rho, beta, and alpha to describe the orientation of the methyl rotor in relation to the rest of the molecule. The tunneling parameters, ϵ, are coefficients of Fourier expansions in the

Hamiltonian describing the large amplitude torsional motion (i.e. the rotation of an internal rotor group in the case of MEK). There are also tunneling parameters related to the rotational constants and the centrifugal distortion constants. These parameters are denoted with a subscript describing the state to which they relate; parameters affecting the prediction of the E state are denoted with a subscript "10." These tunneling parameters are used to describe the barrier to the internal motion rather than using V_3 directly (Groner, 1997).

MEK Results and Analysis

The MEK spectra obtained in the microwave, millimeter, and submillimeter ranges are shown in Figures 12 – 14 below.

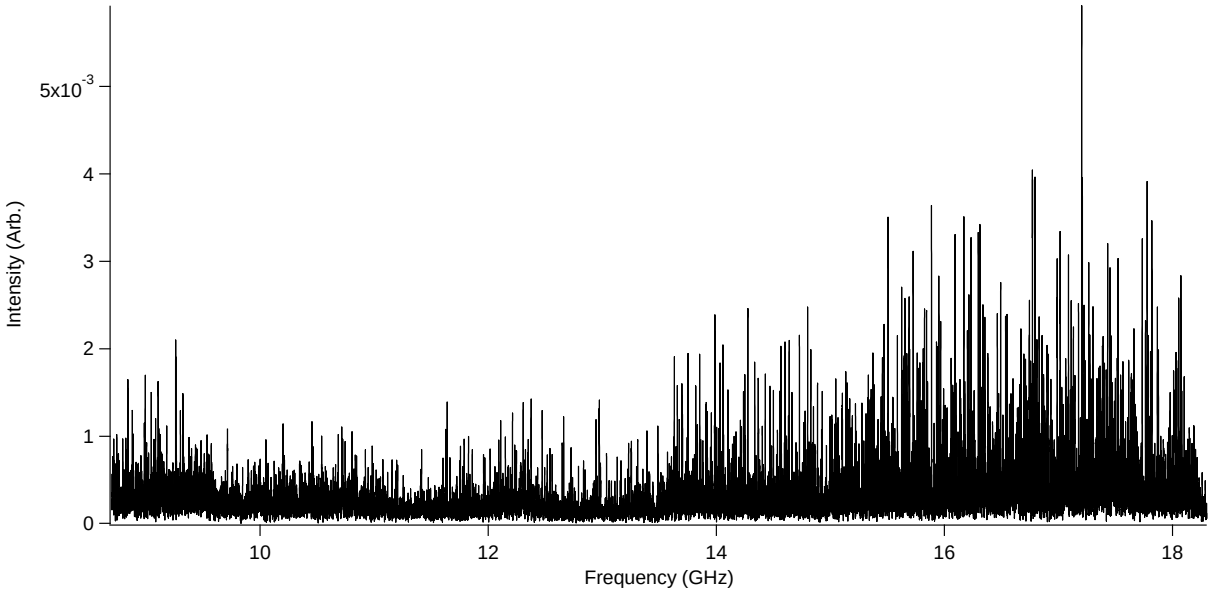

Figure 12. The cm-wave spectrum collected using the CP-FTMW spectrometer at New College of Florida

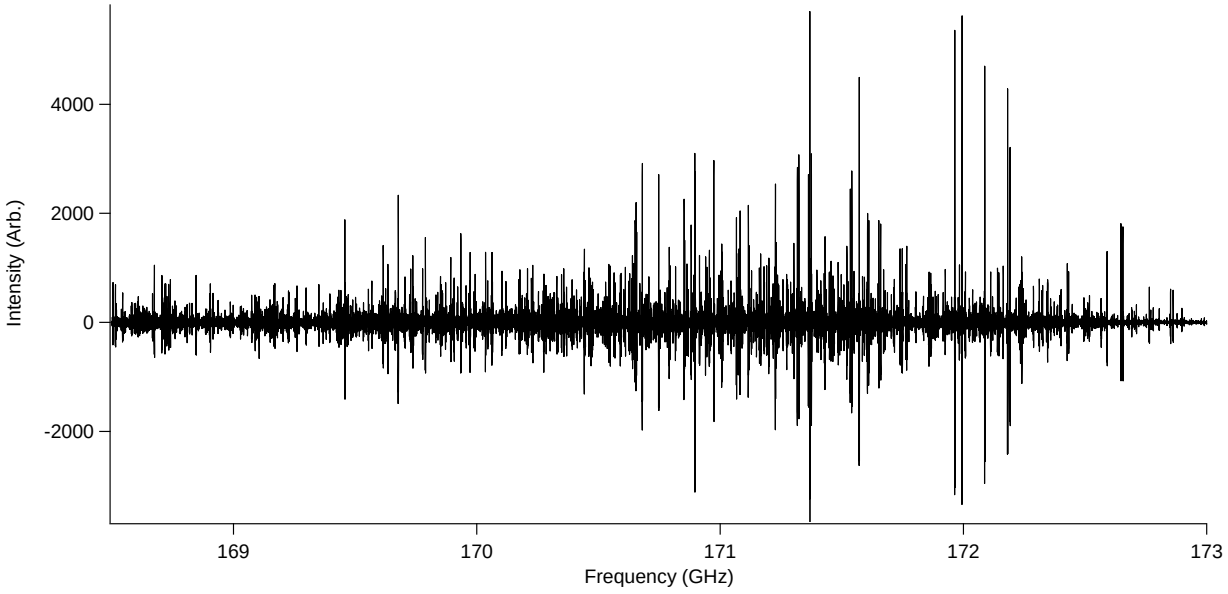

Figure 13. Sample of the mm-wave spectrum collected using the direct absorption flow cell spectrometer at Emory University

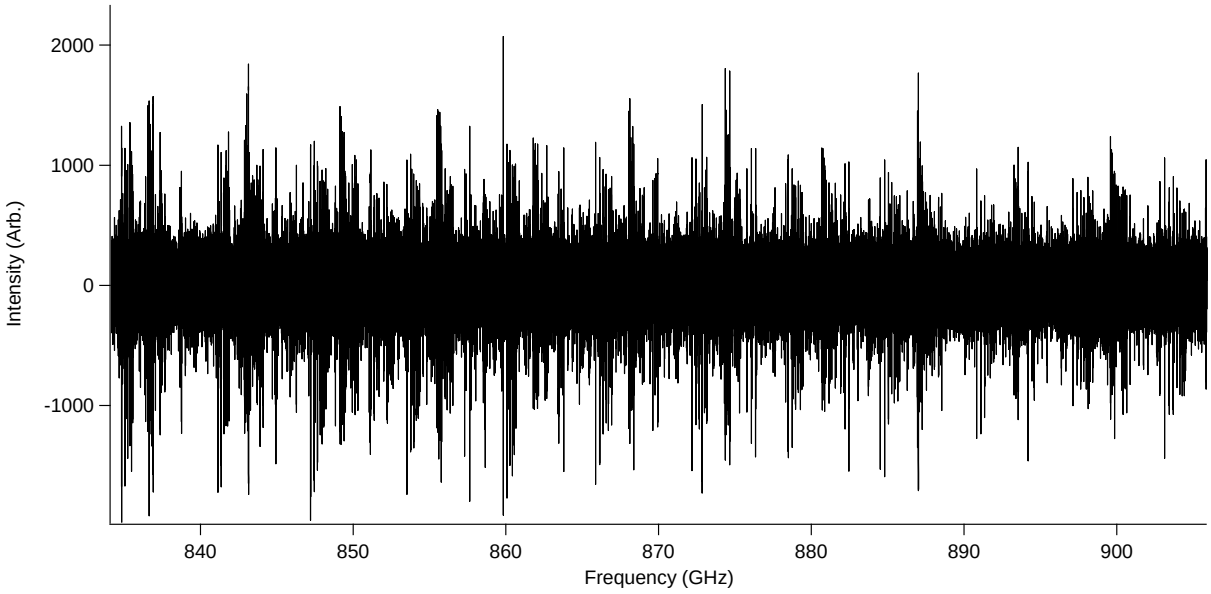

Figure 14. Sample of the sub-mm wave spectrum collected using the direct absorption flow cell spectrometer at Emory University

The spectra were initially analyzed using the CALPGM suite of programs from the Jet Propulsion Laboratory Molecular Spectroscopy group (Pickett et al. 1991). The first set of line assignments treated the internal rotor A state as a standard asymmetric top, and a spectral fit using a Watson A reduction of the Hamiltonian was obtained. Terms for the A, B, and C rotational constants and quartic, sextic, and octic centrifugal distortion constants were included in the Hamiltonian. A total of 1746 transitions (705 a-type and 1041 b-type transitions) were assigned to the A state in its ground vibrational state. The microwave RMS of the fit was 144 kHz, which is comparable to the experimental resolution of ~100 kHz. The results of this analysis are shown below in Table 2. Since this analysis was performed by treating the molecule as a semi-rigid rotor with no internal motion, this initial analysis did not include any E state line assignments.

Table 2

Parameter	A State Fit
A (MHz)	9579.2134(51)
B(MHz)	3598.25745(165)
C (MHz)	2746.60327(32)
Δ_J(MHz)	-0.82722(199)E-03
Δ_{JK}(MHz)	-7.795(41)E-03
Δ_K (MHz)	-3.595(80)E-03
δ_J (MHz)	-0.24016(102)E-03
δ_K (MHz)	-4.7817(183)E-03
Φ_J(MHz)	0.03887(141)E-06
Φ_{JK}(MHz)	-1.124(38)E-06
Φ_{KJ}(MHz)	0.010472(297)E-03
Φ_K(MHz)	-0.01887(87)E-03
ϕ_J(MHz)	0.01949(70)E-06
ϕ_{JK}(MHz)	-0.2344(128)E-06
ϕ_K(MHz)	4.906(175)E-06
L_J(MHz)	-5.747(240)E-12
L_{JJK}(MHz)	0.2781(145)E-09
L_{JK}(MHz)	-0.220(287)E-09
L_{KKJ}(MHz)	-0.01653(199)E-06
L_{KKJ}(MHz)	0.0411(42)E-06
l_J(MHz)	-2.881(120)E-12
l_{JK}(MHz)	0.0894(65)E-09
l_{KJ}(MHz)	0.398(115)E-09
l_K(MHz)	-7.30(66)E-09
J max	103
K_a max	16

While the A state fit provides a tool to get a first approximation at line assignments for this complicated spectrum, it can only be used to assign a small fraction of the lines and has little predictive power. The internal rotation of the methyl group, which leads to A/E splitting of the transitions, must be properly included in the analysis. The CALPGM suite of programs is capable of fitting and predicting spectra of molecules with internal rotors. However, these fits

include Fourier series expansions of all of the parameters of the Hamiltonian. This leads to hundreds of open parameters, making the initial analysis with a limited line list incredibly challenging. In order to proceed with a somewhat simplified Hamiltonian and work up in complexity as lines were added to the fit, I next used the XIAM program (Hartwig, 1996) to analyze the MEK spectrum.

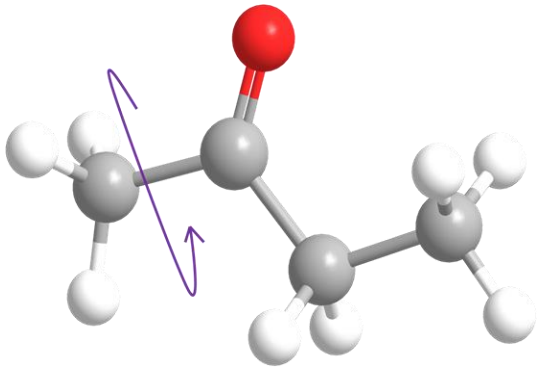

Figure 15 MEK Depicted as having a Single Internal Methyl Rotor

In this treatment, I assumed that only the methyl group underwent substantial internal rotation, and that the ethyl group rotation was negligible. This simplification to treat the rest of the molecule as a semi-rigid rotor was made based on the fact that splitting from a single methyl rotor could easily be observed in the mm/sub-mm spectra, particularly for intense b-type transitions such as the $28_{0\,28} \rightarrow 27_{1\,27}$ transition shown in Figure 16.

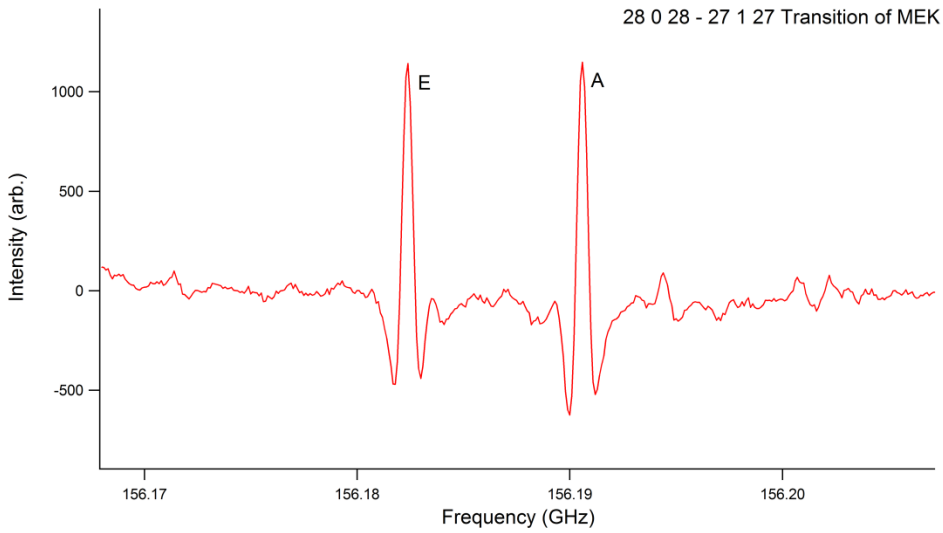

Figure 16. Splitting of the $28_{0\,28} \rightarrow 27_{1\,27}$ Transition of MEK

XIAM was used to determine initial parameters for fitting the spectrum, including transitions from the E state caused by the internal rotation of the methyl group. XIAM is convenient for this use because of the relative ease with which parameters from the semi-rigid rotor analysis in SPFIT (one of the CALPGM programs) can be transferred to this program. The Hamiltonian implemented in XIAM includes the A, B, and C rotational constants, the quartic and sextic centrifugal distortion constants, and the barrier to internal rotation of the methyl group (V_3), as well as the rotor axis angles. This is of particular use because the rotor axis angles are not open parameters in SPFIT, even when using the version designed to fit spectra of internal rotors. The previously assigned transitions, from the A state analysis, were transferred to XIAM, and 1140 E state transitions were added. These E state assignments could be easily identified in the spectrum with relative certainty due to the small splitting (<50 MHz), which leads to obvious A/E doublets as shown above. The lines imported into the XIAM fit were limited to a maximum K_a value of 10 and a maximum J value of 99 due to lack of certainty in assignment of weak transitions with high J or K_a. The initial fit converged to a microwave RMS of 5.4 MHz,

which is much higher than was achieved for the A state analysis using SPFIT. Assignments with high observed-calculated residuals and accidental duplicate assignments were removed to improve the overall RMS; an ultimate RMS of 1.8 MHz was achieved. The final fit in XIAM contained 1623 A state transitions and 566 E state transitions for a total of 2189 assigned lines. The values for the parameters used in XIAM are presented in Table 3.

Table 3

Parameter	Fit Value	Error (1σ)
BJ (GHz)	6.586016	0.000214766
BK (GHz)	-3.83938	0.000215424
B- (GHz)	2.993064	0.000295326
Δ_J (GHz)	5.09E-06	1.79E-06
Δ_{JK} (GHz)	-5.12E-07	5.45E-06
Δ_K (GHz)	-4.22E-06	3.69E-06
δ_j (GHz)	2.44E-06	9.29E-07
δ_k (GHz)	2.85E-06	2.15E-06
Φ_J (GHz)	4.57E-09	3.90E-10
Φ_{JK} (GHz)	-2.03E-08	7.24E-10
Φ_{KJ} (GHz)	2.75E-08	8.05E-10
Φ_K (GHz)	-1.18E-08	5.21E-10
ϕ_j (GHz)	2.37E-09	2.10E-10
ϕ_{jk} (GHz)	-8.35E-09	2.36E-10
ϕ_k (GHz)	6.40E-09	2.91E-10
V_{1n} (GHz)	6318.487	112.477858
F_0 (GHz)	191.967	4.664218314
Epsil	-1.39308	0.023743813
delta	1.571046	0.000043709

XIAM has some limitations in its applicability to complicated internal rotor problems such as that of MEK, especially at higher J and K states where centrifugal distortion becomes a significant factor and octic centrifugal distortion constants are required. Because of this, the assignments included in the XIAM fit were transferred to another program, ERHAM, which is known to be a powerful tool for the analysis of molecules with methyl and ethyl rotors (Groner,

1997). The ERHAM analysis led to a microwave rms of 209.930 kHz. The final fit contained 2904 transitions (1607 A state transitions, 1297 E state transitions). The values of the constants derived from the fit are shown in Table 4. Any constant with an error greater than 10% of its value and did not significantly change the fit was deemed to be a non-physical parameter. These parameters were set to 0.0 for the purposes of this analysis, and are denoted as dashes in the table.

Table 4

Parameter	Fit Value	Error (1σ)
Rho	-3.02854938700E+00	4.04785900000E-04
Beta	3.78334515453E+02	7.11642000000E-01
Alpha	----	----
A (MHz)	9.54486860700E+03	5.18515000000E-02
B (MHz)	3.59712139300E+03	8.03290000000E-03
C (MHz)	2.74665158200E+03	5.35076600000E-04
Δ_J (kHz)	6.65733447800E-01	7.03760000000E-03
Δ_{JK}(kHz)	5.19489328800E+00	2.90132200000E-01
Δ_K(kHz)	-9.40815945000E+00	3.08700000000E+00
δ_j(kHz)	1.58640785278E-01	3.51670000000E-03
δ_k(kHz)	1.87211690100E+00	1.99214400000E-01
Φ_J (Hz)	----	----
Φ_{JK}(Hz)	-5.09033385800E-03	1.04150000000E-03
Φ_{KJ}(Hz)	-3.04935537704E-01	4.63637000000E-02
Φ_K(Hz)	1.16326283170E+01	7.88196500000E-01
ϕ_j(Hz)	----	----
ϕ_{jk}(Hz)	----	----
ϕ_k(Hz)	----	----
ϵ_{10}	-3.10680082100E+03	1.58068600000E+02
$[A-(B+C)/2]_{10}$	1.20698459510E+01	4.51978400000E-01
$[B+C]/2_{10}$	-1.92930053500E-02	1.41725900000E-04
$\delta_{k\,10}$	-1.27667412308E-04	1.31510000000E-06

Figure 17 shows a comparison of the spectral predictions arising from the analysis performed using each program. Here, the 36 $_{1\ 36}$ → 35 $_{0\ 35}$ A and E transitions are used to illustrate the accuracy of the prediction for the A/E splitting.

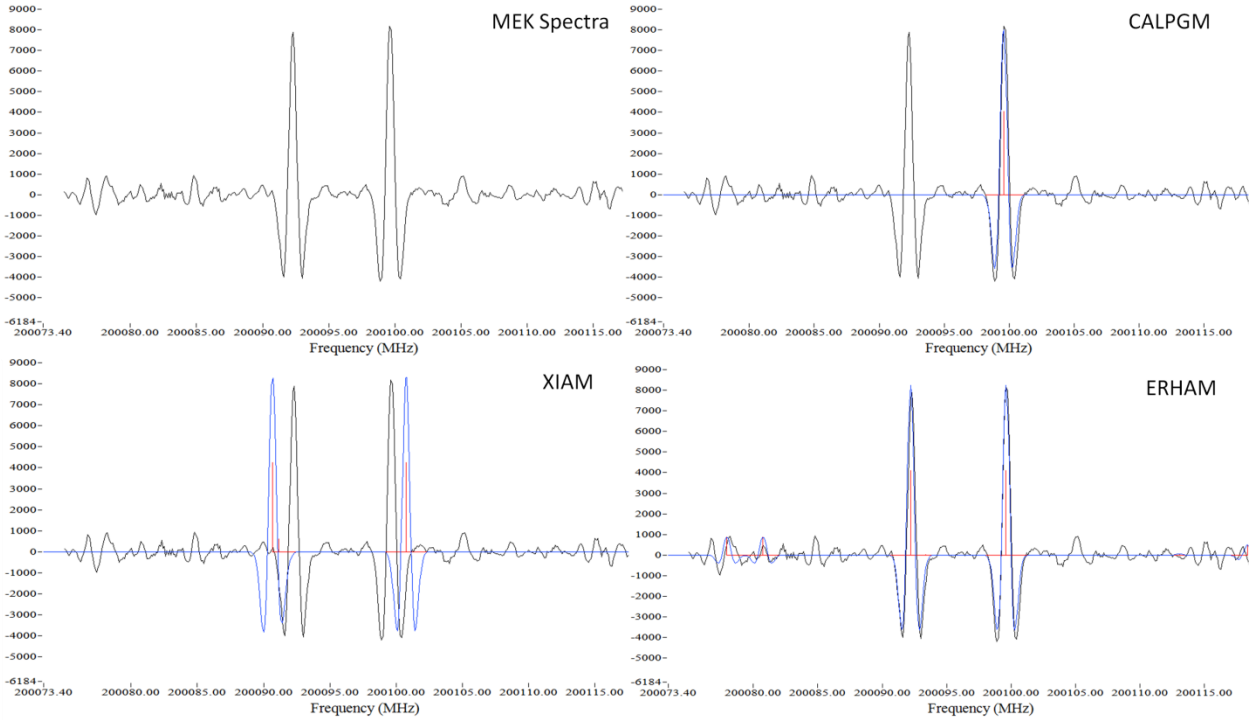

Figure 17. The spectrum of MEK showing the 36 $_{1\ 36}$ →35 $_{0\ 35}$ E transition at 200092.307 MHz and the 36 1 36 →35 0 35 A transition at 20099.643 MHz. The blue line shows the spectral prediction with the red line representing the predicted center frequency for the transition.

It is clear from the spectra in Figure 17 that the CALPGM suite of programs provides an accurate prediction of the transition for the A state. XIAM predicts both the A and E states, but ERHAM does a much better job at modeling the A/E splitting observed in the spectrum.

Pozdeev et al. describes fine structure in the A state resulting from the internal rotation of the methyl group furthest from the carbonyl. However, no evidence of this fine structure is

observed in these higher frequency spectra. It can therefore be concluded that the current fit of MEK can accurately predict the spectrum without inclusion of any terms in the Hamiltonian to treat this internal motion. The current fit in ERHAM provides a good prediction for the strong b-type R (ΔJ=1) transitions in the 30-500 GHz range of the spectrum as well as a number of low intensity a-type transitions that are degenerate with the strong b-type transitions. However, the low intensity Q transitions predicted in this range do not currently match the laboratory spectrum. There is also another series of strong b-type R transitions which has its Boltzmann peak higher in frequency that is also not well-predicted. A stick diagram of the predicted spectrum with the strong transitions labeled is shown in Figure 18.

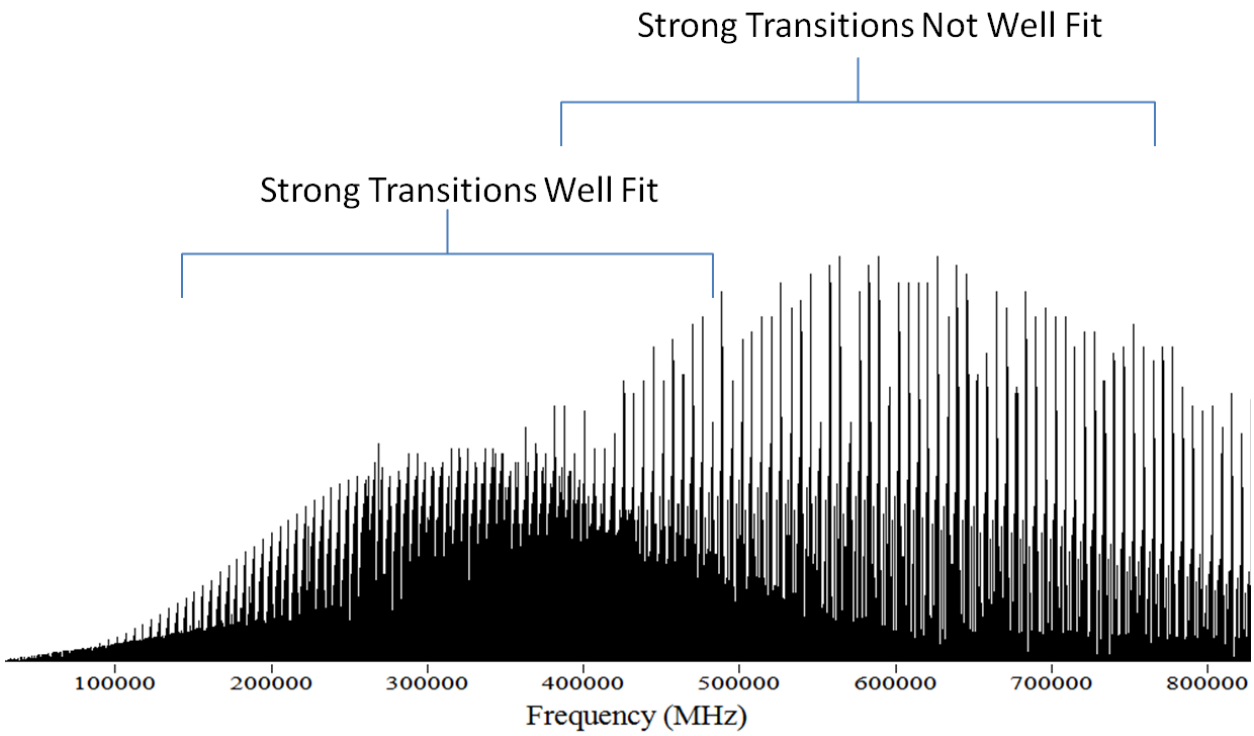

Figure 18. ERHAM prediction stick spectrum showing the strong transitions that are predicted by the fit and the strong transitions that do not well match the laboratory spectra.

The lack of predictive power for some of the transitions in the MEK spectrum could result from a need for more higher-order distortion constants. Additionally, assignments including higher values of K_a to help pin down the distortions might be useful. In the cm-wave region (collected with the CP-FTMW instrument at New College of Florida), the fit does predict the A state transitions described by Pierce (1969). However, the E state transition predictions differ from the transitions described by Pierce by more than 10 MHz, with some transitions having differences from the values obtained by Pierce as large as 200 MHz. The prediction from XIAM provides an E state prediction that more accurately reflects the data provided by Pierce. The transitions described by Pozdeev are in a region outside of the spectral coverage for the current study, and thus could not be used for comparison.

It is clear due to the differences between the quartic and sextic centrifugal distortion constants in the ERHAM fit compared to the XIAM fit that the two programs do not converge to the same spectral parameters. This leads to the conclusion that while ERHAM provides an excellent method for fitting the b-type R transitions, there remains a great deal of future work to refine the parameters and improve the spectral prediction in order to properly assign the full rotational spectrum of MEK.

Astronomical Observations

Each of the above laboratory projects is motivated by a need for spectra to compare to observational spectral results. The common approach used to search for a new molecule in space involves modeling the spectrum of the molecule of interest under appropriate physical conditions for interstellar regions, selecting the transitions most likely to be observed, and conducting targeted searches for these spectral lines. Until the past few years, observational spectra were traditionally collected in small windows centered on the frequency of the transition of interest. However, this method can be biased and prevents analysis using a global fit. This one-molecule-at-a-time, one-line-at–a-time method is also incredibly inefficient, particularly for learning about the many chemical reactions occurring in the ISM. Fortunately, advances in instrumentation now enable broadband spectral line surveys to be collected in a reasonable amount of observing time, such that multiple lines from a given molecule can be observed at once. These broadband spectral line surveys involve collection of large swaths of spectral data on a given interstellar source, allowing for thousands of spectral lines to be detected in a single set of observations. This allows for many more molecules to be accurately identified in an interstellar source. Also, more lines per molecule can be observed, leading to more accurate determination of physical parameters for each molecule. Likewise, the probability of false detections is greatly decreased because the entire spectrum for a given molecule can be analyzed.

The Widicus Weaver group has been actively collecting spectra of multiple interstellar sources over the last four years in order to better understand the effects that various physical environments have on the chemistry of an interstellar source. I have participated in multiple

observing runs, spending a total of >6 weeks at the observatory over the course of my undergraduate research. The observations were performed at the Caltech Submillimeter Observatory (CSO) using the 10.4 meter Leighton Telescope. The observations were collected using the 230 GHz wideband heterodyne receiver (Kaul et al. 2004, Rice et al. 2003). The receiver is capable of observing a 12 GHz instantaneous spectral bandwidth, but due to restraints caused by use of the facility acousto-optical spectrometer (AOS), the observations were limited to 4 GHz bandwidths. The 230 GHz wideband receiver is a heterodyne detector without sideband rejection; therefore all of the spectra collected were double sideband (DSB) in nature. In order to ensure that there was enough spectral coverage to be able to fully-deconvolve the spectra, each frequency point was sampled with a redundancy of at least 6 by randomly moving the sidebands in frequency space. The spectra were deconvolved using the CLASS software package included in the GILDAS suite of programs (Institut de Radioastronomie Millimetrique, Grenoble, France). While I participated in the majority of the observations, others in the Widicus Weaver group focused on the deconvolution of the spectra while I worked on the MEK project. The fully-deconvolved spectra for the sources NGC 1333 4a, NGC 1333 4b, NGC 2264, Orion, and W3 are shown below in Figures 19-24.

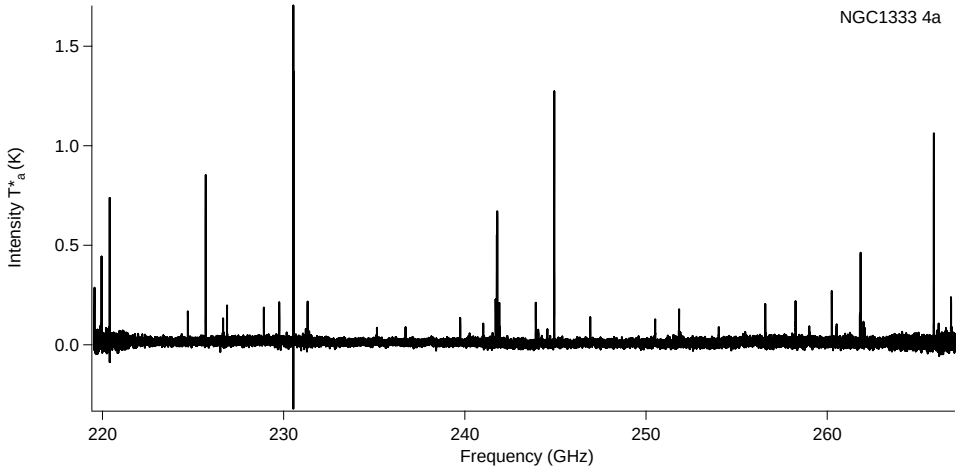

Figure 19. The spectrum of NGC 1333 4a, a hot corino

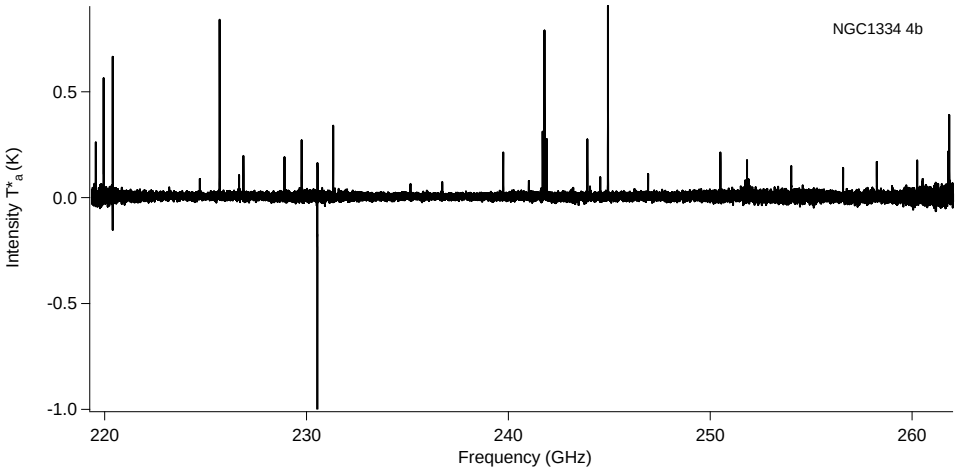

Figure 20. The spectrum of NGC 1333 4b, a hot corino.

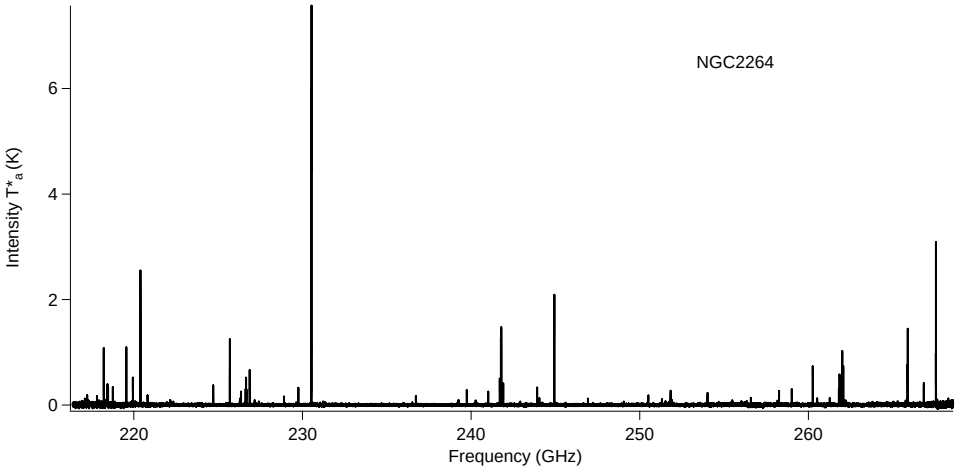

Figure 21. The spectrum of NGC 2264, a hot core.

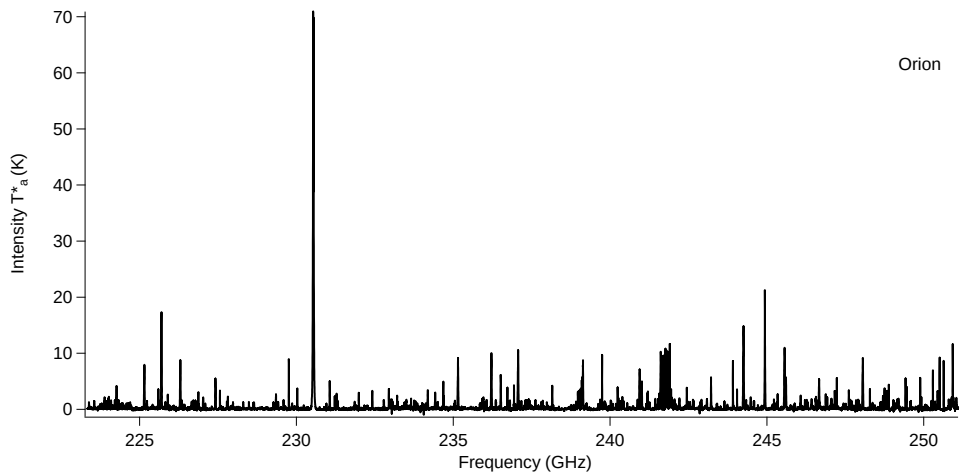

Figure 22. The spectrum of the Orion KL region, a hot core.

Figure

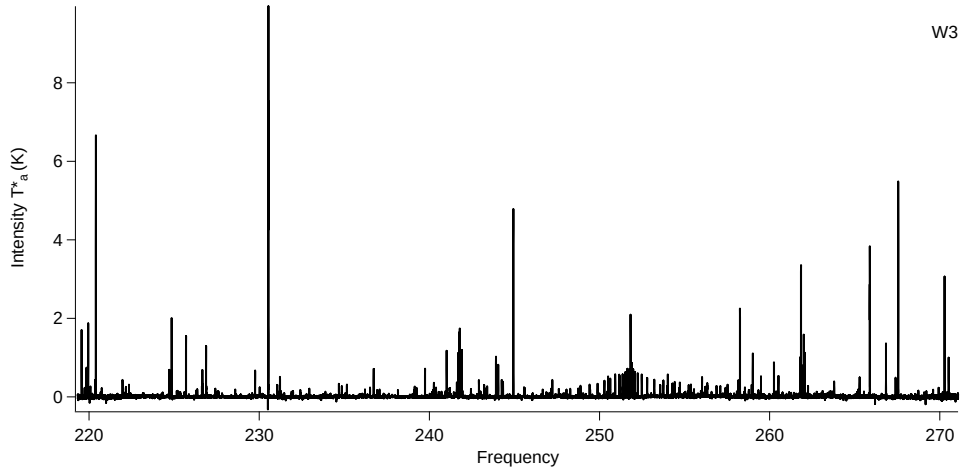

Figure 23. The spectrum of W3, a hot core.

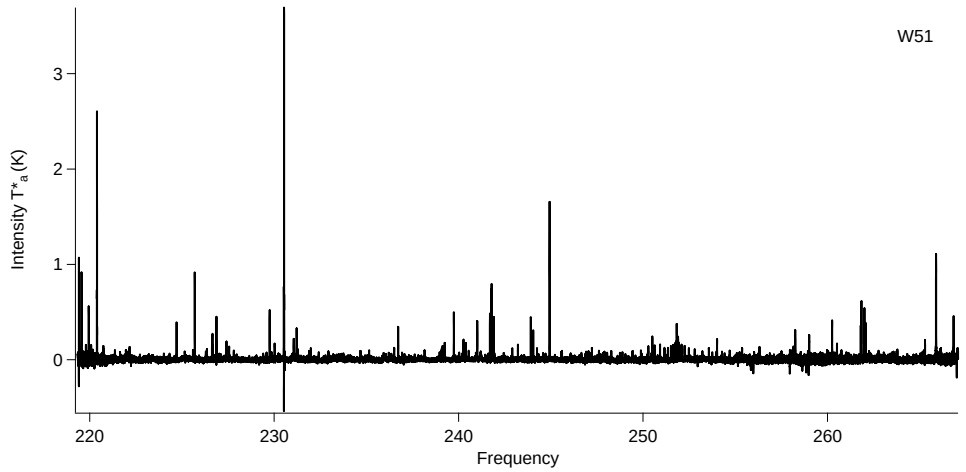

Figure 24. The spectrum of W51, a hot core.

The spectra in these wide frequency bands may appear to have relatively few lines. However, as shown in Figure 25, the spectrum is incredibly dense even when zoomed in on what appears to be baseline in the above spectra.

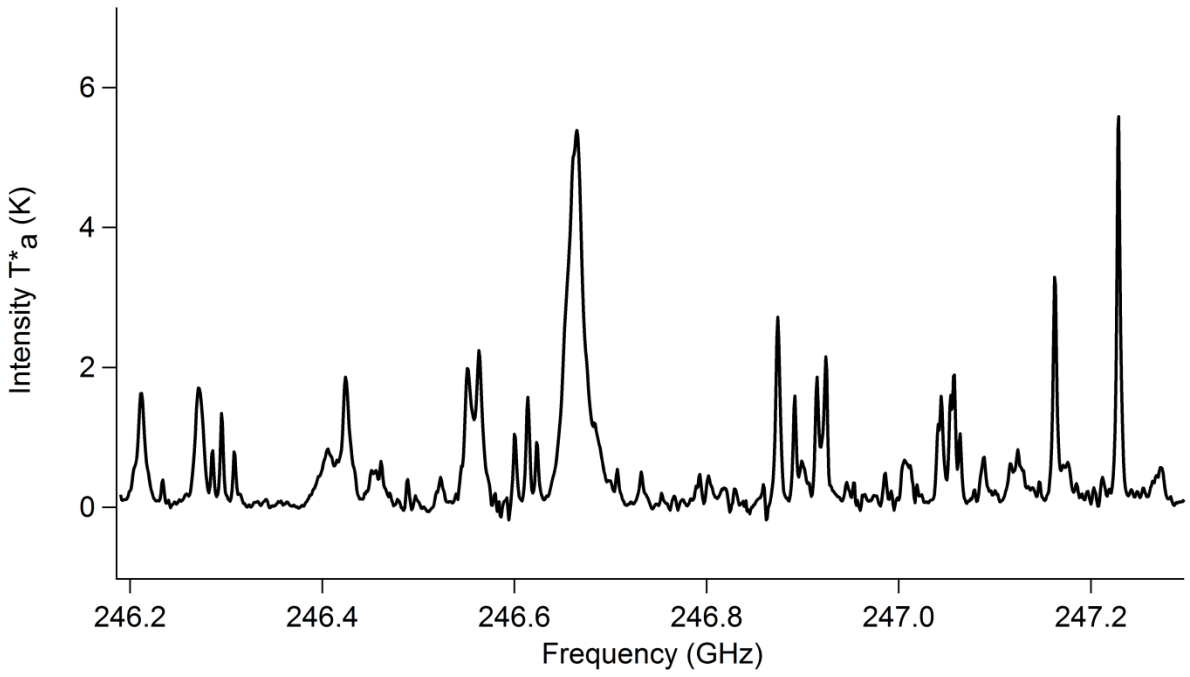

Figure 25. Spectrum of the Orion KL Region showing the dense spectra at the baseline level

Initial spectral analyses were conducted to search for spectral overlap with the strongest predicted MEK lines based on the current MEK analysis. No coincident spectral

features were observed. However, MEK should not be entirely ruled out as an interstellar molecule in these sources. As discussed above, the analysis of the MEK laboratory spectrum is still in need of revision and refinement. Once the spectral analysis for MEK is complete, comparison to these spectra will provide an upper limit for the column density of MEK in these sources.

Conclusion

Here I have overviewed the various research projects I have conducted during my undergraduate research in the Widicus Weaver Group at Emory University. A new source for the production of unstable molecules of astrochemical interest has been built which allows for the production of $O(^1D)$ without the destruction of the precursor molecules. The initial design used photolysis of N_2O in a quartz tube with an excimer laser before introducing the organic precursor molecule. However, when the photolysis light source was changed to an arc lamp, the source was modified to account for the loss of photon flux. The current design uses a filter to only allow 253 nm wavelength light into the chamber from the arc lamp. This allows for the precursor molecule to be mixed with O_3, which is photolyzed to produce $O(^1D)$ without photodissociating the precursor molecule. This source is currently being tested.

In addition to developing a source to produce unstable species for spectroscopic study, I have collected the rotational spectrum of methyl ethyl ketone, a suspected interstellar molecule, from 8.7 to 18.3 GHz, 33 to 129.5 GHz, and 135 GHz to 1 THz. The internal rotor A state of the ground vibrational state was initially analyzed using the CALPGM suite of programs. 1746 transitions were assigned and the spectrum was fit to microwave RMS of 144 kHz, approaching the spectral resolution of ~100 kHz. The fit was then transferred to the XIAM program, where E state transitions were assigned and analyzed. The spectrum was then reanalyzed with 2189 included transitions (566 E state, 1623 A state) and a microwave rms of 1.8 MHz was achieved. This fit was then transferred to ERHAM where it was further refined. The most complete analysis has been performed with 2904 assigned transitions (1607 A state, 1297 E state), and a microwave rms of 209.930 kHz was achieved. The current fit does not

accurately predict the spectrum beyond ~500 GHz, and does not accurately predict low-intensity Q branches or the E state transitions previously observed by Pierce (1969). Based on the disagreement between ERHAM and XIAM for the values of the sextic and quartic distortion constants, it is suspected that the fit in ERHAM converged to a local minimum that only accurately predicts the currently assigned transitions. Further refinement will be needed in order to assign the Q branches and enable extrapolation of the prediction to higher frequencies.

In addition to the MEK analysis, the spectra of six interstellar sources have been collected using the Caltech Submillimeter Observatory. These spectra will facilitate comparison to laboratory spectra and enable identification of new interstellar molecules as laboratory information becomes available. The spectra were examined for evidence of coincidental transitions with the strongest assigned MEK lines, and none were observed. However, due to incomplete nature of the fit for MEK, it should not be ruled out as a potential interstellar molecule. With a more accurate spectral fit from the laboratory analysis, the interstellar spectra can be analyzed and an upper limit on the column density of MEK may be determined.

Sources Cited

Bernath, Peter F. Spectra of Atoms and Molecules. 2nd ed. New York: Oxford UP (2005).

Cami, J. Bernard-Salas, E. Peeters, and S. E. Malek, *Science* 659, 1180–1182 (2010).

Carroll, P. B., Drouin, B.J., Widicus Weaver, S.L., *Astrophys. J.*, 723 (2010) 845.

Combes, F., M. Gerin, A. Wooten, G. Wlodarczak, F. Clausset, and P. J. Encrenaz, *Astron. Astrophys.* 180, L13–L16 (1987).

Durig, J.R., Feng, F.S., Wang, A., and Phan H.V, Cn. J. Chem. 69, 1827 (1991).

Emilsson, Klots, Ruoff, & Gutowsky, *J. Chem. Phys.* 93, 6971 (1990).

Felder, P., Haas, M.M., Huber, J. Robert, *Chemical Physics Letters*, Vol. 186 (1991).

Fourikis,N., M. W. Sinclair, B. J. Robinson, P. D. Godfrey, and R. D. Brown, *Aust. J. Phys.* 27, 425–430 (1974).

Garrod R. T., Widicus Weaver S. L., & Herbst E., *Astrophys. J.,* 682, 283 (2008).

Gordy, Walter, and Robert L. Cook. "Internal Motions." Microwave Molecular Spectra. New York: Wiley (1984).

Groner,P., *J. Chem. Phys.* 107, 4483-4498 (1997).

Hartwig, H. & H. Dreizler, Z. *Naturforsch*, 51a, 923 (1996).

"Heraeus Quarzglas - Suprasil 300." Heraeus Quarzglas - Road to Light. Web. 15 Feb. 2012. <http://lamp-materials.heraeus-quarzglas.com/en/materialgrades/suprasil300suprasil310/Suprasil300.aspx>.

Herbst E. & van Dishoeck E., *Ann. Rev. of Astron. & Astrophys.*, 47, 427 (2009).

Hollis, J.M. P. R. Jewell, F. J. Lovas, A. Remijan, and H. Møllendal, Astrophys. J. 610, L21–L24 (2004).

Kaul A. B., Bumblel B., Lee K. A., LeDuc H. G., Rice F., & Zmuidzinas J., *J. Vac. Sci. Tech. B*, 22, 2417 (2004).

Konen, Pollack, Li, Lester, Varner, & Stanton, *J. Chem. Phys.* 122, 094320, (2005).

Kroto, H. W. Molecular Rotation Spectra. Great Britain: Wiley and Son (1975).

McQuarrie, Donald Allen., and John Douglas. Simon. Physical Chemistry: A Molecular Approach. Sausalito, CA: Univ. Science (1997).

The Merk Index, 10th edition, Windholz M. ed. Rathway, N.J. :Merk & Co., Inc. (1983).

Morris, A. E. Lilley, J. A. Ball, C. A. Gottlieb, and H. Penfield, *Astrophys. J.* 196, L99–L102 (1975).

Muller H.S. P. et al., *J. Mol. Struct.,* 742, 215-227 (2005).

Pickett, H. M., *J. Mol. Spectrosc.* 148, 371-377 (1991).

Pierce L.C., Chang, K., Hayashi, M., and Nelson R., *J. Mol. Spectrosc.*, 5, 449-457, (1969).

Pozdeev, N.M., Mamleev, A. Kh., Gunderova, L. N., and Galeev, R.V., *J. Struc. Chem.*, 52-58, (1988).

Reinhold, B., I. A. Finneran, S.T. Shipman, *J. Mol. Spectrosc.* 270, 89, (2011).

Rice, F., Sumner, M., Zmuidzinas, J., Hu, R., LeDuc, H. G., Harris A. I., & Miller, D., in: SPIE Proc. 4855, Millimeter and Submillimeter Detectors for Astronomy, Phillips & Zmuidzinas, ed., 30, (2003).

Wang, Chia C. et al., *J. Chem. Phys.*, 116, (2002). And references therein.

Watson, J.K.G., *Chem. Phys.* 48, 4517 (1968).

Yang, Xueming, P*hys. Chem. Chem. Phys*, 8, 205–215 (2006).

Zuckerman, B., B. E. Turner, D. R. Johnson, F. O. Clark, F. J. Lovas, N. Fourikis, P. Palmer, M.

Astrophys. J. 196, L99–L102 (1975).

Appendix A

Final Line List from ERHAM fit with the residual (assigned frequency-predicted frequency) shown. In the A/E column, 00 indicates that the transition is in the A state and 10 indicates that the transition is in the E state.

J'	Ka'	kc'	J"	Ka"	Kc"	Frequency MHz	Uncertainty	A/E	Residual
9	0	9	8	1	8	51451.35080	0.10000	00	0.2485
11	0	11	10	1	10	62712.80680	0.10000	00	-0.1853
12	0	12	11	1	11	68263.59330	0.10000	00	0.1408
12	1	12	11	0	11	68414.13480	0.10000	00	0.2345
13	0	13	12	1	12	73788.11660	0.10000	00	0.0976
13	1	13	12	0	12	73870.24680	0.10000	00	0.0292
12	2	11	11	1	10	75093.87340	0.10000	00	0.2857
13	1	12	12	2	11	77629.23210	0.10000	00	0.1300
14	0	14	13	1	13	79297.78900	0.10000	00	0.0293
14	1	14	13	0	13	79342.20880	0.10000	00	0.0331
14	1	13	13	2	12	83545.55290	0.10000	00	0.1036
15	0	15	14	1	14	84799.23620	0.10000	00	0.0648
15	1	15	14	0	14	84822.99140	0.10000	00	0.0429
14	2	13	13	1	12	84916.57970	0.10000	00	0.1272
15	1	14	14	2	13	89299.06230	0.10000	00	0.1686
15	2	14	14	1	13	90112.57460	0.10000	00	0.1779
16	0	16	15	1	15	90296.14480	0.10000	00	0.1795
16	1	16	15	0	15	90308.58890	0.10000	00	-0.0036
16	1	15	15	2	14	94946.97250	0.10000	00	0.1348
16	2	15	15	1	14	95420.92490	0.10000	00	0.1642
17	0	17	16	1	16	95790.30310	0.10000	00	0.0889
17	1	17	16	0	16	95796.95530	0.10000	00	0.0815
17	1	16	16	2	15	100529.18850	0.10000	00	0.2197
17	2	16	16	1	15	100801.08160	0.10000	00	0.2048
18	0	18	17	1	17	101283.15860	0.10000	00	0.1063
18	0	18	17	0	17	101285.58800	0.10000	00	0.2424
18	1	18	17	0	17	101286.70490	0.10000	00	0.1615
18	1	17	17	2	16	106071.41160	0.10000	00	0.1422
18	1	17	17	1	16	106169.92770	0.10000	00	0.0766
18	2	17	17	1	16	106225.42120	0.10000	00	0.1538
19	0	19	18	1	18	106775.18550	0.10000	00	0.0974
19	1	19	18	0	18	106776.98740	0.10000	00	0.0789
18	2	16	17	3	15	109842.56800	0.10000	00	0.1234
19	1	18	18	2	17	111590.25570	0.10000	00	0.1830
19	2	18	18	1	17	111676.40800	0.10000	00	0.0825
20	0	20	19	1	19	112266.68170	0.10000	00	0.0411
20	1	20	19	0	19	112267.66920	0.10000	00	0.0839

19	2	17	18	3	16	115806.93720	0.10000	00	0.1382
20	1	19	19	2	18	117095.40430	0.10000	00	0.0826
20	2	19	19	1	18	117143.23840	0.10000	00	0.0736
19	3	17	18	2	16	117457.75690	0.10000	00	0.2275
19	3	17	18	2	16	117457.75690	0.10000	00	0.2275
21	0	21	20	1	20	117758.12350	0.10000	00	0.2514
21	1	21	20	0	20	117758.12350	0.10000	00	-0.2367
21	1	21	20	1	20	117758.12350	0.10000	00	0.0854
20	2	18	19	3	17	121590.69280	0.10000	00	0.1567
21	1	20	20	2	19	122593.07550	0.10000	00	0.1670
21	2	20	20	1	19	122619.34980	0.10000	00	0.1292
22	0	22	21	1	21	123248.98670	0.10000	00	0.1258
22	1	22	21	0	21	123248.98670	0.10000	00	-0.1255
23	2	21	22	3	20	138394.53210	0.10000	00	0.1524
23	3	21	22	2	20	138596.15800	0.10000	00	0.2184
24	1	23	23	2	22	139067.13610	0.10000	00	0.1294
24	2	23	23	1	22	139071.33630	0.10000	00	0.1345
25	1	25	24	1	24	139720.74510	0.10000	00	0.1188
25	0	25	24	1	24	139720.74510	0.10000	00	0.1301
25	0	25	24	0	24	139720.74510	0.10000	00	0.1078
25	1	25	24	0	24	139720.74510	0.10000	00	0.0965
23	3	20	22	4	19	142221.61390	0.10000	00	0.2296
24	2	22	23	3	21	143913.51220	0.10000	00	0.1718
24	3	22	23	2	21	144029.06230	0.10000	00	0.1613
25	1	24	24	2	23	144556.20740	0.10000	00	0.1323
25	2	24	24	1	23	144558.47400	0.10000	00	0.1510
23	4	20	22	3	19	145041.49440	0.10000	00	0.2593
26	0	26	25	0	25	145202.44230	0.10000	10	-0.0619
26	1	26	25	1	25	145202.44230	0.10000	10	-0.0567
26	0	26	25	1	25	145202.44230	0.10000	10	-0.0513
26	1	26	25	0	25	145202.44230	0.10000	10	-0.0673
26	0	26	25	1	25	145210.89640	0.10000	00	0.0943
26	1	26	25	1	25	145210.89640	0.10000	00	0.0885
26	1	26	25	0	25	145210.89640	0.10000	00	0.0772
26	0	26	25	0	25	145210.89640	0.10000	00	0.0830
24	3	21	23	4	20	148182.87800	0.10000	00	0.1829
25	2	23	24	3	22	149416.62460	0.10000	00	0.1692
25	3	23	24	2	22	149482.28030	0.10000	00	0.1898
24	4	21	23	3	20	149936.62060	0.10000	00	0.2148
26	1	25	25	2	24	150044.88090	0.10000	00	0.1257
26	2	25	25	1	24	150046.09480	0.10000	00	0.1411
27	0	27	26	1	26	150692.50050	0.10000	10	-0.0781
27	1	27	26	0	26	150692.50050	0.10000	10	-0.0862
27	1	27	26	1	26	150692.50050	0.10000	10	-0.0808
27	0	27	26	0	26	150692.50050	0.10000	10	-0.0835
27	0	27	26	1	26	150700.86530	0.10000	00	0.0857
27	1	27	26	1	26	150700.86530	0.10000	00	0.0828
27	1	27	26	0	26	150700.86530	0.10000	00	0.0770

27	0	27	26	0	26	150700.86530	0.10000	00	0.0799
25	3	22	24	4	21	153962.59480	0.10000	00	0.1349
26	2	24	25	3	23	154910.68320	0.10000	00	0.1031
26	3	24	25	2	23	154947.68550	0.10000	00	0.1389
25	4	22	24	3	21	155035.12380	0.10000	00	0.1532
27	1	26	26	2	25	155533.26940	0.10000	00	0.0776
27	2	26	26	1	25	155533.95990	0.10000	00	0.1321
28	1	28	27	0	27	156182.37210	0.10000	10	-0.0759
28	0	28	27	0	27	156182.37210	0.10000	10	-0.0745
28	0	28	27	1	27	156182.37210	0.10000	10	-0.0718
28	1	28	27	1	27	156182.37210	0.10000	10	-0.0732
28	0	28	27	1	27	156190.64190	0.10000	00	0.1037
28	1	28	27	0	27	156190.64190	0.10000	00	0.0993
28	1	28	27	1	27	156190.64190	0.10000	00	0.1022
28	0	28	27	0	27	156190.64190	0.10000	00	0.1008
26	3	23	25	4	22	159623.90370	0.10000	00	0.1232
26	4	23	25	3	22	160270.49880	0.10000	00	0.1910
27	2	25	26	3	24	160399.88420	0.10000	00	0.1305
27	3	25	26	2	24	160420.51060	0.10000	00	0.0943
28	2	27	27	2	26	161021.68100	0.10000	00	0.1172
28	2	27	27	1	26	161021.68100	0.10000	00	-0.1030
28	1	27	27	2	26	161021.68100	0.10000	00	0.2332
28	1	27	27	1	26	161021.68100	0.10000	00	0.0131
29	0	29	28	1	28	161671.99810	0.10000	10	-0.0816
29	0	29	28	0	28	161671.99810	0.10000	10	-0.0830
29	1	29	28	0	28	161671.99810	0.10000	10	-0.0837
29	1	29	28	1	28	161671.99810	0.10000	10	-0.0823
29	1	29	28	0	28	161680.11780	0.10000	00	0.0474
29	0	29	28	1	28	161680.11780	0.10000	00	0.0496
29	0	29	28	0	28	161680.11780	0.10000	00	0.0481
29	1	29	28	1	28	161680.11780	0.10000	00	0.0489
27	3	24	26	4	23	165210.24370	0.10000	00	0.1257
27	4	24	26	3	23	165595.07160	0.10000	00	0.0814
28	2	26	27	3	25	165886.41410	0.10000	00	0.1157
28	3	26	27	2	25	165897.88620	0.10000	00	0.1177
29	2	28	28	2	27	166479.51130	0.10000	10	-0.2190
29	1	28	28	2	27	166479.51130	0.10000	10	-0.1621
29	2	28	28	1	27	166479.51130	0.10000	10	-0.3276
29	1	28	28	1	27	166479.51130	0.10000	10	-0.2707
29	1	28	28	2	27	166509.72300	0.10000	00	0.1795
29	2	28	28	2	27	166509.72300	0.10000	00	0.1185
29	2	28	28	1	27	166509.72300	0.10000	00	0.0025
29	1	28	28	1	27	166509.72300	0.10000	00	0.0634
30	0	30	29	0	29	167161.40170	0.10000	10	-0.0752
30	0	30	29	1	29	167161.40170	0.10000	10	-0.0745
30	1	30	29	0	29	167161.40170	0.10000	10	-0.0756
30	1	30	29	1	29	167161.40170	0.10000	10	-0.0749
30	0	30	29	0	29	167169.43190	0.10000	00	0.0714

30	1	30	29	0	29	167169.43190	0.10000	00	0.0710
30	1	30	29	1	29	167169.43190	0.10000	00	0.0717
30	0	30	29	1	29	167169.43190	0.10000	00	0.0721
28	3	25	27	4	24	170750.39930	0.10000	00	0.1269
28	4	25	27	3	24	170976.96690	0.10000	00	0.1108
29	2	27	28	3	26	171320.69380	0.10000	10	-0.2963
29	3	27	28	2	26	171326.65000	0.10000	10	-0.3034
29	2	27	28	3	26	171371.59600	0.10000	00	0.0833
29	3	27	28	2	26	171377.90760	0.10000	00	0.0675
30	2	29	29	2	28	171967.55170	0.10000	10	-0.2116
30	1	29	29	2	28	171967.55170	0.10000	10	-0.1818
30	1	29	29	1	28	171967.55170	0.10000	10	-0.2388
30	2	29	29	1	28	171967.55170	0.10000	10	-0.2685
30	2	29	29	2	28	171997.61780	0.10000	00	0.1084
30	1	29	29	1	28	171997.61780	0.10000	00	0.0794
30	1	29	29	2	28	171997.61780	0.10000	00	0.1403
30	2	29	29	1	28	171997.61780	0.10000	00	0.0475
31	0	31	30	0	30	172650.53850	0.10000	10	-0.0856
31	1	31	30	1	30	172650.53850	0.10000	10	-0.0855
31	1	31	30	0	30	172650.53850	0.10000	10	-0.0858
31	0	31	30	1	30	172650.53850	0.10000	10	-0.0853
31	1	31	30	1	30	172658.42610	0.10000	00	0.0226
31	0	31	30	0	30	172658.42610	0.10000	00	0.0224
31	0	31	30	1	30	172658.42610	0.10000	00	0.0228
31	1	31	30	0	30	172658.42610	0.10000	00	0.0222
29	3	26	28	4	25	176262.82710	0.10000	00	0.0892
29	4	26	28	3	25	176394.92850	0.10000	00	0.1096
30	2	28	29	3	27	176805.44460	0.10000	10	-0.3151
30	3	28	29	2	27	176808.71550	0.10000	10	-0.3067
30	2	28	29	3	27	176856.22890	0.10000	00	0.1305
30	3	28	29	2	27	176859.78800	0.10000	00	0.2193
31	1	30	30	1	29	177455.38010	0.10000	10	-0.2673
31	2	30	30	1	29	177455.38010	0.10000	10	-0.2828
31	1	30	30	2	29	177455.38010	0.10000	10	-0.2376
31	2	30	30	2	29	177455.38010	0.10000	10	-0.2531
31	1	30	30	2	29	177485.36190	0.10000	00	0.1240
31	2	30	30	2	29	177485.36190	0.10000	00	0.1074
31	1	30	30	1	29	177485.36190	0.10000	00	0.0921
31	2	30	30	1	29	177485.36190	0.10000	00	0.0755
32	0	32	31	0	31	178139.43580	0.10000	10	-0.0772
32	0	32	31	1	31	178139.43580	0.10000	10	-0.0770
32	1	32	31	0	31	178139.43580	0.10000	10	-0.0773
32	1	32	31	1	31	178139.43580	0.10000	10	-0.0771
32	1	32	31	0	31	178147.24850	0.10000	00	0.0590
32	0	32	31	1	31	178147.26090	0.10000	00	0.0717
32	1	32	31	1	31	178147.26090	0.10000	00	0.0716
32	0	32	31	0	31	178147.26090	0.10000	00	0.0715
32	1	32	31	0	31	178147.26090	0.10000	00	0.0714

30	3	27	29	4	26	181759.21130	0.10000	00	0.1392
30	4	27	29	3	26	181835.45920	0.10000	00	0.0774
31	2	29	30	3	28	182289.97210	0.10000	10	-0.3091
31	3	29	30	2	28	182291.75540	0.10000	10	-0.3013
31	2	29	30	3	28	182340.56560	0.10000	00	0.1501
31	3	29	30	2	28	182342.44870	0.10000	00	0.1399
32	2	31	31	2	30	182943.12700	0.10000	10	-0.1904
32	1	31	31	1	30	182943.12700	0.10000	10	-0.1979
32	1	31	31	2	30	182943.12700	0.10000	10	-0.1824
32	2	31	31	1	30	182943.12700	0.10000	10	-0.2059
32	2	31	31	2	30	182972.89640	0.10000	00	0.0790
32	1	31	31	2	30	182972.89640	0.10000	00	0.0877
32	2	31	31	1	30	182972.89640	0.10000	00	0.0624
32	1	31	31	1	30	182972.89640	0.10000	00	0.0710
33	0	33	32	1	32	183628.08050	0.10000	10	-0.0534
33	0	33	32	0	32	183628.08050	0.10000	10	-0.0535
33	1	33	32	0	32	183628.08050	0.10000	10	-0.0536
33	1	33	32	1	32	183628.08050	0.10000	10	-0.0535
33	0	33	32	0	32	183635.77620	0.10000	00	0.0681
33	1	33	32	0	32	183635.77620	0.10000	00	0.0681
33	1	33	32	1	32	183635.77620	0.10000	00	0.0682
33	0	33	32	1	32	183635.77620	0.10000	00	0.0682
31	3	28	30	4	27	187246.49810	0.10000	00	0.1787
31	4	28	30	3	27	187290.08530	0.10000	00	0.0330
32	2	30	31	3	29	187824.71630	0.10000	00	0.0828
32	3	30	31	2	29	187825.80300	0.10000	00	0.1417
33	1	32	32	1	31	188430.59630	0.10000	10	-0.2028
33	1	32	32	2	31	188430.59630	0.10000	10	-0.1948
33	2	32	32	2	31	188430.59630	0.10000	10	-0.1989
33	2	32	32	1	31	188430.59630	0.10000	10	-0.2069
33	2	32	32	1	31	188460.21800	0.10000	00	0.0324
33	1	32	32	1	31	188460.21800	0.10000	00	0.0369
33	1	32	32	2	31	188460.21800	0.10000	00	0.0455
33	2	32	32	2	31	188460.21800	0.10000	00	0.0410
34	1	34	33	1	33	189116.42620	0.10000	10	-0.0517
34	0	34	33	0	33	189116.42620	0.10000	10	-0.0517
34	1	34	33	0	33	189116.42620	0.10000	10	-0.0517
34	0	34	33	1	33	189116.42620	0.10000	10	-0.0517
34	0	34	33	1	33	189124.02470	0.10000	00	0.0742
34	0	34	33	0	33	189124.02470	0.10000	00	0.0742
34	1	34	33	0	33	189124.02470	0.10000	00	0.0741
34	1	34	33	1	33	189124.02470	0.10000	00	0.0742
31	4	27	30	5	26	192028.93930	0.10000	00	0.0755
31	5	27	30	4	26	192682.33750	0.10000	00	0.3799
32	3	29	31	4	28	192728.79600	0.10000	00	0.1270
32	4	29	31	3	28	192753.61860	0.10000	00	0.0706
33	2	31	32	2	30	193259.16920	0.10000	10	-0.2782
33	2	31	32	3	30	193259.16920	0.10000	10	0.0589

33	3	31	32	3	30	193259.16920	0.10000	10	-0.1223
33	3	31	32	2	30	193259.16920	0.10000	10	-0.4594
33	3	31	32	2	30	193309.20260	0.10000	00	-0.1709
33	2	31	32	3	30	193309.20260	0.10000	00	0.3846
34	2	33	33	2	32	193917.87720	0.10000	10	-0.1702
34	1	33	33	1	32	193917.87720	0.10000	10	-0.1722
34	1	33	33	2	32	193917.87720	0.10000	10	-0.1681
34	2	33	33	1	32	193917.87720	0.10000	10	-0.1744
34	2	33	33	2	32	193947.74970	0.10000	00	0.4357
34	2	33	33	1	32	193947.74970	0.10000	00	0.4312
34	1	33	33	1	32	193947.74970	0.10000	00	0.4335
34	1	33	33	2	32	193947.74970	0.10000	00	0.4380
35	1	35	34	1	34	194604.47080	0.10000	10	-0.0647
35	0	35	34	1	34	194604.47080	0.10000	10	-0.0647
35	0	35	34	0	34	194604.47080	0.10000	10	-0.0647
35	1	35	34	0	34	194604.47080	0.10000	10	-0.0647
35	0	35	34	1	34	194612.00610	0.10000	00	0.0986
35	0	35	34	0	34	194612.00610	0.10000	00	0.0985
35	1	35	34	0	34	194612.00610	0.10000	00	0.0985
35	1	35	34	1	34	194612.00610	0.10000	00	0.0986
32	4	28	31	5	27	197600.57500	0.10000	00	0.1321
32	5	28	31	4	27	197993.54520	0.10000	00	0.0388
33	3	30	32	4	29	198208.68110	0.10000	00	0.1343
33	4	30	32	3	29	198222.70050	0.10000	00	0.0958
34	2	32	33	2	31	198743.42610	0.10000	10	-0.2391
34	3	32	33	2	31	198743.42610	0.10000	10	-0.3361
34	3	32	33	3	31	198743.42610	0.10000	10	-0.1549
34	2	32	33	3	31	198743.42610	0.10000	10	-0.0579
34	3	32	33	2	31	198793.28890	0.10000	00	0.0097
34	2	32	33	3	31	198793.28890	0.10000	00	0.3086
34	2	32	33	2	31	198793.28890	0.10000	00	0.1141
34	3	32	33	3	31	198793.28890	0.10000	00	0.2042
35	2	34	34	2	33	199404.88290	0.10000	10	-0.1735
35	1	34	34	1	33	199404.88290	0.10000	10	-0.1745
35	2	34	34	1	33	199404.88290	0.10000	10	-0.1756
35	1	34	34	2	33	199404.88290	0.10000	10	-0.1724
35	1	34	34	2	33	199434.28880	0.10000	00	0.0791
35	1	34	34	1	33	199434.28880	0.10000	00	0.0768
35	2	34	34	2	33	199434.28880	0.10000	00	0.0779
35	2	34	34	1	33	199434.28880	0.10000	00	0.0756
36	0	36	35	1	35	200092.28030	0.10000	10	-0.0174
36	0	36	35	0	35	200092.28030	0.10000	10	-0.0174
36	1	36	35	0	35	200092.28030	0.10000	10	-0.0174
36	1	36	35	1	35	200092.28030	0.10000	10	-0.0174
36	1	36	35	0	35	200099.64060	0.10000	00	0.0705
36	0	36	35	0	35	200099.64060	0.10000	00	0.0705
36	0	36	35	1	35	200099.64060	0.10000	00	0.0705
36	1	36	35	1	35	200099.64060	0.10000	00	0.0705

33	4	29	32	5	28	203128.25620	0.10000	00	0.0651
33	5	29	32	4	28	203362.43500	0.10000	00	0.0902
34	3	31	33	4	30	203687.39580	0.10000	00	0.0823
34	4	31	33	3	30	203695.26740	0.10000	00	0.0599
35	2	33	34	2	32	204227.61170	0.10000	10	-0.3004
35	2	33	34	3	32	204227.61170	0.10000	10	-0.2034
35	3	33	34	3	32	204227.61170	0.10000	10	-0.2551
35	3	33	34	2	32	204227.61170	0.10000	10	-0.3521
35	3	33	34	2	32	204277.25510	0.10000	00	-0.0095
35	2	33	34	2	32	204277.25510	0.10000	00	0.0464
35	2	33	34	3	32	204277.25510	0.10000	00	0.1508
35	3	33	34	3	32	204277.25510	0.10000	00	0.0950
36	1	35	35	1	34	204891.59780	0.10000	10	-0.2086
36	2	35	35	1	34	204891.59780	0.10000	10	-0.2091
36	1	35	35	2	34	204891.59780	0.10000	10	-0.2075
36	2	35	35	2	34	204891.59780	0.10000	10	-0.2080
36	1	35	35	2	34	204920.92600	0.10000	00	0.0755
36	2	35	35	1	34	204920.92600	0.10000	00	0.0736
36	1	35	35	1	34	204920.92600	0.10000	00	0.0743
36	2	35	35	2	34	204920.92600	0.10000	00	0.0748
37	1	37	36	1	36	205579.71300	0.10000	10	-0.0427
37	0	37	36	0	36	205579.71300	0.10000	10	-0.0427
37	1	37	36	0	36	205579.71300	0.10000	10	-0.0427
37	0	37	36	1	36	205579.71300	0.10000	10	-0.0427
37	0	37	36	1	36	205586.97180	0.10000	00	0.0426
37	1	37	36	0	36	205586.97180	0.10000	00	0.0426
37	1	37	36	1	36	205586.97180	0.10000	00	0.0426
37	0	37	36	0	36	205586.97180	0.10000	00	0.0426
34	4	30	33	5	29	208629.80960	0.10000	00	0.0896
34	4	30	33	5	29	208629.80960	0.10000	00	0.0896
34	5	30	33	4	29	208767.93020	0.10000	00	0.0056
34	5	30	33	4	29	208767.93020	0.10000	00	0.0056
35	3	32	34	4	31	209165.79560	0.10000	00	0.0959
35	4	32	34	3	31	209170.08810	0.10000	00	-0.0189
36	2	34	35	2	33	209711.91330	0.10000	10	-0.2129
36	3	34	35	2	33	209711.91330	0.10000	10	-0.2404
36	3	34	35	3	33	209711.91330	0.10000	10	-0.1887
36	2	34	35	3	33	209711.91330	0.10000	10	-0.1612
36	3	34	35	2	33	209761.11650	0.10000	00	-0.1311
36	2	34	35	3	33	209761.11650	0.10000	00	-0.0455
36	2	34	35	2	33	209761.11650	0.10000	00	-0.1013
36	3	34	35	3	33	209761.11650	0.10000	00	-0.0753
37	2	36	36	1	35	210378.07410	0.10000	10	-0.2071
37	1	36	36	1	35	210378.07410	0.10000	10	-0.2068
37	2	36	36	2	35	210378.07410	0.10000	10	-0.2065
37	1	36	36	2	35	210378.07410	0.10000	10	-0.2062
37	1	36	36	1	35	210407.31560	0.10000	00	0.0957
37	1	36	36	2	35	210407.31560	0.10000	00	0.0963

37	2	36	36	1	35	210407.31560	0.10000	00	0.0954
37	2	36	36	2	35	210407.31560	0.10000	00	0.0960
38	1	38	37	0	37	211066.86390	0.10000	10	-0.0366
38	0	38	37	1	37	211066.86390	0.10000	10	-0.0366
38	0	38	37	0	37	211066.86390	0.10000	10	-0.0366
38	1	38	37	1	37	211066.86390	0.10000	10	-0.0366
38	1	38	37	1	37	211074.06340	0.10000	00	0.0874
38	0	38	37	0	37	211074.06340	0.10000	00	0.0874
38	0	38	37	1	37	211074.06340	0.10000	00	0.0874
38	1	38	37	0	37	211074.06340	0.10000	00	0.0874
37	5	33	36	4	32	225095.02400	0.10000	00	0.2846
38	3	35	37	4	34	225601.42690	0.10000	00	0.1210
38	4	35	37	3	34	225602.29970	0.10000	00	0.2499
39	3	37	38	3	36	226212.46940	0.10000	00	-0.1470
39	3	37	38	2	36	226212.46940	0.10000	00	-0.1553
39	2	37	38	2	36	226212.46940	0.10000	00	-0.1509
39	2	37	38	3	36	226212.46940	0.10000	00	-0.1426
40	2	39	39	2	38	226864.64520	0.10000	00	0.0896
40	2	39	39	1	38	226864.64520	0.10000	00	0.0895
40	1	39	39	2	38	226864.64520	0.10000	00	0.0896
40	1	39	39	1	38	226864.64520	0.10000	00	0.0895
41	0	41	40	0	40	227533.28730	0.10000	00	0.1324
41	1	41	40	1	40	227533.28730	0.10000	00	0.1324
41	0	41	40	1	40	227533.28730	0.10000	00	0.1324
41	1	41	40	0	40	227533.28730	0.10000	00	0.1324
38	4	34	37	5	33	230539.23360	0.10000	00	0.0006
38	5	34	37	4	33	230554.81370	0.10000	00	0.0583
39	4	36	38	3	35	231080.51500	0.10000	00	-0.0984
39	3	36	38	4	35	231080.51500	0.10000	00	0.3090
40	3	38	39	2	37	231647.57000	0.10000	10	-0.1829
40	2	38	39	2	37	231647.57000	0.10000	10	-0.1807
40	3	38	39	3	37	231647.57000	0.10000	10	-0.1788
40	2	38	39	3	37	231647.57000	0.10000	10	-0.1767
40	2	38	39	3	37	231696.23100	0.10000	00	0.1477
40	3	38	39	3	37	231696.23100	0.10000	00	0.1453
40	2	38	39	2	37	231696.23100	0.10000	00	0.1433
40	3	38	39	2	37	231696.23100	0.10000	00	0.1409
41	2	40	40	2	39	232320.98140	0.10000	10	-0.1802
41	2	40	40	1	39	232320.98140	0.10000	10	-0.1802
41	1	40	40	2	39	232320.98140	0.10000	10	-0.1802
41	1	40	40	1	39	232320.98140	0.10000	10	-0.1802
41	2	40	40	2	39	232349.80650	0.10000	00	0.1045
41	1	40	40	2	39	232349.80650	0.10000	00	0.1045
41	2	40	40	1	39	232349.80650	0.10000	00	0.1044
41	1	40	40	1	39	232349.80650	0.10000	00	0.1044
42	0	42	41	1	41	233012.19340	0.10000	10	0.0200
42	1	42	41	1	41	233012.19340	0.10000	10	0.0200
42	0	42	41	0	41	233012.19340	0.10000	10	0.0200

42	1	42	41	0	41	233012.19340	0.10000	10	0.0200
42	1	42	41	0	41	233018.88040	0.10000	00	0.0153
42	1	42	41	1	41	233018.94320	0.10000	00	0.0781
42	0	42	41	1	41	233018.94320	0.10000	00	0.0781
42	0	42	41	0	41	233018.94320	0.10000	00	0.0781
39	4	35	38	5	34	236009.89780	0.10000	00	-0.2146
39	5	35	38	4	34	236018.93770	0.10000	00	-0.0141
40	3	37	39	4	36	236559.46360	0.10000	00	0.2106
40	4	37	39	3	36	236559.46360	0.10000	00	-0.0116
40	4	37	39	4	36	236559.46370	0.10000	00	0.1324
40	3	37	39	3	36	236559.46370	0.10000	00	0.0668
41	2	39	40	3	38	237130.90690	0.10000	10	-0.2659
41	3	39	40	2	38	237130.90690	0.10000	10	-0.2691
41	2	39	40	2	38	237130.90690	0.10000	10	-0.2680
41	3	39	40	3	38	237130.90690	0.10000	10	-0.2670
41	2	39	40	2	38	237179.37090	0.10000	00	0.0334
41	3	39	40	3	38	237179.37090	0.10000	00	0.0345
41	3	39	40	2	38	237179.37090	0.10000	00	0.0322
41	2	39	40	3	38	237179.37090	0.10000	00	0.0358
42	2	41	41	1	40	237805.86400	0.10000	10	-0.2012
42	1	41	41	1	40	237805.86400	0.10000	10	-0.2012
42	1	41	41	2	40	237805.86400	0.10000	10	-0.2012
42	2	41	41	2	40	237805.86400	0.10000	10	-0.2012
42	2	41	41	1	40	237834.60810	0.10000	00	0.0956
42	2	41	41	2	40	237834.60810	0.10000	00	0.0956
42	1	41	41	1	40	237834.60810	0.10000	00	0.0956
42	1	41	41	2	40	237834.60810	0.10000	00	0.0956
43	0	43	42	1	42	238497.59780	0.10000	10	-0.0239
43	1	43	42	0	42	238497.59780	0.10000	10	-0.0239
43	0	43	42	0	42	238497.59780	0.10000	10	-0.0239
43	1	43	42	1	42	238497.59780	0.10000	10	-0.0239
43	1	43	42	1	42	238504.25260	0.10000	00	0.0331
43	0	43	42	0	42	238504.25260	0.10000	00	0.0331
43	0	43	42	1	42	238504.25260	0.10000	00	0.0331
43	1	43	42	0	42	238504.25260	0.10000	00	0.0331
40	4	36	39	5	35	241481.60150	0.10000	00	0.6243
40	5	36	39	4	35	241485.76060	0.10000	00	-0.2219
41	3	38	40	3	37	242038.70190	0.10000	00	0.2273
41	4	38	40	4	37	242038.70190	0.10000	00	0.2631
41	3	38	40	4	37	242038.70190	0.10000	00	0.3056
41	4	38	40	3	37	242038.70190	0.10000	00	0.1848
42	3	40	41	3	39	242662.48460	0.10000	00	0.1413
42	2	40	41	2	39	242662.48460	0.10000	00	0.1408
42	3	40	41	2	39	242662.48460	0.10000	00	0.1401
42	2	40	41	3	39	242662.48460	0.10000	00	0.1420
43	2	42	42	1	41	243290.51630	0.10000	10	-0.1029
43	1	42	42	2	41	243290.51630	0.10000	10	-0.1029
43	1	42	42	1	41	243290.51630	0.10000	10	-0.1029

43	2	42	42	2	41	243290.51630	0.10000	10	-0.1029
43	2	42	42	2	41	243319.02450	0.10000	00	0.0488
43	1	42	42	1	41	243319.02450	0.10000	00	0.0488
43	1	42	42	2	41	243319.02450	0.10000	00	0.0488
43	2	42	42	1	41	243319.02450	0.10000	00	0.0488
44	1	44	43	1	43	243982.71790	0.10000	10	0.0131
44	0	44	43	0	43	243982.71790	0.10000	10	0.0131
44	1	44	43	0	43	243982.71790	0.10000	10	0.0131
44	0	44	43	1	43	243982.71790	0.10000	10	0.0131
44	1	44	43	0	43	243989.27460	0.10000	00	0.0652
44	1	44	43	1	43	243989.27460	0.10000	00	0.0652
44	0	44	43	0	43	243989.27460	0.10000	00	0.0652
44	0	44	43	1	43	243989.27460	0.10000	00	0.0652
39	6	33	38	7	32	245627.86170	0.10000	00	0.0895
40	5	35	39	6	34	246480.17590	0.10000	00	-0.0497
40	6	35	39	5	34	246561.03590	0.10000	00	-0.0386
41	4	37	40	5	36	246952.04570	0.10000	00	-0.1153
41	5	37	40	4	36	246954.77330	0.10000	00	-0.2069
39	7	33	38	6	32	247150.20250	0.10000	00	-0.2207
42	3	39	41	3	38	247517.65960	0.10000	00	0.0347
42	4	39	41	3	38	247517.65960	0.10000	00	0.0117
42	3	39	41	4	38	247517.65960	0.10000	00	0.0771
42	4	39	41	4	38	247517.65960	0.10000	00	0.0542
43	3	41	42	3	40	248097.07110	0.10000	10	-0.1838
43	2	41	42	2	40	248097.07110	0.10000	10	-0.1841
43	3	41	42	2	40	248097.07110	0.10000	10	-0.1844
43	2	41	42	3	40	248097.07110	0.10000	10	-0.1835
43	2	41	42	3	40	248145.10650	0.10000	00	0.0235
43	2	41	42	2	40	248145.10650	0.10000	00	0.0228
43	3	41	42	3	40	248145.10650	0.10000	00	0.0231
43	3	41	42	2	40	248145.10650	0.10000	00	0.0225
44	1	43	43	1	42	248774.65430	0.10000	10	-0.1583
44	2	43	43	2	42	248774.65430	0.10000	10	-0.1583
44	1	43	43	2	42	248774.65430	0.10000	10	-0.1583
44	2	43	43	1	42	248774.65430	0.10000	10	-0.1583
44	1	43	43	1	42	248803.16510	0.10000	00	0.0842
44	1	43	43	2	42	248803.16510	0.10000	00	0.0842
44	2	43	43	2	42	248803.16510	0.10000	00	0.0842
44	2	43	43	1	42	248803.16510	0.10000	00	0.0842
45	0	45	44	1	44	249467.39060	0.10000	10	-0.0235
45	0	45	44	0	44	249467.39060	0.10000	10	-0.0235
45	1	45	44	1	44	249467.39060	0.10000	10	-0.0235
45	1	45	44	0	44	249467.39060	0.10000	10	-0.0235
45	0	45	44	1	44	249473.86850	0.10000	00	0.0421
45	1	45	44	0	44	249473.86850	0.10000	00	0.0421
45	1	45	44	1	44	249473.86850	0.10000	00	0.0421
45	0	45	44	0	44	249473.86850	0.10000	00	0.0421
40	6	34	39	7	33	251304.85210	0.10000	00	-0.0261

41	5	36	40	6	35	251947.21700	0.10000	00	-0.0801
41	6	36	40	5	35	251994.67220	0.10000	00	-0.0815
40	7	34	39	6	33	252254.14730	0.10000	00	-0.1694
42	4	38	41	5	37	252423.76750	0.10000	00	-0.0263
42	5	38	41	4	37	252425.35510	0.10000	00	-0.0188
43	3	40	42	4	39	252996.85500	0.10000	00	0.0958
43	3	40	42	3	39	252996.85500	0.10000	00	0.0729
43	4	40	42	4	39	252996.85500	0.10000	00	0.0835
43	4	40	42	3	39	252996.85500	0.10000	00	0.0606
44	3	42	43	3	41	253579.79430	0.10000	10	-0.0729
44	2	42	43	3	41	253579.79430	0.10000	10	-0.0727
44	3	42	43	2	41	253579.79430	0.10000	10	-0.0732
44	2	42	43	2	41	253579.79430	0.10000	10	-0.0730
44	2	42	43	2	41	253627.62330	0.10000	00	0.0875
44	2	42	43	3	41	253627.62330	0.10000	00	0.0878
44	3	42	43	2	41	253627.62330	0.10000	00	0.0873
44	3	42	43	3	41	253627.62330	0.10000	00	0.0876
45	1	44	44	2	43	254258.52530	0.10000	10	-0.1098
45	1	44	44	1	43	254258.52530	0.10000	10	-0.1098
45	2	44	44	1	43	254258.52530	0.10000	10	-0.1098
45	2	44	44	2	43	254258.52530	0.10000	10	-0.1098
45	1	44	44	1	43	254286.81360	0.10000	00	-0.0038
45	2	44	44	2	43	254286.81360	0.10000	00	-0.0038
45	2	44	44	1	43	254286.81360	0.10000	00	-0.0038
45	1	44	44	2	43	254286.81360	0.10000	00	-0.0038
46	1	46	45	0	45	254951.72460	0.10000	10	-0.0165
46	0	46	45	0	45	254951.72460	0.10000	10	-0.0165
46	1	46	45	1	45	254951.72460	0.10000	10	-0.0165
46	0	46	45	1	45	254951.72460	0.10000	10	-0.0165
46	0	46	45	0	45	254958.10510	0.10000	00	0.0431
46	1	46	45	0	45	254958.10510	0.10000	00	0.0431
46	0	46	45	1	45	254958.10510	0.10000	00	0.0431
46	1	46	45	1	45	254958.10510	0.10000	00	0.0431
41	6	35	40	7	34	256890.23500	0.10000	00	-0.1190
42	5	37	41	6	36	257410.78920	0.10000	00	-0.0410
42	6	37	41	5	36	257438.36160	0.10000	00	-0.1363
41	7	35	40	6	34	257475.93360	0.10000	00	-0.1178
43	4	39	42	5	38	257896.18020	0.10000	00	0.2854
43	5	39	42	4	38	257896.18020	0.10000	00	-0.5961
44	4	41	43	3	40	258475.90380	0.10000	00	0.0076
44	4	41	43	4	40	258475.90380	0.10000	00	0.0199
44	3	41	43	3	40	258475.90380	0.10000	00	0.0142
44	3	41	43	4	40	258475.90380	0.10000	00	0.0265
45	2	43	44	2	42	259062.09600	0.10000	10	-0.0718
45	2	43	44	3	42	259062.09600	0.10000	10	-0.0716
45	3	43	44	3	42	259062.09600	0.10000	10	-0.0717
45	3	43	44	2	42	259062.09600	0.10000	10	-0.0719
45	2	43	44	2	42	259109.78190	0.10000	00	0.1012

45	3	43	44	2	42	259109.78190	0.10000	00	0.1011
45	3	43	44	3	42	259109.78190	0.10000	00	0.1012
45	2	43	44	3	42	259109.78190	0.10000	00	0.1013
46	1	45	45	1	44	259741.89500	0.10000	10	-0.1812
46	2	45	45	2	44	259741.89500	0.10000	10	-0.1812
46	1	45	45	2	44	259741.89500	0.10000	10	-0.1812
46	2	45	45	1	44	259741.89500	0.10000	10	-0.1812
46	2	45	45	2	44	259770.28990	0.10000	00	0.1149
46	1	45	45	2	44	259770.28990	0.10000	00	0.1149
46	1	45	45	1	44	259770.28990	0.10000	00	0.1149
46	2	45	45	1	44	259770.28990	0.10000	00	0.1149
47	0	47	46	0	46	260435.73910	0.10000	10	0.0617
47	0	47	46	1	46	260435.73910	0.10000	10	0.0617
47	1	47	46	1	46	260435.73910	0.10000	10	0.0617
47	1	47	46	0	46	260435.73910	0.10000	10	0.0617
47	0	47	46	0	46	260442.01260	0.10000	00	0.1051
47	1	47	46	0	46	260442.01260	0.10000	00	0.1051
47	1	47	46	1	46	260442.01260	0.10000	00	0.1051
47	0	47	46	1	46	260442.01260	0.10000	00	0.1051
42	6	36	41	7	35	262418.24960	0.10000	00	-0.1004
42	7	36	41	6	35	262775.79920	0.10000	00	-0.3746
43	5	38	42	6	37	262873.10830	0.10000	00	0.1348
43	6	38	42	5	37	262888.86830	0.10000	00	-0.1345
44	4	40	43	5	39	263368.56570	0.10000	00	0.1400
44	5	40	43	4	39	263368.56570	0.10000	00	-0.3496
45	4	42	44	3	41	263954.88290	0.10000	00	-0.0190
45	3	42	44	4	41	263954.88290	0.10000	00	-0.0088
45	4	42	44	4	41	263954.88290	0.10000	00	-0.0124
45	3	42	44	3	41	263954.88290	0.10000	00	-0.0154
46	2	44	45	3	43	264543.92590	0.10000	10	-0.2128
46	2	44	45	2	43	264543.92590	0.10000	10	-0.2128
46	3	44	45	2	43	264543.92590	0.10000	10	-0.2129
46	3	44	45	3	43	264543.92590	0.10000	10	-0.2128
46	3	44	45	3	43	264591.53180	0.10000	00	0.0315
46	3	44	45	2	43	264591.53180	0.10000	00	0.0314
46	2	44	45	3	43	264591.53180	0.10000	00	0.0315
46	2	44	45	2	43	264591.53180	0.10000	00	0.0314
47	1	46	46	1	45	265224.87380	0.10000	10	-0.2522
47	2	46	46	1	45	265224.87380	0.10000	10	-0.2522
47	1	46	46	2	45	265224.87380	0.10000	10	-0.2522
47	2	46	46	2	45	265224.87380	0.10000	10	-0.2522
47	1	46	46	2	45	265253.27300	0.10000	00	0.1295
47	2	46	46	2	45	265253.27300	0.10000	00	0.1295
47	2	46	46	1	45	265253.27300	0.10000	00	0.1295
47	1	46	46	1	45	265253.27300	0.10000	00	0.1295
48	1	48	47	0	47	265919.08270	0.10000	10	-0.1316
48	0	48	47	0	47	265919.08270	0.10000	10	-0.1316
48	0	48	47	1	47	265919.08270	0.10000	10	-0.1316

48	1	48	47	1	47	265919.08270	0.10000	10	-0.1316
48	1	48	47	1	47	265925.43310	0.10000	00	0.0787
48	1	48	47	0	47	265925.43310	0.10000	00	0.0787
48	0	48	47	1	47	265925.43310	0.10000	00	0.0787
48	0	48	47	0	47	265925.43310	0.10000	00	0.0787
43	6	37	42	7	36	267911.20340	0.10000	00	-0.1588
43	7	37	42	6	36	268127.82100	0.10000	00	-0.2256
44	5	39	43	6	38	268335.02700	0.10000	00	0.1116
44	6	39	43	5	38	268344.00050	0.10000	00	-0.1470
45	4	41	44	4	40	268841.40380	0.10000	00	-0.0921
45	4	41	44	5	40	268841.40380	0.10000	00	0.0825
45	5	41	44	5	40	268841.40380	0.10000	00	-0.0138
45	5	41	44	4	40	268841.40380	0.10000	00	-0.1884
45	5	41	44	5	40	268841.41880	0.10000	00	0.0012
45	4	41	44	4	40	268841.41880	0.10000	00	-0.0771
46	4	43	45	3	42	269433.79090	0.10000	00	0.0240
46	3	43	45	3	42	269433.79090	0.10000	00	0.0259
46	3	43	45	4	42	269433.79090	0.10000	00	0.0295
46	4	43	45	4	42	269433.79090	0.10000	00	0.0276
47	2	45	46	3	44	270025.63460	0.10000	10	-0.1288
47	3	45	46	2	44	270025.63460	0.10000	10	-0.1288
47	3	45	46	3	44	270025.63460	0.10000	10	-0.1288
47	2	45	46	2	44	270025.63460	0.10000	10	-0.1288
47	2	45	46	2	44	270073.01960	0.10000	00	0.0417
47	3	45	46	2	44	270073.01960	0.10000	00	0.0417
47	3	45	46	3	44	270073.01960	0.10000	00	0.0418
47	2	45	46	3	44	270073.01960	0.10000	00	0.0418
48	1	47	47	1	46	270707.63510	0.10000	10	-0.1395
48	1	47	47	2	46	270707.63510	0.10000	10	-0.1395
48	2	47	47	1	46	270707.63510	0.10000	10	-0.1395
48	2	47	47	2	46	270707.63510	0.10000	10	-0.1395
48	1	47	47	1	46	270735.69950	0.10000	00	-0.0137
48	2	47	47	1	46	270735.69950	0.10000	00	-0.0137
48	2	47	47	2	46	270735.69950	0.10000	00	-0.0137
48	1	47	47	2	46	270735.69950	0.10000	00	-0.0137
49	0	49	48	0	48	271402.24070	0.10000	10	-0.1026
49	1	49	48	0	48	271402.24070	0.10000	10	-0.1026
49	1	49	48	1	48	271402.24070	0.10000	10	-0.1026
49	0	49	48	1	48	271402.24070	0.10000	10	-0.1026
49	1	49	48	0	48	271408.01840	0.10000	00	-0.3760
49	0	49	48	1	48	271408.01840	0.10000	00	-0.3760
49	1	49	48	1	48	271408.01840	0.10000	00	-0.3760
49	0	49	48	0	48	271408.01840	0.10000	00	-0.3760
44	6	38	43	7	37	273383.72830	0.10000	00	-0.1237
44	7	38	43	6	37	273513.83790	0.10000	00	-0.1698
45	5	40	44	6	39	273797.26310	0.10000	00	-0.0057
45	6	40	44	5	39	273802.49630	0.10000	00	-0.0605
46	4	42	45	4	41	274314.56850	0.10000	00	-0.0343

46	5	42	45	4	41	274314.56850	0.10000	00	-0.0873
46	4	42	45	5	41	274314.56850	0.10000	00	0.0620
46	5	42	45	5	41	274314.56850	0.10000	00	0.0091
47	3	44	46	4	43	274912.44220	0.10000	00	-0.0070
47	4	44	46	3	43	274912.44220	0.10000	00	-0.0099
47	4	44	46	4	43	274912.44220	0.10000	00	-0.0080
47	3	44	46	3	43	274912.44220	0.10000	00	-0.0089
48	3	46	47	3	45	275506.95490	0.10000	10	-0.0711
48	2	46	47	3	45	275506.95490	0.10000	10	-0.0711
48	2	46	47	2	45	275506.95490	0.10000	10	-0.0711
48	3	46	47	2	45	275506.95490	0.10000	10	-0.0711
48	3	46	47	3	45	275554.13150	0.10000	00	0.0342
48	2	46	47	3	45	275554.13150	0.10000	00	0.0342
48	2	46	47	2	45	275554.13150	0.10000	00	0.0342
48	3	46	47	2	45	275554.13150	0.10000	00	0.0341
49	2	48	48	1	47	276189.92320	0.10000	10	-0.0890
49	1	48	48	2	47	276189.92320	0.10000	10	-0.0890
49	1	48	48	1	47	276189.92320	0.10000	10	-0.0890
49	2	48	48	2	47	276189.92320	0.10000	10	-0.0890
49	2	48	48	2	47	276217.89660	0.10000	00	0.0224
49	1	48	48	2	47	276217.89660	0.10000	00	0.0224
49	2	48	48	1	47	276217.89660	0.10000	00	0.0224
49	1	48	48	1	47	276217.89660	0.10000	00	0.0224
50	0	50	49	0	49	276885.08140	0.10000	10	0.0252
50	1	50	49	1	49	276885.08140	0.10000	10	0.0252
50	0	50	49	1	49	276885.08140	0.10000	10	0.0252
50	1	50	49	0	49	276885.08140	0.10000	10	0.0252
50	0	50	49	1	49	276890.89590	0.10000	00	-0.1229
50	0	50	49	0	49	276890.89590	0.10000	00	-0.1229
50	1	50	49	1	49	276890.89590	0.10000	00	-0.1229
50	1	50	49	0	49	276890.89590	0.10000	00	-0.1229
45	6	39	44	7	38	278844.65820	0.10000	00	-0.2394
45	7	39	44	6	38	278922.34330	0.10000	00	-0.1516
46	5	41	45	6	40	279260.13750	0.10000	00	-0.1729
46	6	41	45	5	40	279263.14420	0.10000	00	-0.1795
47	5	43	46	5	42	279787.82910	0.10000	00	-0.1048
47	4	43	46	4	42	279787.82910	0.10000	00	-0.1288
47	4	43	46	5	42	279787.82910	0.10000	00	-0.0758
47	5	43	46	4	42	279787.82910	0.10000	00	-0.1578
48	3	45	47	4	44	280390.81740	0.10000	00	-0.1037
48	3	45	47	3	44	280390.81740	0.10000	00	-0.1047
48	4	45	47	4	44	280390.81740	0.10000	00	-0.1042
48	4	45	47	3	44	280390.81740	0.10000	00	-0.1052
49	3	47	48	3	46	280987.73530	0.10000	10	-0.1765
49	2	47	48	3	46	280987.73530	0.10000	10	-0.1765
49	3	47	48	2	46	280987.73530	0.10000	10	-0.1765
49	2	47	48	2	46	280987.73530	0.10000	10	-0.1765
49	2	47	48	2	46	281034.83080	0.10000	00	-0.0130

49	3	47	48	2	46	281034.83080	0.10000	00	-0.0130
49	3	47	48	3	46	281034.83080	0.10000	00	-0.0130
49	2	47	48	3	46	281034.83080	0.10000	00	-0.0130
50	1	49	49	1	48	281671.73010	0.10000	10	-0.0994
50	1	49	49	2	48	281671.73010	0.10000	10	-0.0994
50	2	49	49	1	48	281671.73010	0.10000	10	-0.0994
50	2	49	49	2	48	281671.73010	0.10000	10	-0.0994
50	2	49	49	2	48	281699.71250	0.10000	00	0.0955
50	2	49	49	1	48	281699.71250	0.10000	00	0.0955
50	1	49	49	2	48	281699.71250	0.10000	00	0.0955
50	1	49	49	1	48	281699.71250	0.10000	00	0.0955
51	0	51	50	1	50	282373.17880	0.10000	00	-0.0405
51	0	51	50	0	50	282373.17880	0.10000	00	-0.0405
51	1	51	50	0	50	282373.17880	0.10000	00	-0.0405
51	1	51	50	1	50	282373.17880	0.10000	00	-0.0405
45	7	38	44	8	37	283770.41070	0.10000	00	-0.2140
46	6	40	45	7	39	284299.87580	0.10000	00	-0.1816
46	7	40	45	6	39	284345.86300	0.10000	00	-0.1367
47	5	42	46	6	41	284723.90150	0.10000	00	-0.2249
47	6	42	46	5	41	284725.75670	0.10000	00	-0.0785
48	4	44	47	5	43	285261.45600	0.10000	00	0.0124
48	5	44	47	5	43	285261.45600	0.10000	00	-0.0034
48	4	44	47	4	43	285261.45600	0.10000	00	-0.0166
48	5	44	47	4	43	285261.45600	0.10000	00	-0.0324
49	4	46	48	3	45	285869.12840	0.10000	00	-0.0187
49	3	46	48	3	45	285869.12840	0.10000	00	-0.0185
49	4	46	48	4	45	285869.12840	0.10000	00	-0.0182
49	3	46	48	4	45	285869.12840	0.10000	00	-0.0179
50	2	48	49	2	47	286468.29230	0.10000	10	-0.1142
50	3	48	49	3	47	286468.29230	0.10000	10	-0.1142
50	2	48	49	3	47	286468.29230	0.10000	10	-0.1142
50	3	48	49	2	47	286468.29230	0.10000	10	-0.1143
50	3	48	49	2	47	286515.23170	0.10000	00	0.0286
50	3	48	49	3	47	286515.23170	0.10000	00	0.0286
50	2	48	49	3	47	286515.23170	0.10000	00	0.0286
51	2	50	50	2	49	287153.05570	0.10000	10	-0.1611
51	1	50	50	1	49	287153.05570	0.10000	10	-0.1611
51	1	50	50	2	49	287153.05570	0.10000	10	-0.1611
51	2	50	50	1	49	287153.05570	0.10000	10	-0.1611
51	1	50	50	2	49	287180.98920	0.10000	00	0.0571
51	2	50	50	2	49	287180.98920	0.10000	00	0.0571
51	2	50	50	1	49	287180.98920	0.10000	00	0.0571
51	1	50	50	1	49	287180.98920	0.10000	00	0.0571
52	0	52	51	1	51	287855.05140	0.10000	00	0.0640
52	0	52	51	0	51	287855.05140	0.10000	00	0.0640
52	1	52	51	0	51	287855.05140	0.10000	00	0.0640
52	1	52	51	1	51	287855.05140	0.10000	00	0.0640
46	7	39	45	8	38	289323.66960	0.10000	00	-0.1147

47	6	41	46	7	40	289752.44020	0.10000	00	-0.1980
47	7	41	46	6	40	289779.51170	0.10000	00	-0.1516
48	6	43	47	5	42	290189.05020	0.10000	00	-0.6142
48	5	43	47	6	42	290189.06240	0.10000	00	0.3626
49	5	45	48	4	44	290734.95720	0.10000	00	-0.1220
49	4	45	48	4	44	290734.95720	0.10000	00	-0.1134
49	4	45	48	5	44	290734.95720	0.10000	00	-0.0976
49	5	45	48	5	44	290734.95720	0.10000	00	-0.1062
50	4	47	49	3	46	291347.05320	0.10000	00	-0.0440
50	3	47	49	3	46	291347.05320	0.10000	00	-0.0438
50	4	47	49	4	46	291347.05320	0.10000	00	-0.0437
50	3	47	49	4	46	291347.05320	0.10000	00	-0.0436
51	3	49	50	3	48	291948.40020	0.10000	10	-0.0966
51	2	49	50	2	48	291948.40020	0.10000	10	-0.0966
51	2	49	50	3	48	291948.40020	0.10000	10	-0.0966
51	3	49	50	2	48	291948.40020	0.10000	10	-0.0966
51	2	49	50	2	48	291995.13910	0.10000	00	-0.0224
51	3	49	50	3	48	291995.13910	0.10000	00	-0.0224
51	2	49	50	3	48	291995.13910	0.10000	00	-0.0224
51	3	49	50	2	48	291995.13910	0.10000	00	-0.0224
52	1	51	51	2	50	292634.09130	0.10000	10	-0.0736
52	2	51	51	1	50	292634.09130	0.10000	10	-0.0736
52	1	51	51	1	50	292634.09130	0.10000	10	-0.0736
52	2	51	51	2	50	292634.09130	0.10000	10	-0.0736
52	1	51	51	2	50	292661.82170	0.10000	00	0.0115
52	2	51	51	2	50	292661.82170	0.10000	00	0.0115
52	1	51	51	1	50	292661.82170	0.10000	00	0.0115
52	2	51	51	1	50	292661.82170	0.10000	00	0.0115
53	0	53	52	1	52	293330.64690	0.10000	10	0.0346
53	1	53	52	0	52	293330.64690	0.10000	10	0.0346
53	0	53	52	0	52	293330.64690	0.10000	10	0.0346
53	1	53	52	1	52	293330.64690	0.10000	10	0.0346
53	0	53	52	1	52	293336.33030	0.10000	00	0.0157
53	1	53	52	1	52	293336.33030	0.10000	00	0.0157
53	1	53	52	0	52	293336.33030	0.10000	00	0.0157
53	0	53	52	0	52	293336.33030	0.10000	00	0.0157
47	7	40	46	8	39	294826.99900	0.10000	00	-0.2640
48	6	42	47	7	41	295204.58300	0.10000	00	0.0470
48	7	42	47	6	41	295220.01530	0.10000	00	-0.3221
49	6	44	48	5	43	295654.02640	0.10000	00	-0.4767
49	5	44	48	6	43	295654.02640	0.10000	00	0.0654
50	5	46	49	5	45	296208.55420	0.10000	00	-0.1269
50	5	46	49	4	45	296208.55420	0.10000	00	-0.1356
50	4	46	49	4	45	296208.55420	0.10000	00	-0.1309
50	4	46	49	5	45	296208.55420	0.10000	00	-0.1223
51	3	48	50	3	47	296824.68220	0.10000	00	-0.0645
51	4	48	50	4	47	296824.68220	0.10000	00	-0.0644
51	3	48	50	4	47	296824.68220	0.10000	00	-0.0643

51	4	48	50	3	47	296824.68220	0.10000	00	-0.0645
52	2	50	51	3	49	297428.04720	0.10000	10	-0.1225
52	3	50	51	3	49	297428.04720	0.10000	10	-0.1225
52	2	50	51	2	49	297428.04720	0.10000	10	-0.1225
52	3	50	51	2	49	297428.04720	0.10000	10	-0.1225
52	3	50	51	2	49	297474.68390	0.10000	00	-0.0223
52	2	50	51	2	49	297474.68390	0.10000	00	-0.0223
52	2	50	51	3	49	297474.68390	0.10000	00	-0.0223
52	3	50	51	3	49	297474.68390	0.10000	00	-0.0223
53	1	52	52	1	51	298114.58920	0.10000	10	-0.0754
53	2	52	52	1	51	298114.58920	0.10000	10	-0.0754
53	2	52	52	2	51	298114.58920	0.10000	10	-0.0754
53	1	52	52	2	51	298114.58920	0.10000	10	-0.0754
53	2	52	52	2	51	298142.25750	0.10000	00	0.0155
53	1	52	52	1	51	298142.25750	0.10000	00	0.0155
53	2	52	52	1	51	298142.25750	0.10000	00	0.0155
53	1	52	52	2	51	298142.25750	0.10000	00	0.0155
54	0	54	53	1	53	298811.60140	0.10000	10	0.0260
54	1	54	53	0	53	298811.60140	0.10000	10	0.0260
54	0	54	53	0	53	298811.60140	0.10000	10	0.0260
54	1	54	53	1	53	298811.60140	0.10000	10	0.0260
54	1	54	53	0	53	298817.23090	0.10000	00	0.0384
54	0	54	53	1	53	298817.23090	0.10000	00	0.0384
54	0	54	53	0	53	298817.23090	0.10000	00	0.0384
54	1	54	53	1	53	298817.23090	0.10000	00	0.0384
48	7	41	47	8	40	300300.61760	0.10000	00	-0.2225
48	8	41	47	7	40	300499.84310	0.10000	00	-0.2444
49	6	43	48	7	42	300656.58220	0.10000	00	-0.1988
49	7	43	48	6	42	300665.77580	0.10000	00	-0.1919
50	5	45	49	6	44	301119.81360	0.10000	00	-0.0034
50	5	45	49	5	44	301119.81360	0.10000	00	-0.1981
50	6	45	49	6	44	301119.81360	0.10000	00	-0.1121
50	6	45	49	5	44	301119.81360	0.10000	00	-0.3068
51	5	47	50	5	46	301682.12150	0.10000	00	-0.1335
51	4	47	50	4	46	301682.12150	0.10000	00	-0.1357
51	5	47	50	4	46	301682.12150	0.10000	00	-0.1382
51	4	47	50	5	46	301682.12150	0.10000	00	-0.1310
52	4	49	51	4	48	302302.01500	0.10000	00	-0.0568
52	3	49	51	3	48	302302.01500	0.10000	00	-0.0568
52	3	49	51	4	48	302302.01500	0.10000	00	-0.0567
52	4	49	51	3	48	302302.01500	0.10000	00	-0.0568
53	2	51	52	3	50	302907.27860	0.10000	10	-0.1342
53	3	51	52	3	50	302907.27860	0.10000	10	-0.1342
53	3	51	52	2	50	302907.27860	0.10000	10	-0.1342
53	2	51	52	2	50	302907.27860	0.10000	10	-0.1342
53	2	51	52	3	50	302953.78290	0.10000	00	-0.0416
53	3	51	52	2	50	302953.78290	0.10000	00	-0.0416
53	3	51	52	3	50	302953.78290	0.10000	00	-0.0416

53	2	51	52	2	50	302953.78290	0.10000	00	-0.0416
54	2	53	53	2	52	303594.62530	0.10000	10	-0.0814
54	1	53	53	2	52	303594.62530	0.10000	10	-0.0814
54	1	53	53	1	52	303594.62530	0.10000	10	-0.0814
54	2	53	53	1	52	303594.62530	0.10000	10	-0.0814
54	2	53	53	2	52	303622.25090	0.10000	00	0.0325
54	1	53	53	2	52	303622.25090	0.10000	00	0.0325
54	2	53	53	1	52	303622.25090	0.10000	00	0.0325
54	1	53	53	1	52	303622.25090	0.10000	00	0.0325
55	1	55	54	0	54	304292.15540	0.10000	10	0.0753
55	1	55	54	1	54	304292.15540	0.10000	10	0.0753
55	0	55	54	1	54	304292.15540	0.10000	10	0.0753
55	0	55	54	0	54	304292.15540	0.10000	10	0.0753
55	1	55	54	0	54	304297.61220	0.10000	00	-0.0004
55	0	55	54	0	54	304297.61220	0.10000	00	-0.0004
55	1	55	54	1	54	304297.61220	0.10000	00	-0.0004
55	0	55	54	1	54	304297.61220	0.10000	00	-0.0004
49	7	42	48	8	41	305757.06680	0.10000	00	-0.1292
49	8	42	48	7	41	305877.31740	0.10000	00	-0.3308
51	5	46	50	5	45	306586.14700	0.10000	00	-0.1295
51	6	46	50	5	45	306586.14700	0.10000	00	-0.1900
51	6	46	50	6	45	306586.14700	0.10000	00	-0.0812
51	5	46	50	6	45	306586.14700	0.10000	00	-0.0208
52	5	48	51	5	47	307155.62000	0.10000	00	-0.1134
52	4	48	51	4	47	307155.62000	0.10000	00	-0.1146
52	4	48	51	5	47	307155.62000	0.10000	00	-0.1121
52	5	48	51	4	47	307155.62000	0.10000	00	-0.1159
53	3	50	52	4	49	307778.98690	0.10000	00	-0.0634
53	4	50	52	4	49	307778.98690	0.10000	00	-0.0634
53	4	50	52	3	49	307778.98690	0.10000	00	-0.0634
53	3	50	52	3	49	307778.98690	0.10000	00	-0.0634
54	2	52	53	3	51	308386.11650	0.10000	10	-0.0975
54	3	52	53	3	51	308386.11650	0.10000	10	-0.0975
54	3	52	53	2	51	308386.11650	0.10000	10	-0.0975
54	2	52	53	2	51	308386.11650	0.10000	10	-0.0975
54	2	52	53	3	51	308432.53850	0.10000	00	0.0341
54	3	52	53	3	51	308432.53850	0.10000	00	0.0341
54	2	52	53	2	51	308432.53850	0.10000	00	0.0341
54	3	52	53	2	51	308432.53850	0.10000	00	0.0341
55	1	54	54	2	53	309074.17550	0.10000	10	-0.1067
55	2	54	54	1	53	309074.17550	0.10000	10	-0.1067
55	1	54	54	1	53	309074.17550	0.10000	10	-0.1067
55	2	54	54	2	53	309074.17550	0.10000	10	-0.1067
55	1	54	54	2	53	309101.74060	0.10000	00	0.0103
55	2	54	54	1	53	309101.74060	0.10000	00	0.0103
55	2	54	54	2	53	309101.74060	0.10000	00	0.0103
55	1	54	54	1	53	309101.74060	0.10000	00	0.0103
56	0	56	55	0	55	309772.13270	0.10000	10	0.0150

56	1	56	55	0	55	309772.13270	0.10000	10	0.0150
56	0	56	55	1	55	309772.13270	0.10000	10	0.0150
56	1	56	55	1	55	309772.13270	0.10000	10	0.0150
56	0	56	55	0	55	309777.54260	0.10000	00	-0.0239
56	0	56	55	1	55	309777.54260	0.10000	00	-0.0239
56	1	56	55	1	55	309777.54260	0.10000	00	-0.0239
56	1	56	55	0	55	309777.54260	0.10000	00	-0.0239
50	7	43	49	8	42	311204.01440	0.10000	00	-0.2559
50	8	43	49	7	42	311276.44660	0.10000	00	-0.1273
51	6	45	50	7	44	311563.86400	0.10000	00	-0.1886
51	7	45	50	6	44	311566.92830	0.10000	00	-0.1811
52	6	47	51	5	46	312052.76670	0.10000	00	-0.2418
52	5	47	51	6	46	312052.76670	0.10000	00	-0.1478
52	5	47	51	5	46	312052.76670	0.10000	00	-0.2083
52	6	47	51	6	46	312052.76670	0.10000	00	-0.1814
53	5	49	52	5	48	312628.90530	0.10000	00	-0.1645
53	5	49	52	4	48	312628.90530	0.10000	00	-0.1658
53	4	49	52	5	48	312628.90530	0.10000	00	-0.1637
53	4	49	52	4	48	312628.90530	0.10000	00	-0.1651
54	3	51	53	3	50	313255.58910	0.10000	00	-0.0724
54	3	51	53	4	50	313255.58910	0.10000	00	-0.0724
54	4	51	53	3	50	313255.58910	0.10000	00	-0.0724
54	4	51	53	4	50	313255.58910	0.10000	00	-0.0724
55	3	53	54	2	52	313864.44000	0.10000	10	-0.1217
55	2	53	54	3	52	313864.44000	0.10000	10	-0.1217
55	2	53	54	2	52	313864.44000	0.10000	10	-0.1217
55	3	53	54	3	52	313864.44000	0.10000	10	-0.1217
55	2	53	54	3	52	313910.71740	0.10000	00	-0.0167
55	3	53	54	2	52	313910.71740	0.10000	00	-0.0167
55	2	53	54	2	52	313910.71740	0.10000	00	-0.0167
55	3	53	54	3	52	313910.71740	0.10000	00	-0.0167
56	2	55	55	2	54	314553.27930	0.10000	10	-0.1028
56	2	55	55	1	54	314553.27930	0.10000	10	-0.1028
56	1	55	55	1	54	314553.27930	0.10000	10	-0.1028
56	1	55	55	2	54	314553.27930	0.10000	10	-0.1028
56	2	55	55	2	54	314580.78970	0.10000	00	0.0210
56	2	55	55	1	54	314580.78970	0.10000	00	0.0210
56	1	55	55	1	54	314580.78970	0.10000	00	0.0210
56	1	55	55	2	54	314580.78970	0.10000	00	0.0210
57	1	57	56	1	56	315251.74860	0.10000	10	0.0686
57	0	57	56	1	56	315251.74860	0.10000	10	0.0686
57	1	57	56	0	56	315251.74860	0.10000	10	0.0686
57	0	57	56	0	56	315251.74860	0.10000	10	0.0686
57	0	57	56	0	56	315257.03980	0.10000	00	-0.0060
57	1	57	56	0	56	315257.03980	0.10000	00	-0.0060
57	1	57	56	1	56	315257.03980	0.10000	00	-0.0060
57	0	57	56	1	56	315257.03980	0.10000	00	-0.0060
51	7	44	50	8	43	316646.74660	0.10000	00	-0.1588

51	8	44	50	7	43	316689.67950	0.10000	00	-0.3418
52	6	46	51	7	45	317019.04120	0.10000	00	-0.2811
52	7	46	51	6	45	317020.86180	0.10000	00	-0.2111
53	5	48	52	6	47	317519.80850	0.10000	00	-0.1555
53	6	48	52	5	47	317519.80850	0.10000	00	-0.2075
53	6	48	52	6	47	317519.80850	0.10000	00	-0.1740
53	5	48	52	5	47	317519.80850	0.10000	00	-0.1890
54	4	50	53	4	49	318102.12870	0.10000	00	-0.0937
54	5	50	53	5	49	318102.12870	0.10000	00	-0.0934
54	4	50	53	5	49	318102.12870	0.10000	00	-0.0930
54	5	50	53	4	49	318102.12870	0.10000	00	-0.0941
55	3	52	54	3	51	318731.82340	0.10000	00	-0.0627
55	4	52	54	3	51	318731.82340	0.10000	00	-0.0627
55	4	52	54	4	51	318731.82340	0.10000	00	-0.0627
55	3	52	54	4	51	318731.82340	0.10000	00	-0.0627
56	2	54	55	3	53	319342.33970	0.10000	10	-0.1050
56	3	54	55	3	53	319342.33970	0.10000	10	-0.1050
56	2	54	55	2	53	319342.33970	0.10000	10	-0.1050
56	3	54	55	2	53	319342.33970	0.10000	10	-0.1050
56	2	54	55	3	53	319388.48830	0.10000	00	-0.0140
56	2	54	55	2	53	319388.48830	0.10000	00	-0.0140
56	3	54	55	2	53	319388.48830	0.10000	00	-0.0140
56	3	54	55	3	53	319388.48830	0.10000	00	-0.0140
57	1	56	56	1	55	320031.89440	0.10000	10	-0.1030
57	2	56	56	2	55	320031.89440	0.10000	10	-0.1030
57	2	56	56	1	55	320031.89440	0.10000	10	-0.1030
57	1	56	56	2	55	320031.89440	0.10000	10	-0.1030
57	1	56	56	2	55	320059.28190	0.10000	00	-0.0427
57	1	56	56	1	55	320059.28190	0.10000	00	-0.0427
57	2	56	56	1	55	320059.28190	0.10000	00	-0.0427
57	2	56	56	2	55	320059.28190	0.10000	00	-0.0427
58	0	58	57	0	57	320730.83300	0.10000	10	0.0745
58	1	58	57	1	57	320730.83300	0.10000	10	0.0745
58	1	58	57	0	57	320730.83300	0.10000	10	0.0745
58	0	58	57	1	57	320730.83300	0.10000	10	0.0745
58	0	58	57	1	57	320735.86010	0.10000	00	-0.1820
58	0	58	57	0	57	320735.86010	0.10000	00	-0.1820
58	1	58	57	0	57	320735.86010	0.10000	00	-0.1820
58	1	58	57	1	57	320735.86010	0.10000	00	-0.1820
52	7	45	51	8	44	322087.66820	0.10000	00	-0.2949
52	8	45	51	7	44	322113.24220	0.10000	00	-0.2731
53	6	47	52	7	46	322475.43470	0.10000	00	-0.2025
53	7	47	52	6	46	322476.43640	0.10000	00	-0.1988
54	5	49	53	5	48	322987.10840	0.10000	00	-0.1401
54	6	49	53	6	48	322987.10840	0.10000	00	-0.1318
54	6	49	53	5	48	322987.10840	0.10000	00	-0.1503
54	5	49	53	6	48	322987.10840	0.10000	00	-0.1216
55	5	51	54	4	50	323575.00850	0.10000	00	-0.1441

55	4	51	54	5	50	323575.00850	0.10000	00	-0.1435
55	4	51	54	4	50	323575.00850	0.10000	00	-0.1439
55	5	51	54	5	50	323575.00850	0.10000	00	-0.1437
56	3	53	55	4	52	324207.57800	0.10000	00	-0.1280
56	4	53	55	3	52	324207.57800	0.10000	00	-0.1280
56	3	53	55	3	52	324207.57800	0.10000	00	-0.1280
56	4	53	55	4	52	324207.57800	0.10000	00	-0.1280
57	3	55	56	2	54	324819.76000	0.10000	10	-0.0918
57	2	55	56	2	54	324819.76000	0.10000	10	-0.0918
57	3	55	56	3	54	324819.76000	0.10000	10	-0.0918
57	2	55	56	3	54	324819.76000	0.10000	10	-0.0918
57	2	55	56	2	54	324865.75860	0.10000	00	-0.0393
57	3	55	56	3	54	324865.75860	0.10000	00	-0.0393
57	2	55	56	3	54	324865.75860	0.10000	00	-0.0393
57	3	55	56	2	54	324865.75860	0.10000	00	-0.0393
58	1	57	57	1	56	325510.01870	0.10000	10	-0.1005
58	2	57	57	2	56	325510.01870	0.10000	10	-0.1005
58	1	57	57	2	56	325510.01870	0.10000	10	-0.1005
58	2	57	57	1	56	325510.01870	0.10000	10	-0.1005
58	2	57	57	1	56	325537.39210	0.10000	00	0.0031
58	1	57	57	1	56	325537.39210	0.10000	00	0.0031
58	2	57	57	2	56	325537.39210	0.10000	00	0.0031
58	1	57	57	2	56	325537.39210	0.10000	00	0.0031
59	1	59	58	1	58	326209.43370	0.10000	10	0.0888
59	1	59	58	0	58	326209.43370	0.10000	10	0.0888
59	0	59	58	0	58	326209.43370	0.10000	10	0.0888
59	0	59	58	1	58	326209.43370	0.10000	10	0.0888
59	1	59	58	0	58	326214.56260	0.10000	00	0.0156
59	0	59	58	1	58	326214.56260	0.10000	00	0.0156
59	1	59	58	1	58	326214.56260	0.10000	00	0.0156
59	0	59	58	0	58	326214.56260	0.10000	00	0.0156
53	7	46	52	8	45	327528.70890	0.10000	00	-0.3539
53	8	46	52	7	45	327543.84170	0.10000	00	-0.2768
54	6	48	53	7	47	327932.90860	0.10000	00	0.0127
54	7	48	53	6	47	327932.90860	0.10000	00	-0.5538
55	6	50	54	5	49	328454.45540	0.10000	00	-0.1943
55	5	50	54	5	49	328454.45540	0.10000	00	-0.1887
55	6	50	54	6	49	328454.45540	0.10000	00	-0.1841
55	5	50	54	6	49	328454.45540	0.10000	00	-0.1785
56	5	52	55	4	51	329047.65790	0.10000	00	-0.1676
56	4	52	55	5	51	329047.65790	0.10000	00	-0.1673
56	4	52	55	4	51	329047.65790	0.10000	00	-0.1675
56	5	52	55	5	51	329047.65790	0.10000	00	-0.1674
57	4	54	56	3	53	329683.05260	0.10000	00	-0.0513
57	3	54	56	3	53	329683.05260	0.10000	00	-0.0513
57	3	54	56	4	53	329683.05260	0.10000	00	-0.0513
57	4	54	56	4	53	329683.05260	0.10000	00	-0.0513
58	3	56	57	3	55	330296.63420	0.10000	10	-0.1381

58	3	56	57	2	55	330296.63420	0.10000	10	-0.1381
58	2	56	57	2	55	330296.63420	0.10000	10	-0.1381
58	2	56	57	3	55	330296.63420	0.10000	10	-0.1381
58	2	56	57	3	55	330342.55770	0.10000	00	-0.0523
58	2	56	57	2	55	330342.55770	0.10000	00	-0.0523
58	3	56	57	3	55	330342.55770	0.10000	00	-0.0523
58	3	56	57	2	55	330342.55770	0.10000	00	-0.0523
59	1	58	58	2	57	330987.77970	0.10000	10	0.0410
59	1	58	58	1	57	330987.77970	0.10000	10	0.0410
59	2	58	58	1	57	330987.77970	0.10000	10	0.0410
59	2	58	58	2	57	330987.77970	0.10000	10	0.0410
59	1	58	58	2	57	331015.01790	0.10000	00	0.0647
59	2	58	58	1	57	331015.01790	0.10000	00	0.0647
59	1	58	58	1	57	331015.01790	0.10000	00	0.0647
59	2	58	58	2	57	331015.01790	0.10000	00	0.0647
60	0	60	59	1	59	331687.59960	0.10000	10	0.1690
60	1	60	59	0	59	331687.59960	0.10000	10	0.1690
60	1	60	59	1	59	331687.59960	0.10000	10	0.1690
60	0	60	59	0	59	331687.59960	0.10000	10	0.1690
60	0	60	59	0	59	331692.60450	0.10000	00	0.0526
60	0	60	59	1	59	331692.60450	0.10000	00	0.0526
60	1	60	59	0	59	331692.60450	0.10000	00	0.0526
60	1	60	59	1	59	331692.60450	0.10000	00	0.0526
53	8	45	52	9	44	332680.36700	0.10000	00	-0.1378
54	7	47	53	8	46	332970.90550	0.10000	00	-0.1560
54	8	47	53	7	46	332979.79720	0.10000	00	-0.0870
55	6	49	54	6	48	333391.03560	0.10000	00	-0.1475
55	6	49	54	7	48	333391.03560	0.10000	00	0.0573
55	7	49	54	6	48	333391.03560	0.10000	00	-0.2630
56	5	51	55	6	50	333921.98990	0.10000	00	-0.1147
56	6	51	55	5	50	333921.98990	0.10000	00	-0.1234
56	5	51	55	5	50	333921.98990	0.10000	00	-0.1203
56	6	51	55	6	50	333921.98990	0.10000	00	-0.1178
57	4	53	56	5	52	334520.17570	0.10000	00	-0.0337
57	4	53	56	4	52	334520.17570	0.10000	00	-0.0338
57	5	53	56	5	52	334520.17570	0.10000	00	-0.0338
57	5	53	56	4	52	334520.17570	0.10000	00	-0.0339
58	3	55	57	3	54	335158.08540	0.10000	00	0.0217
58	4	55	57	3	54	335158.08540	0.10000	00	0.0217
58	3	55	57	4	54	335158.08540	0.10000	00	0.0217
58	4	55	57	4	54	335158.08540	0.10000	00	0.0217
59	3	57	58	3	56	335773.22900	0.10000	10	0.0334
59	2	57	58	3	56	335773.22900	0.10000	10	0.0334
59	2	57	58	2	56	335773.22900	0.10000	10	0.0334
59	3	57	58	2	56	335773.22900	0.10000	10	0.0334
59	3	57	58	3	56	335819.01360	0.10000	00	0.0855
59	3	57	58	2	56	335819.01360	0.10000	00	0.0855
59	2	57	58	2	56	335819.01360	0.10000	00	0.0855

59	2	57	58	3	56	335819.01360	0.10000	00	0.0855
60	2	59	59	2	58	336464.67480	0.10000	10	-0.1723
60	2	59	59	1	58	336464.67480	0.10000	10	-0.1723
60	1	59	59	2	58	336464.67480	0.10000	10	-0.1723
60	1	59	59	1	58	336464.67480	0.10000	10	-0.1723
60	2	59	59	2	58	336492.07240	0.10000	00	0.0640
60	1	59	59	1	58	336492.07240	0.10000	00	0.0640
60	2	59	59	1	58	336492.07240	0.10000	00	0.0640
60	1	59	59	2	58	336492.07240	0.10000	00	0.0640
61	1	61	60	1	60	337165.17650	0.10000	10	0.1692
61	0	61	60	1	60	337165.17650	0.10000	10	0.1692
61	1	61	60	0	60	337165.17650	0.10000	10	0.1692
61	0	61	60	0	60	337165.17650	0.10000	10	0.1692
61	1	61	60	0	60	337170.12030	0.10000	00	0.0716
61	1	61	60	1	60	337170.12030	0.10000	00	0.0716
61	0	61	60	1	60	337170.12030	0.10000	00	0.0716
61	0	61	60	0	60	337170.12030	0.10000	00	0.0716
54	8	46	53	9	45	338120.25380	0.10000	00	-0.1907
55	7	48	54	8	47	338414.25580	0.10000	00	-0.1030
55	8	48	54	7	47	338419.36810	0.10000	00	-0.1343
56	6	50	55	6	49	338849.73970	0.10000	00	-0.1364
56	6	50	55	7	49	338849.74160	0.10000	00	-0.0190
56	7	50	55	6	49	338849.74160	0.10000	00	-0.1994
56	6	50	55	6	49	338849.74160	0.10000	00	-0.1345
56	7	50	55	7	49	338849.74160	0.10000	00	-0.0839
57	5	52	56	6	51	339389.50260	0.10000	00	-0.0750
57	5	52	56	5	51	339389.50260	0.10000	00	-0.0780
57	6	52	56	6	51	339389.50260	0.10000	00	-0.0766
57	6	52	56	5	51	339389.50260	0.10000	00	-0.0797
58	4	54	57	5	53	339992.25740	0.10000	00	-0.0179
58	4	54	57	4	53	339992.25740	0.10000	00	-0.0179
58	5	54	57	4	53	339992.25740	0.10000	00	-0.0180
58	5	54	57	5	53	339992.25740	0.10000	00	-0.0179
59	4	56	58	3	55	340632.62590	0.10000	00	0.0561
59	3	56	58	3	55	340632.62590	0.10000	00	0.0561
59	4	56	58	4	55	340632.62590	0.10000	00	0.0561
59	3	56	58	4	55	340632.62590	0.10000	00	0.0561
60	3	58	59	3	57	341249.08960	0.10000	10	-0.0219
60	2	58	59	2	57	341249.08960	0.10000	10	-0.0219
60	2	58	59	3	57	341249.08960	0.10000	10	-0.0219
60	3	58	59	2	57	341249.08960	0.10000	10	-0.0219
60	2	58	59	2	57	341294.81150	0.10000	00	0.0698
60	2	58	59	3	57	341294.81150	0.10000	00	0.0698
60	3	58	59	3	57	341294.81150	0.10000	00	0.0698
60	3	58	59	2	57	341294.81150	0.10000	00	0.0698
61	1	60	60	2	59	341941.45330	0.10000	10	0.0176
61	1	60	60	1	59	341941.45330	0.10000	10	0.0176
61	2	60	60	2	59	341941.45330	0.10000	10	0.0176

61	2	60	60	1	59	341941.45330	0.10000	10	0.0176
61	2	60	60	1	59	341968.64120	0.10000	00	0.0956
61	2	60	60	2	59	341968.64120	0.10000	00	0.0956
61	1	60	60	1	59	341968.64120	0.10000	00	0.0956
61	1	60	60	2	59	341968.64120	0.10000	00	0.0956
62	0	62	61	1	61	342642.25980	0.10000	10	0.1933
62	1	62	61	0	61	342642.25980	0.10000	10	0.1933
62	0	62	61	0	61	342642.25980	0.10000	10	0.1933
62	1	62	61	1	61	342642.25980	0.10000	10	0.1933
62	0	62	61	0	61	342647.10410	0.10000	00	0.0754
62	0	62	61	1	61	342647.10410	0.10000	00	0.0754
62	1	62	61	0	61	342647.10410	0.10000	00	0.0754
62	1	62	61	1	61	342647.10410	0.10000	00	0.0754
55	8	47	54	9	46	343553.23380	0.10000	00	-0.0010
56	7	49	55	8	48	343858.94500	0.10000	00	-0.1429
56	8	49	55	7	48	343861.91250	0.10000	00	-0.1594
56	8	49	55	7	48	343861.91250	0.10000	00	-0.1594
57	7	51	56	7	50	344309.07520	0.10000	00	-0.0840
57	6	51	56	7	50	344309.07520	0.10000	00	-0.0477
57	7	51	56	6	50	344309.07520	0.10000	00	-0.1489
57	6	51	56	6	50	344309.07520	0.10000	00	-0.1126
58	5	53	57	5	52	344856.90950	0.10000	00	-0.0866
58	5	53	57	6	52	344856.90950	0.10000	00	-0.0849
58	6	53	57	6	52	344856.90950	0.10000	00	-0.0858
58	6	53	57	5	52	344856.90950	0.10000	00	-0.0875
59	5	55	58	4	54	345463.97620	0.10000	00	-0.0195
59	4	55	58	4	54	345463.97620	0.10000	00	-0.0195
59	5	55	58	5	54	345463.97620	0.10000	00	-0.0195
59	4	55	58	5	54	345463.97620	0.10000	00	-0.0194
60	3	57	59	3	56	346106.59960	0.10000	00	-0.0078
60	4	57	59	3	56	346106.59960	0.10000	00	-0.0078
60	3	57	59	4	56	346106.59960	0.10000	00	-0.0078
60	4	57	59	4	56	346106.59960	0.10000	00	-0.0078
61	2	59	60	2	58	346724.53220	0.10000	10	0.0225
61	3	59	60	2	58	346724.53220	0.10000	10	0.0225
61	2	59	60	3	58	346724.53220	0.10000	10	0.0225
61	3	59	60	3	58	346724.53220	0.10000	10	0.0225
61	3	59	60	2	58	346770.10410	0.10000	00	0.0635
61	2	59	60	3	58	346770.10410	0.10000	00	0.0635
61	2	59	60	2	58	346770.10410	0.10000	00	0.0635
61	3	59	60	3	58	346770.10410	0.10000	00	0.0635
61	3	59	60	3	58	346770.10890	0.10000	00	0.0683
61	3	59	60	2	58	346770.10890	0.10000	00	0.0683
61	2	59	60	3	58	346770.10890	0.10000	00	0.0683
61	2	59	60	2	58	346770.10890	0.10000	00	0.0683
62	1	61	61	2	60	347417.54770	0.10000	10	0.0521
62	1	61	61	1	60	347417.54770	0.10000	10	0.0521
62	2	61	61	2	60	347417.54770	0.10000	10	0.0521

62	2	61	61	1	60	347417.54770	0.10000	10	0.0521
62	2	61	61	1	60	347444.60390	0.10000	00	0.0477
62	1	61	61	2	60	347444.60390	0.10000	00	0.0477
62	1	61	61	1	60	347444.60650	0.10000	00	0.0503
62	2	61	61	2	60	347444.60650	0.10000	00	0.0503
63	1	63	62	0	62	348118.78200	0.10000	10	0.1820
63	1	63	62	1	62	348118.78200	0.10000	10	0.1820
63	0	63	62	1	62	348118.78200	0.10000	10	0.1820
63	0	63	62	0	62	348118.78200	0.10000	10	0.1820
63	0	63	62	0	62	348123.54070	0.10000	00	0.0570
63	1	63	62	0	62	348123.54070	0.10000	00	0.0570
63	0	63	62	1	62	348123.54070	0.10000	00	0.0570
63	0	63	62	1	62	348123.54180	0.10000	00	0.0581
63	1	63	62	1	62	348123.54180	0.10000	00	0.0581
63	1	63	62	0	62	348123.54180	0.10000	00	0.0581
56	8	48	55	9	47	348982.82670	0.10000	00	-0.1836
57	7	50	56	8	49	349305.05660	0.10000	00	-0.1759
57	8	50	56	7	49	349306.85170	0.10000	00	-0.1040
58	6	52	57	6	51	349768.88530	0.10000	00	-0.1037
58	7	52	57	6	51	349768.88530	0.10000	00	-0.1240
58	6	52	57	7	51	349768.88530	0.10000	00	-0.0674
58	7	52	57	7	51	349768.88530	0.10000	00	-0.0877
59	6	54	58	5	53	350324.21870	0.10000	00	-0.0850
59	5	54	58	5	53	350324.21870	0.10000	00	-0.0845
59	6	54	58	6	53	350324.21870	0.10000	00	-0.0841
59	5	54	58	6	53	350324.21870	0.10000	00	-0.0836
60	4	56	59	4	55	350935.33010	0.10000	00	-0.0151
60	5	56	59	4	55	350935.33010	0.10000	00	-0.0151
60	5	56	59	5	55	350935.33010	0.10000	00	-0.0151
60	4	56	59	5	55	350935.33010	0.10000	00	-0.0151
61	3	58	60	4	57	351580.18970	0.10000	00	0.0275
61	3	58	60	3	57	351580.18970	0.10000	00	0.0275
61	4	58	60	4	57	351580.18970	0.10000	00	0.0275
61	4	58	60	3	57	351580.18970	0.10000	00	0.0275
62	3	60	61	2	59	352199.39910	0.10000	10	0.0189
62	3	60	61	3	59	352199.39910	0.10000	10	0.0189
62	2	60	61	3	59	352199.39910	0.10000	10	0.0189
62	2	60	61	2	59	352199.39910	0.10000	10	0.0189
62	3	60	61	3	59	352244.85250	0.10000	00	0.0378
62	3	60	61	2	59	352244.85250	0.10000	00	0.0378
62	2	60	61	2	59	352244.85250	0.10000	00	0.0378
62	2	60	61	3	59	352244.85250	0.10000	00	0.0378
63	2	62	62	1	61	352893.00400	0.10000	10	-0.0142
63	2	62	62	2	61	352893.00400	0.10000	10	-0.0142
63	1	62	62	1	61	352893.00400	0.10000	10	-0.0142
63	2	62	62	1	61	352920.10340	0.10000	00	0.0719
63	1	62	62	2	61	352920.10340	0.10000	00	0.0719
63	1	62	62	1	61	352920.10340	0.10000	00	0.0719

63	2	62	62	2	61	352920.10340	0.10000	00	0.0719
64	0	64	63	0	63	353594.82720	0.10000	10	0.2279
64	1	64	63	1	63	353594.82720	0.10000	10	0.2279
64	0	64	63	1	63	353594.82720	0.10000	10	0.2279
64	1	64	63	0	63	353594.82720	0.10000	10	0.2279
64	0	64	63	0	63	353599.49860	0.10000	00	0.0935
64	1	64	63	0	63	353599.49860	0.10000	00	0.0935
64	0	64	63	1	63	353599.49860	0.10000	00	0.0935
64	1	64	63	1	63	353599.49860	0.10000	00	0.0935
57	8	49	56	9	48	354411.87250	0.10000	00	-0.3162
58	7	51	57	8	50	354752.99680	0.10000	00	0.2991
58	8	51	57	7	50	354752.99680	0.10000	00	-0.6916
59	7	53	58	6	52	355229.05560	0.10000	00	-0.1227
59	7	53	58	7	52	355229.05560	0.10000	00	-0.1024
59	6	53	58	7	52	355229.05560	0.10000	00	-0.0911
59	6	53	58	6	52	355229.05560	0.10000	00	-0.1114
60	5	55	59	6	54	355791.41260	0.10000	00	-0.0403
60	5	55	59	5	54	355791.41260	0.10000	00	-0.0408
60	6	55	59	6	54	355791.41260	0.10000	00	-0.0406
60	6	55	59	5	54	355791.41260	0.10000	00	-0.0411
61	5	57	60	5	56	356406.26160	0.10000	00	-0.0388
61	4	57	60	4	56	356406.26160	0.10000	00	-0.0388
61	4	57	60	5	56	356406.26160	0.10000	00	-0.0388
61	5	57	60	4	56	356406.26160	0.10000	00	-0.0388
62	4	59	61	3	58	357053.21950	0.10000	00	-0.0012
62	3	59	61	4	58	357053.21950	0.10000	00	-0.0012
62	3	59	61	3	58	357053.21950	0.10000	00	-0.0012
62	4	59	61	4	58	357053.21950	0.10000	00	-0.0012
63	3	61	62	3	60	357673.71650	0.10000	10	0.0033
63	3	61	62	2	60	357673.71650	0.10000	10	0.0033
63	2	61	62	3	60	357673.71650	0.10000	10	0.0033
63	2	61	62	2	60	357673.71650	0.10000	10	0.0033
63	3	61	62	3	60	357719.09250	0.10000	00	0.0385
63	2	61	62	2	60	357719.09250	0.10000	00	0.0385
63	3	61	62	2	60	357719.09250	0.10000	00	0.0385
63	2	61	62	3	60	357719.09250	0.10000	00	0.0385
64	2	63	63	1	62	358368.00920	0.10000	10	0.0144
64	1	63	63	1	62	358368.00920	0.10000	10	0.0144
64	1	63	63	2	62	358368.00920	0.10000	10	0.0144
64	2	63	63	2	62	358368.00920	0.10000	10	0.0144
64	2	63	63	1	62	358395.03400	0.10000	00	0.0713
64	2	63	63	2	62	358395.03400	0.10000	00	0.0713
64	1	63	63	2	62	358395.03400	0.10000	00	0.0713
64	1	63	63	1	62	358395.03400	0.10000	00	0.0713
65	1	65	64	1	64	359070.23300	0.10000	10	0.1771
65	0	65	64	0	64	359070.23300	0.10000	10	0.1771
65	1	65	64	0	64	359070.23300	0.10000	10	0.1771
65	0	65	64	1	64	359070.23300	0.10000	10	0.1771

65	0	65	64	0	64	359074.82520	0.10000	00	0.0405
65	1	65	64	0	64	359074.82520	0.10000	00	0.0405
65	0	65	64	1	64	359074.82520	0.10000	00	0.0405
65	1	65	64	1	64	359074.82520	0.10000	00	0.0405
59	8	52	58	7	51	360201.52400	0.10000	00	-0.3947
59	7	52	58	8	51	360201.52400	0.10000	00	0.1726
60	6	54	59	7	53	360689.55400	0.10000	00	-0.0567
60	7	54	59	7	53	360689.55400	0.10000	00	-0.0629
60	7	54	59	6	53	360689.55400	0.10000	00	-0.0742
60	6	54	59	6	53	360689.55400	0.10000	00	-0.0679
61	6	56	60	6	55	361258.35910	0.10000	00	-0.0435
61	5	56	60	6	55	361258.35910	0.10000	00	-0.0434
61	5	56	60	5	55	361258.35910	0.10000	00	-0.0437
61	6	56	60	5	55	361258.35910	0.10000	00	-0.0438
62	4	58	61	5	57	361876.76620	0.10000	00	-0.0730
62	5	58	61	4	57	361876.76620	0.10000	00	-0.0730
62	5	58	61	5	57	361876.76620	0.10000	00	-0.0730
62	4	58	61	4	57	361876.76620	0.10000	00	-0.0730
63	3	60	62	4	59	362525.76460	0.10000	00	-0.0050
63	4	60	62	3	59	362525.76460	0.10000	00	-0.0050
63	3	60	62	3	59	362525.76460	0.10000	00	-0.0050
63	4	60	62	4	59	362525.76460	0.10000	00	-0.0050
64	2	62	63	3	61	363147.55330	0.10000	10	0.0545
64	3	62	63	3	61	363147.55330	0.10000	10	0.0545
64	3	62	63	2	61	363147.55330	0.10000	10	0.0545
64	2	62	63	2	61	363147.55330	0.10000	10	0.0545
64	2	62	63	3	61	363192.77150	0.10000	00	0.0226
64	3	62	63	2	61	363192.77150	0.10000	00	0.0226
64	3	62	63	3	61	363192.77150	0.10000	00	0.0226
64	2	62	63	2	61	363192.77150	0.10000	00	0.0226
65	2	64	64	1	63	363842.45390	0.10000	10	0.0371
65	1	64	64	1	63	363842.45390	0.10000	10	0.0371
65	2	64	64	2	63	363842.45390	0.10000	10	0.0371
65	1	64	64	2	63	363842.45390	0.10000	10	0.0371
65	2	64	64	2	63	363869.40090	0.10000	00	0.0596
65	1	64	64	1	63	363869.40090	0.10000	00	0.0596
65	2	64	64	1	63	363869.40090	0.10000	00	0.0596
65	1	64	64	2	63	363869.40090	0.10000	00	0.0596
66	1	66	65	1	65	364545.16690	0.10000	10	0.2054
66	0	66	65	0	65	364545.16690	0.10000	10	0.2054
66	1	66	65	0	65	364545.16690	0.10000	10	0.2054
66	0	66	65	1	65	364545.16690	0.10000	10	0.2054
66	0	66	65	1	65	364549.67170	0.10000	00	0.0577
66	1	66	65	0	65	364549.67170	0.10000	00	0.0577
66	0	66	65	0	65	364549.67170	0.10000	00	0.0577
66	1	66	65	1	65	364549.67170	0.10000	00	0.0577
59	8	51	58	9	50	365273.50490	0.10000	00	0.0408
60	7	53	59	8	52	365651.23290	0.10000	00	0.1846

60	8	53	59	7	52	365651.23290	0.10000	00	-0.1388
61	6	55	60	7	54	366150.17340	0.10000	00	-0.0857
61	6	55	60	6	54	366150.17340	0.10000	00	-0.0919
61	7	55	60	7	54	366150.17340	0.10000	00	-0.0891
61	7	55	60	6	54	366150.17340	0.10000	00	-0.0954
62	5	57	61	6	56	366725.07120	0.10000	00	-0.0395
62	5	57	61	5	56	366725.07120	0.10000	00	-0.0396
62	6	57	61	6	56	366725.07120	0.10000	00	-0.0396
62	6	57	61	5	56	366725.07120	0.10000	00	-0.0397
63	5	59	62	5	58	367346.91830	0.10000	00	-0.0224
63	4	59	62	5	58	367346.91830	0.10000	00	-0.0224
63	5	59	62	4	58	367346.91830	0.10000	00	-0.0224
63	4	59	62	4	58	367346.91830	0.10000	00	-0.0224
64	4	61	63	3	60	367997.79670	0.10000	00	0.0006
64	3	61	63	3	60	367997.79670	0.10000	00	0.0006
64	4	61	63	4	60	367997.79670	0.10000	00	0.0006
64	3	61	63	4	60	367997.79670	0.10000	00	0.0006
65	2	63	64	3	62	368620.73780	0.10000	10	0.0102
65	3	63	64	2	62	368620.73780	0.10000	10	0.0102
65	2	63	64	2	62	368620.73780	0.10000	10	0.0102
65	3	63	64	3	62	368620.73780	0.10000	10	0.0102
65	2	63	64	2	62	368665.95170	0.10000	00	0.0620
65	2	63	64	3	62	368665.95170	0.10000	00	0.0620
65	3	63	64	2	62	368665.95170	0.10000	00	0.0620
65	3	63	64	3	62	368665.95170	0.10000	00	0.0620
66	1	65	65	1	64	369316.34280	0.10000	10	0.0673
66	2	65	65	1	64	369316.34280	0.10000	10	0.0673
66	1	65	65	2	64	369316.34280	0.10000	10	0.0673
66	2	65	65	2	64	369316.34280	0.10000	10	0.0673
66	2	65	65	1	64	369343.17740	0.10000	00	0.0190
66	2	65	65	2	64	369343.17740	0.10000	00	0.0190
66	1	65	65	1	64	369343.17740	0.10000	00	0.0190
66	1	65	65	2	64	369343.17740	0.10000	00	0.0190
67	1	67	66	0	66	370019.50670	0.10000	10	0.1989
67	0	67	66	0	66	370019.50670	0.10000	10	0.1989
67	0	67	66	1	66	370019.50670	0.10000	10	0.1989
67	1	67	66	1	66	370019.50670	0.10000	10	0.1989
67	0	67	66	0	66	370023.89350	0.10000	00	0.0088
67	0	67	66	1	66	370023.89350	0.10000	00	0.0088
67	1	67	66	1	66	370023.89350	0.10000	00	0.0088
67	1	67	66	0	66	370023.89350	0.10000	00	0.0088
60	8	52	59	9	51	370706.47440	0.10000	00	-0.0576
61	8	54	60	8	53	371101.71140	0.10000	00	0.0025
61	7	54	60	7	53	371101.71140	0.10000	00	-0.0483
61	8	54	60	7	53	371101.71140	0.10000	00	-0.1148
61	7	54	60	8	53	371101.71140	0.10000	00	0.0690
62	6	56	61	7	55	371610.93730	0.10000	00	-0.0772
62	7	56	61	7	55	371610.93730	0.10000	00	-0.0791

62	6	56	61	6	55	371610.93730	0.10000	00	-0.0806
62	7	56	61	6	55	371610.93730	0.10000	00	-0.0825
63	6	58	62	6	57	372191.48460	0.10000	00	-0.0560
63	5	58	62	5	57	372191.48460	0.10000	00	-0.0560
63	5	58	62	6	57	372191.48460	0.10000	00	-0.0560
63	6	58	62	5	57	372191.48460	0.10000	00	-0.0561
64	4	60	63	4	59	372816.56280	0.10000	00	-0.0226
64	5	60	63	4	59	372816.56280	0.10000	00	-0.0226
64	5	60	63	5	59	372816.56280	0.10000	00	-0.0226
64	4	60	63	5	59	372816.56280	0.10000	00	-0.0226
65	4	62	64	3	61	373469.26720	0.10000	00	-0.0207
65	3	62	64	3	61	373469.26720	0.10000	00	-0.0207
65	4	62	64	4	61	373469.26720	0.10000	00	-0.0207
65	3	62	64	4	61	373469.26720	0.10000	00	-0.0207
66	2	64	65	3	63	374093.40660	0.10000	10	0.0168
66	3	64	65	3	63	374093.40660	0.10000	10	0.0168
66	2	64	65	2	63	374093.40660	0.10000	10	0.0168
66	3	64	65	2	63	374093.40660	0.10000	10	0.0168
66	2	64	65	2	63	374138.51380	0.10000	00	0.0472
66	2	64	65	3	63	374138.51380	0.10000	00	0.0472
66	3	64	65	2	63	374138.51380	0.10000	00	0.0472
66	3	64	65	3	63	374138.51380	0.10000	00	0.0472
67	1	66	66	2	65	374789.58820	0.10000	10	0.0259
67	1	66	66	1	65	374789.58820	0.10000	10	0.0259
67	2	66	66	2	65	374789.58820	0.10000	10	0.0259
67	2	66	66	1	65	374789.58820	0.10000	10	0.0259
67	2	66	66	1	65	374816.45300	0.10000	00	0.0474
67	1	66	66	2	65	374816.45300	0.10000	00	0.0474
67	2	66	66	2	65	374816.45300	0.10000	00	0.0474
67	1	66	66	1	65	374816.45300	0.10000	00	0.0474
68	1	68	67	0	67	375493.29590	0.10000	10	0.2097
68	1	68	67	1	67	375493.29590	0.10000	10	0.2097
68	0	68	67	1	67	375493.29590	0.10000	10	0.2097
68	0	68	67	0	67	375493.29590	0.10000	10	0.2097
68	0	68	67	1	67	375497.60500	0.10000	00	0.0167
68	1	68	67	1	67	375497.60500	0.10000	00	0.0167
68	0	68	67	0	67	375497.60500	0.10000	00	0.0167
68	1	68	67	0	67	375497.60500	0.10000	00	0.0167
61	8	53	60	9	52	376141.33200	0.10000	00	-0.0437
62	7	55	61	7	54	376552.97130	0.10000	00	-0.0898
62	8	55	61	8	54	376552.97130	0.10000	00	-0.0608
62	7	55	61	8	54	376552.97130	0.10000	00	-0.0233
62	8	55	61	7	54	376552.97130	0.10000	00	-0.1273
63	7	57	62	7	56	377071.74690	0.10000	00	-0.0608
63	6	57	62	7	56	377071.74690	0.10000	00	-0.0597
63	6	57	62	6	56	377071.74690	0.10000	00	-0.0617
63	7	57	62	6	56	377071.74690	0.10000	00	-0.0627
64	6	59	63	6	58	377657.61970	0.10000	00	-0.0382

64	6	59	63	5	58	377657.61970	0.10000	00	-0.0383
64	5	59	63	5	58	377657.61970	0.10000	00	-0.0382
64	5	59	63	6	58	377657.61970	0.10000	00	-0.0382
65	4	61	64	4	60	378285.74930	0.10000	00	-0.0054
65	4	61	64	5	60	378285.74930	0.10000	00	-0.0054
65	5	61	64	5	60	378285.74930	0.10000	00	-0.0054
65	5	61	64	4	60	378285.74930	0.10000	00	-0.0054
66	4	63	65	4	62	378940.24650	0.10000	00	0.0135
66	3	63	65	4	62	378940.24650	0.10000	00	0.0135
66	4	63	65	3	62	378940.24650	0.10000	00	0.0135
66	3	63	65	3	62	378940.24650	0.10000	00	0.0135
67	3	65	66	3	64	379565.50340	0.10000	10	0.0272
67	2	65	66	3	64	379565.50340	0.10000	10	0.0272
67	2	65	66	2	64	379565.50340	0.10000	10	0.0272
67	3	65	66	2	64	379565.50340	0.10000	10	0.0272
67	3	65	66	2	64	379610.54860	0.10000	00	0.0782
67	2	65	66	2	64	379610.54860	0.10000	00	0.0782
67	2	65	66	3	64	379610.54860	0.10000	00	0.0782
67	3	65	66	3	64	379610.54860	0.10000	00	0.0782
68	1	67	67	2	66	380262.29620	0.10000	10	0.0276
68	2	67	67	1	66	380262.29620	0.10000	10	0.0276
68	1	67	67	1	66	380262.29620	0.10000	10	0.0276
68	1	67	67	2	66	380289.09590	0.10000	00	0.0217
68	1	67	67	1	66	380289.09590	0.10000	00	0.0217
68	2	67	67	1	66	380289.09590	0.10000	00	0.0217
68	2	67	67	2	66	380289.09590	0.10000	00	0.0217
69	1	69	68	1	68	380966.52400	0.10000	10	0.2355
69	0	69	68	1	68	380966.52400	0.10000	10	0.2355
69	0	69	68	0	68	380966.52400	0.10000	10	0.2355
69	1	69	68	0	68	380966.52400	0.10000	10	0.2355
69	0	69	68	0	68	380970.73880	0.10000	00	0.0224
69	1	69	68	1	68	380970.73880	0.10000	00	0.0224
69	0	69	68	1	68	380970.73880	0.10000	00	0.0224
69	1	69	68	0	68	380970.73880	0.10000	00	0.0224
62	8	54	61	9	53	381577.83810	0.10000	00	-0.0902
63	7	56	62	8	55	382005.09240	0.10000	00	0.1174
63	7	56	62	7	55	382005.09240	0.10000	00	0.0798
63	8	56	62	7	55	382005.09240	0.10000	00	0.0587
63	8	56	62	8	55	382005.09240	0.10000	00	0.0963
64	7	58	63	6	57	382532.52500	0.10000	00	-0.0485
64	6	58	63	7	57	382532.52500	0.10000	00	-0.0469
64	6	58	63	6	57	382532.52500	0.10000	00	-0.0479
64	7	58	63	7	57	382532.52500	0.10000	00	-0.0474
65	5	60	64	6	59	383123.38110	0.10000	00	-0.0500
65	6	60	64	5	59	383123.38110	0.10000	00	-0.0501
65	5	60	64	5	59	383123.38110	0.10000	00	-0.0501
65	6	60	64	6	59	383123.38110	0.10000	00	-0.0501
66	4	62	65	5	61	383754.41490	0.10000	00	-0.0161

66	5	62	65	4	61	383754.41490	0.10000	00	-0.0161
66	5	62	65	5	61	383754.41490	0.10000	00	-0.0161
66	4	62	65	4	61	383754.41490	0.10000	00	-0.0161
67	4	64	66	3	63	384410.61120	0.10000	00	-0.0082
67	3	64	66	3	63	384410.61120	0.10000	00	-0.0082
67	3	64	66	4	63	384410.61120	0.10000	00	-0.0082
67	4	64	66	4	63	384410.61120	0.10000	00	-0.0082
68	2	66	67	2	65	385037.04210	0.10000	10	0.0648
68	2	66	67	3	65	385037.04210	0.10000	10	0.0648
68	3	66	67	2	65	385037.04210	0.10000	10	0.0648
68	3	66	67	3	65	385037.04210	0.10000	10	0.0648
68	3	66	67	2	65	385081.88540	0.10000	00	-0.0061
68	3	66	67	3	65	385081.88540	0.10000	00	-0.0061
68	2	66	67	2	65	385081.88540	0.10000	00	-0.0061
68	2	66	67	3	65	385081.88540	0.10000	00	-0.0061
69	1	68	68	2	67	385734.43400	0.10000	10	0.0481
69	1	68	68	1	67	385734.43400	0.10000	10	0.0481
69	2	68	68	1	67	385734.43400	0.10000	10	0.0481
69	2	68	68	1	67	385761.16040	0.10000	00	0.0048
69	1	68	68	2	67	385761.16040	0.10000	00	0.0048
69	2	68	68	2	67	385761.16040	0.10000	00	0.0048
69	1	68	68	1	67	385761.16040	0.10000	00	0.0048
70	1	70	69	1	69	386439.13830	0.10000	10	0.2321
70	0	70	69	0	69	386439.13830	0.10000	10	0.2321
70	1	70	69	0	69	386439.13830	0.10000	10	0.2321
70	0	70	69	1	69	386439.13830	0.10000	10	0.2321
70	0	70	69	0	69	386443.26300	0.10000	00	0.0023
70	1	70	69	1	69	386443.26300	0.10000	00	0.0023
70	0	70	69	1	69	386443.26300	0.10000	00	0.0023
70	1	70	69	0	69	386443.26300	0.10000	00	0.0023
63	8	55	62	9	54	387016.48440	0.10000	00	0.4265
64	8	57	63	7	56	387457.52700	0.10000	00	0.0294
64	7	57	63	8	56	387457.52700	0.10000	00	0.0624
64	8	57	63	8	56	387457.52700	0.10000	00	0.0506
64	7	57	63	7	56	387457.52700	0.10000	00	0.0413
65	7	59	64	7	58	387993.19410	0.10000	00	-0.0583
65	6	59	64	6	58	387993.19410	0.10000	00	-0.0586
65	6	59	64	7	58	387993.19410	0.10000	00	-0.0580
65	7	59	64	6	58	387993.19410	0.10000	00	-0.0589
66	5	61	65	5	60	388588.78840	0.10000	00	-0.0425
66	6	61	65	5	60	388588.78840	0.10000	00	-0.0425
66	6	61	65	6	60	388588.78840	0.10000	00	-0.0425
66	5	61	65	6	60	388588.78840	0.10000	00	-0.0425
67	4	63	66	4	62	389222.61500	0.10000	00	0.0177
67	4	63	66	5	62	389222.61500	0.10000	00	0.0177
67	5	63	66	4	62	389222.61500	0.10000	00	0.0177
67	5	63	66	5	62	389222.61500	0.10000	00	0.0177
68	3	65	67	3	64	389880.45010	0.10000	00	0.0142

68	4	65	67	4	64	389880.45010	0.10000	00	0.0142
68	4	65	67	3	64	389880.45010	0.10000	00	0.0142
68	3	65	67	4	64	389880.45010	0.10000	00	0.0142
69	2	67	68	2	66	390507.92800	0.10000	10	0.0441
69	2	67	68	3	66	390507.92800	0.10000	10	0.0441
69	3	67	68	2	66	390507.92800	0.10000	10	0.0441
69	3	67	68	3	66	390507.92800	0.10000	10	0.0441
69	2	67	68	2	66	390552.71740	0.10000	00	-0.0032
69	2	67	68	3	66	390552.71740	0.10000	00	-0.0032
69	3	67	68	2	66	390552.71740	0.10000	00	-0.0032
69	3	67	68	3	66	390552.71740	0.10000	00	-0.0032
70	1	69	69	1	68	391205.93010	0.10000	10	0.0246
70	2	69	69	1	68	391205.93010	0.10000	10	0.0246
70	1	69	69	2	68	391205.93010	0.10000	10	0.0246
70	1	69	69	2	68	391232.66220	0.10000	00	0.0210
70	1	69	69	1	68	391232.66220	0.10000	00	0.0210
70	2	69	69	2	68	391232.66220	0.10000	00	0.0210
70	2	69	69	1	68	391232.66220	0.10000	00	0.0210
71	1	71	70	1	70	391911.16010	0.10000	10	0.2292
71	0	71	70	0	70	391911.16010	0.10000	10	0.2292
71	0	71	70	1	70	391911.16010	0.10000	10	0.2292
71	1	71	70	0	70	391911.16010	0.10000	10	0.2292
71	1	71	70	0	70	391915.18100	0.10000	00	-0.0317
71	0	71	70	0	70	391915.18100	0.10000	00	-0.0317
71	1	71	70	1	70	391915.18100	0.10000	00	-0.0317
71	0	71	70	1	70	391915.18100	0.10000	00	-0.0317
64	8	56	63	9	55	392455.95080	0.10000	00	0.3466
65	7	58	64	7	57	392910.48780	0.10000	00	0.1212
65	8	58	64	7	57	392910.48780	0.10000	00	0.1146
65	7	58	64	8	57	392910.48780	0.10000	00	0.1331
65	8	58	64	8	57	392910.48780	0.10000	00	0.1265
66	6	60	65	6	59	393453.76590	0.10000	00	-0.0287
66	7	60	65	7	59	393453.76590	0.10000	00	-0.0286
66	6	60	65	7	59	393453.76590	0.10000	00	-0.0284
66	7	60	65	6	59	393453.76590	0.10000	00	-0.0289
67	6	62	66	6	61	394053.82640	0.10000	00	-0.0032
67	6	62	66	5	61	394053.82640	0.10000	00	-0.0032
67	5	62	66	5	61	394053.82640	0.10000	00	-0.0032
67	5	62	66	6	61	394053.82640	0.10000	00	-0.0032
68	5	64	67	4	63	394690.25440	0.10000	00	0.0168
68	4	64	67	5	63	394690.25440	0.10000	00	0.0168
68	5	64	67	5	63	394690.25440	0.10000	00	0.0168
68	4	64	67	4	63	394690.25440	0.10000	00	0.0168
69	4	66	68	4	65	395349.68780	0.10000	00	0.0167
69	3	66	68	3	65	395349.68780	0.10000	00	0.0167
69	4	66	68	3	65	395349.68780	0.10000	00	0.0167
69	3	66	68	4	65	395349.68780	0.10000	00	0.0167
70	3	68	69	3	67	395978.25160	0.10000	10	0.0649

70	3	68	69	2	67	395978.25160	0.10000	10	0.0649
70	2	68	69	2	67	395978.25160	0.10000	10	0.0649
70	2	68	69	3	67	395978.25160	0.10000	10	0.0649
71	1	70	70	1	69	396676.85890	0.10000	10	0.0399
71	1	70	70	2	69	396676.85890	0.10000	10	0.0399
71	2	70	70	1	69	396676.85890	0.10000	10	0.0399
71	2	70	70	2	69	396676.85890	0.10000	10	0.0399
71	1	70	70	2	69	396703.52600	0.10000	00	0.0036
71	2	70	70	1	69	396703.52600	0.10000	00	0.0036
71	2	70	70	2	69	396703.52600	0.10000	00	0.0036
71	1	70	70	1	69	396703.52600	0.10000	00	0.0036
72	0	72	71	1	71	397382.63930	0.10000	10	0.2850
72	1	72	71	0	71	397382.63930	0.10000	10	0.2850
72	0	72	71	0	71	397382.63930	0.10000	10	0.2850
72	1	72	71	1	71	397382.63930	0.10000	10	0.2850
72	0	72	71	1	71	397386.56780	0.10000	00	0.0037
72	1	72	71	1	71	397386.56780	0.10000	00	0.0037
72	0	72	71	0	71	397386.56780	0.10000	00	0.0037
72	1	72	71	0	71	397386.56780	0.10000	00	0.0037
65	9	57	64	8	56	397896.66450	0.10000	00	-0.0496
65	8	57	64	9	56	397896.66450	0.10000	00	0.2662
66	8	59	65	8	58	398363.56170	0.10000	00	0.0112
66	7	59	65	8	58	398363.56170	0.10000	00	0.0149
66	7	59	65	7	58	398363.56170	0.10000	00	0.0083
66	8	59	65	7	58	398363.56170	0.10000	00	0.0046
67	7	61	66	7	60	398914.23330	0.10000	00	0.0832
67	6	61	66	7	60	398914.23330	0.10000	00	0.0833
67	6	61	66	6	60	398914.23330	0.10000	00	0.0832
67	7	61	66	6	60	398914.23330	0.10000	00	0.0831
68	5	63	67	6	62	399518.40020	0.10000	00	-0.0016
68	5	63	67	5	62	399518.40020	0.10000	00	-0.0016
68	6	63	67	5	62	399518.40020	0.10000	00	-0.0016
68	6	63	67	6	62	399518.40020	0.10000	00	-0.0016
69	5	65	68	4	64	400157.42240	0.10000	00	0.0860
69	5	65	68	5	64	400157.42240	0.10000	00	0.0860
69	4	65	68	4	64	400157.42240	0.10000	00	0.0860
69	4	65	68	5	64	400157.42240	0.10000	00	0.0860
70	4	67	69	4	66	400818.32990	0.10000	00	0.0158
70	4	67	69	3	66	400818.32990	0.10000	00	0.0158
70	3	67	69	3	66	400818.32990	0.10000	00	0.0158
70	3	67	69	4	66	400818.32990	0.10000	00	0.0158
71	3	69	70	2	68	401447.87810	0.10000	10	0.0014
71	2	69	70	2	68	401447.87810	0.10000	10	0.0014
71	3	69	70	3	68	401447.87810	0.10000	10	0.0014
71	2	69	70	3	68	401447.87810	0.10000	10	0.0014
72	2	71	71	1	70	402147.14710	0.10000	10	0.0294
72	1	71	71	1	70	402147.14710	0.10000	10	0.0294
72	1	71	71	2	70	402147.14710	0.10000	10	0.0294

72	2	71	71	2	70	402147.14710	0.10000	10	0.0294
72	1	71	71	1	70	402173.79310	0.10000	00	0.0023
72	2	71	71	2	70	402173.79310	0.10000	00	0.0023
72	2	71	71	1	70	402173.79310	0.10000	00	0.0023
72	1	71	71	2	70	402173.79310	0.10000	00	0.0023
73	1	73	72	1	72	402853.40450	0.10000	10	0.2365
73	0	73	72	0	72	402853.40450	0.10000	10	0.2365
73	1	73	72	0	72	402853.40450	0.10000	10	0.2365
73	0	73	72	1	72	402853.40450	0.10000	10	0.2365
73	0	73	72	0	72	402857.28850	0.10000	00	-0.0180
73	0	73	72	1	72	402857.28850	0.10000	00	-0.0180
73	1	73	72	1	72	402857.28850	0.10000	00	-0.0180
73	1	73	72	0	72	402857.28850	0.10000	00	-0.0180
67	7	60	66	7	59	403816.99830	0.10000	00	0.0433
67	8	60	66	7	59	403816.99830	0.10000	00	0.0413
67	8	60	66	8	59	403816.99830	0.10000	00	0.0450
67	7	60	66	8	59	403816.99830	0.10000	00	0.0470
68	6	62	67	7	61	404374.30630	0.10000	00	0.0318
68	7	62	67	7	61	404374.30630	0.10000	00	0.0318
68	6	62	67	6	61	404374.30630	0.10000	00	0.0317
68	7	62	67	6	61	404374.30630	0.10000	00	0.0317
69	6	64	68	6	63	404982.54220	0.10000	00	0.0190
69	5	64	68	5	63	404982.54220	0.10000	00	0.0190
69	5	64	68	6	63	404982.54220	0.10000	00	0.0190
69	6	64	68	5	63	404982.54220	0.10000	00	0.0190
70	4	66	69	5	65	405623.89990	0.10000	00	0.0210
70	5	66	69	4	65	405623.89990	0.10000	00	0.0210
70	4	66	69	4	65	405623.89990	0.10000	00	0.0210
70	5	66	69	5	65	405623.89990	0.10000	00	0.0210
71	4	68	70	4	67	406286.37760	0.10000	00	0.0235
71	3	68	70	4	67	406286.37760	0.10000	00	0.0235
71	4	68	70	3	67	406286.37760	0.10000	00	0.0235
71	3	68	70	3	67	406286.37760	0.10000	00	0.0235
72	3	70	71	2	69	406916.98700	0.10000	10	0.0423
72	3	70	71	3	69	406916.98700	0.10000	10	0.0423
72	2	70	71	3	69	406916.98700	0.10000	10	0.0423
72	2	70	71	2	69	406916.98700	0.10000	10	0.0423
72	3	70	71	2	69	406961.58770	0.10000	00	0.0237
72	2	70	71	3	69	406961.58770	0.10000	00	0.0237
72	2	70	71	2	69	406961.58770	0.10000	00	0.0237
72	3	70	71	3	69	406961.58770	0.10000	00	0.0237
73	1	72	72	1	71	407616.85270	0.10000	10	0.0595
73	1	72	72	2	71	407616.85270	0.10000	10	0.0595
73	2	72	72	1	71	407616.85270	0.10000	10	0.0595
73	2	72	72	2	71	407616.85270	0.10000	10	0.0595
73	1	72	72	2	71	407643.43430	0.10000	00	-0.0034
73	2	72	72	2	71	407643.43430	0.10000	00	-0.0034
73	2	72	72	1	71	407643.43430	0.10000	00	-0.0034

73	1	72	72	1	71	407643.43430	0.10000	00	-0.0034
74	0	74	73	0	73	408323.64890	0.10000	10	0.2853
74	0	74	73	1	73	408323.64890	0.10000	10	0.2853
74	1	74	73	0	73	408323.64890	0.10000	10	0.2853
74	1	74	73	1	73	408323.64890	0.10000	10	0.2853
74	0	74	73	0	73	408327.42120	0.10000	00	-0.0103
74	0	74	73	1	73	408327.42120	0.10000	00	-0.0103
74	1	74	73	0	73	408327.42120	0.10000	00	-0.0103
74	1	74	73	1	73	408327.42120	0.10000	00	-0.0103
67	9	59	66	8	58	408781.25850	0.10000	00	0.0781
67	9	59	66	9	58	408781.25850	0.10000	00	0.1438
67	8	59	66	9	58	408781.25850	0.10000	00	0.1812
67	8	59	66	8	58	408781.25850	0.10000	00	0.1155
68	7	61	67	8	60	409270.60050	0.10000	00	0.1135
68	7	61	67	7	60	409270.60050	0.10000	00	0.1114
68	8	61	67	7	60	409270.60050	0.10000	00	0.1103
68	8	61	67	8	60	409270.60050	0.10000	00	0.1123
69	6	63	68	7	62	409834.15970	0.10000	00	0.0330
69	7	63	68	7	62	409834.15970	0.10000	00	0.0330
69	6	63	68	6	62	409834.15970	0.10000	00	0.0330
69	7	63	68	6	62	409834.15970	0.10000	00	0.0329
70	5	65	69	6	64	410446.20760	0.10000	00	0.0365
70	6	65	69	6	64	410446.20760	0.10000	00	0.0365
70	6	65	69	5	64	410446.20760	0.10000	00	0.0365
70	5	65	69	5	64	410446.20760	0.10000	00	0.0365
71	5	67	70	5	66	411089.83960	0.10000	00	-0.0110
71	4	67	70	5	66	411089.83960	0.10000	00	-0.0110
71	5	67	70	4	66	411089.83960	0.10000	00	-0.0110
71	4	67	70	4	66	411089.83960	0.10000	00	-0.0110
72	4	69	71	4	68	411753.77530	0.10000	00	-0.0051
72	3	69	71	4	68	411753.77530	0.10000	00	-0.0051
72	3	69	71	3	68	411753.77530	0.10000	00	-0.0051
72	4	69	71	3	68	411753.77530	0.10000	00	-0.0051
73	2	71	72	3	70	412385.38920	0.10000	10	0.0076
73	2	71	72	2	70	412385.38920	0.10000	10	0.0076
73	3	71	72	2	70	412385.38920	0.10000	10	0.0076
73	3	71	72	3	70	412385.38920	0.10000	10	0.0076
73	2	71	72	3	70	412429.89190	0.10000	00	-0.0414
73	3	71	72	3	70	412429.89190	0.10000	00	-0.0414
73	2	71	72	2	70	412429.89190	0.10000	00	-0.0414
73	3	71	72	2	70	412429.89190	0.10000	00	-0.0414
74	2	73	73	2	72	413085.87790	0.10000	10	0.0410
74	2	73	73	1	72	413085.87790	0.10000	10	0.0410
74	1	73	73	2	72	413085.87790	0.10000	10	0.0410
74	1	73	73	1	72	413085.87790	0.10000	10	0.0410
74	1	73	73	1	72	413112.42140	0.10000	00	-0.0332
74	2	73	73	1	72	413112.42140	0.10000	00	-0.0332
74	1	73	73	2	72	413112.42140	0.10000	00	-0.0332

74	2	73	73	2	72	413112.42140	0.10000	00	-0.0332
75	0	75	74	0	74	413793.21350	0.10000	10	0.2808
75	1	75	74	0	74	413793.21350	0.10000	10	0.2808
75	0	75	74	1	74	413793.21350	0.10000	10	0.2808
75	1	75	74	1	74	413793.21350	0.10000	10	0.2808
75	1	75	74	0	74	413796.89880	0.10000	00	-0.0319
75	0	75	74	0	74	413796.89880	0.10000	00	-0.0319
75	0	75	74	1	74	413796.89880	0.10000	00	-0.0319
75	1	75	74	1	74	413796.89880	0.10000	00	-0.0319
68	8	60	67	9	59	414224.81640	0.10000	00	0.1561
68	9	60	67	8	59	414224.81640	0.10000	00	0.0975
68	8	60	67	8	59	414224.81640	0.10000	00	0.1187
68	9	60	67	9	59	414224.81640	0.10000	00	0.1349
69	7	62	68	8	61	414724.19930	0.10000	00	0.1193
69	7	62	68	7	61	414724.19930	0.10000	00	0.1181
69	8	62	68	8	61	414724.19930	0.10000	00	0.1187
69	8	62	68	7	61	414724.19930	0.10000	00	0.1175
70	6	64	69	7	63	415293.75470	0.10000	00	0.0862
70	7	64	69	7	63	415293.75470	0.10000	00	0.0862
70	6	64	69	6	63	415293.75470	0.10000	00	0.0861
70	7	64	69	6	63	415293.75470	0.10000	00	0.0861
71	5	66	70	5	65	415909.37260	0.10000	00	0.0485
71	6	66	70	5	65	415909.37260	0.10000	00	0.0485
71	6	66	70	6	65	415909.37260	0.10000	00	0.0485
71	5	66	70	6	65	415909.37260	0.10000	00	0.0485
72	5	68	71	4	67	416555.25920	0.10000	00	0.0214
72	5	68	71	5	67	416555.25920	0.10000	00	0.0214
72	4	68	71	4	67	416555.25920	0.10000	00	0.0214
72	4	68	71	5	67	416555.25920	0.10000	00	0.0214
73	3	70	72	4	69	417220.59380	0.10000	00	0.0112
73	4	70	72	4	69	417220.59380	0.10000	00	0.0112
73	3	70	72	3	69	417220.59380	0.10000	00	0.0112
73	4	70	72	3	69	417220.59380	0.10000	00	0.0112
74	2	72	73	3	71	417853.15610	0.10000	10	-0.0224
74	3	72	73	2	71	417853.15610	0.10000	10	-0.0224
74	2	72	73	2	71	417853.15610	0.10000	10	-0.0224
74	3	72	73	3	71	417853.15610	0.10000	10	-0.0224
74	2	72	73	3	71	417897.71210	0.10000	00	0.0471
74	3	72	73	3	71	417897.71210	0.10000	00	0.0471
74	3	72	73	2	71	417897.71210	0.10000	00	0.0471
74	2	72	73	2	71	417897.71210	0.10000	00	0.0471
75	2	74	74	2	73	418554.26440	0.10000	10	0.0241
75	1	74	74	1	73	418554.26440	0.10000	10	0.0241
75	2	74	74	1	73	418554.26440	0.10000	10	0.0241
75	1	74	74	2	73	418554.26440	0.10000	10	0.0241
75	2	74	74	1	73	418580.85760	0.10000	00	0.0246
75	1	74	74	2	73	418580.85760	0.10000	00	0.0246
75	1	74	74	1	73	418580.85760	0.10000	00	0.0246

75	2	74	74	2	73	418580.85760	0.10000	00	0.0246
76	1	76	75	1	75	419262.17840	0.10000	10	0.3115
76	0	76	75	1	75	419262.17840	0.10000	10	0.3115
76	0	76	75	0	75	419262.17840	0.10000	10	0.3115
76	1	76	75	0	75	419262.17840	0.10000	10	0.3115
76	0	76	75	1	75	419265.76510	0.10000	00	-0.0306
76	0	76	75	0	75	419265.76510	0.10000	00	-0.0306
76	1	76	75	1	75	419265.76510	0.10000	00	-0.0306
76	1	76	75	0	75	419265.76510	0.10000	00	-0.0306
69	8	61	68	8	60	419669.15740	0.10000	00	0.2454
69	9	61	68	8	60	419669.15740	0.10000	00	0.2334
69	9	61	68	9	60	419669.15740	0.10000	00	0.2546
69	8	61	68	9	60	419669.15740	0.10000	00	0.2666
70	7	63	69	8	62	420177.80740	0.10000	00	0.1445
70	8	63	69	8	62	420177.80740	0.10000	00	0.1442
70	7	63	69	7	62	420177.80740	0.10000	00	0.1439
70	8	63	69	7	62	420177.80740	0.10000	00	0.1435
71	7	65	70	7	64	420752.95510	0.10000	00	0.0904
71	6	65	70	7	64	420752.95510	0.10000	00	0.0904
71	6	65	70	6	64	420752.95510	0.10000	00	0.0904
71	7	65	70	6	64	420752.95510	0.10000	00	0.0904
72	5	67	71	5	66	421372.11350	0.10000	00	0.1518
72	6	67	71	5	66	421372.11350	0.10000	00	0.1518
72	5	67	71	6	66	421372.11350	0.10000	00	0.1518
72	6	67	71	6	66	421372.11350	0.10000	00	0.1518
73	4	69	72	4	68	422020.00080	0.10000	00	-0.0262
73	5	69	72	4	68	422020.00080	0.10000	00	-0.0262
73	5	69	72	5	68	422020.00080	0.10000	00	-0.0262
73	4	69	72	5	68	422020.00080	0.10000	00	-0.0262
74	3	71	73	3	70	422686.79400	0.10000	00	0.0437
74	4	71	73	3	70	422686.79400	0.10000	00	0.0437
74	3	71	73	4	70	422686.79400	0.10000	00	0.0437
74	4	71	73	4	70	422686.79400	0.10000	00	0.0437
75	3	73	74	2	72	423320.34450	0.10000	10	0.0180
75	3	73	74	3	72	423320.34450	0.10000	10	0.0180
75	2	73	74	3	72	423320.34450	0.10000	10	0.0180
75	2	73	74	2	72	423320.34450	0.10000	10	0.0180
75	3	73	74	3	72	423364.75450	0.10000	00	0.0044
75	3	73	74	2	72	423364.75450	0.10000	00	0.0044
75	2	73	74	3	72	423364.75450	0.10000	00	0.0044
75	2	73	74	2	72	423364.75450	0.10000	00	0.0044
76	1	75	75	2	74	424022.05730	0.10000	10	0.0624
76	2	75	75	1	74	424022.05730	0.10000	10	0.0624
76	1	75	75	1	74	424022.05730	0.10000	10	0.0624
76	2	75	75	2	74	424022.05730	0.10000	10	0.0624
76	2	75	75	2	74	424048.54370	0.10000	00	-0.0207
76	1	75	75	2	74	424048.54370	0.10000	00	-0.0207
76	1	75	75	1	74	424048.54370	0.10000	00	-0.0207

76	2	75	75	1	74	424048.54370	0.10000	00	-0.0207
77	1	77	76	0	76	424730.48620	0.10000	10	0.3284
77	0	77	76	0	76	424730.48620	0.10000	10	0.3284
77	1	77	76	1	76	424730.48620	0.10000	10	0.3284
77	0	77	76	1	76	424730.48620	0.10000	10	0.3284
77	0	77	76	0	76	424733.96570	0.10000	00	-0.0524
77	1	77	76	1	76	424733.96570	0.10000	00	-0.0524
77	1	77	76	0	76	424733.96570	0.10000	00	-0.0524
77	0	77	76	1	76	424733.96570	0.10000	00	-0.0524
70	8	62	69	8	61	425114.07940	0.10000	00	0.4202
70	9	62	69	9	61	425114.07940	0.10000	00	0.4254
70	8	62	69	9	61	425114.07940	0.10000	00	0.4322
70	9	62	69	8	61	425114.07940	0.10000	00	0.4134
71	8	64	70	7	63	425631.35450	0.10000	00	0.1800
71	7	64	70	7	63	425631.35450	0.10000	00	0.1802
71	8	64	70	8	63	425631.35450	0.10000	00	0.1803
71	7	64	70	8	63	425631.35450	0.10000	00	0.1805
72	6	66	71	6	65	426212.02110	0.10000	00	0.3389
72	6	66	71	7	65	426212.02110	0.10000	00	0.3389
72	7	66	71	6	65	426212.02110	0.10000	00	0.3389
72	7	66	71	7	65	426212.02110	0.10000	00	0.3389
73	5	68	72	5	67	426834.06430	0.10000	00	-0.0002
73	6	68	72	6	67	426834.06430	0.10000	00	-0.0002
73	6	68	72	5	67	426834.06430	0.10000	00	-0.0002
73	5	68	72	6	67	426834.06430	0.10000	00	-0.0002
74	5	70	73	4	69	427484.24500	0.10000	00	0.0399
74	5	70	73	5	69	427484.24500	0.10000	00	0.0399
74	4	70	73	5	69	427484.24500	0.10000	00	0.0399
74	4	70	73	4	69	427484.24500	0.10000	00	0.0399
75	3	72	74	4	71	428152.27790	0.10000	00	0.0044
75	4	72	74	3	71	428152.27790	0.10000	00	0.0044
75	3	72	74	3	71	428152.27790	0.10000	00	0.0044
75	4	72	74	4	71	428152.27790	0.10000	00	0.0044
76	3	74	75	2	73	428786.81540	0.10000	10	-0.0011
76	2	74	75	3	73	428786.81540	0.10000	10	-0.0011
76	3	74	75	3	73	428786.81540	0.10000	10	-0.0011
76	2	74	75	2	73	428786.81540	0.10000	10	-0.0011
76	3	74	75	2	73	428831.18670	0.10000	00	0.0072
76	3	74	75	3	73	428831.18670	0.10000	00	0.0072
76	2	74	75	3	73	428831.18670	0.10000	00	0.0072
76	2	74	75	2	73	428831.18670	0.10000	00	0.0072
77	2	76	76	2	75	429489.12750	0.10000	10	0.0353
77	2	76	76	1	75	429489.12750	0.10000	10	0.0353
77	1	76	76	1	75	429489.12750	0.10000	10	0.0353
77	1	76	76	2	75	429489.12750	0.10000	10	0.0353
77	1	76	76	2	75	429515.62960	0.10000	00	-0.0107
77	2	76	76	2	75	429515.62960	0.10000	00	-0.0107
77	1	76	76	1	75	429515.62960	0.10000	00	-0.0107

77	2	76	76	1	75	429515.62960	0.10000	00	-0.0107
78	1	78	77	0	77	430198.11090	0.10000	10	0.3137
78	1	78	77	1	77	430198.11090	0.10000	10	0.3137
78	0	78	77	1	77	430198.11090	0.10000	10	0.3137
78	0	78	77	0	77	430198.11090	0.10000	10	0.3137
78	0	78	77	0	77	430201.53240	0.10000	00	-0.0573
78	1	78	77	1	77	430201.53240	0.10000	00	-0.0573
78	1	78	77	0	77	430201.53240	0.10000	00	-0.0573
78	0	78	77	1	77	430201.53240	0.10000	00	-0.0573
71	8	63	70	8	62	430559.14570	0.10000	00	0.3198
71	8	63	70	9	62	430559.14570	0.10000	00	0.3265
71	9	63	70	9	62	430559.14570	0.10000	00	0.3227
71	9	63	70	8	62	430559.14570	0.10000	00	0.3160
72	8	65	71	8	64	431084.76270	0.10000	00	0.2058
72	7	65	71	7	64	431084.76270	0.10000	00	0.2057
72	8	65	71	7	64	431084.76270	0.10000	00	0.2056
72	7	65	71	8	64	431084.76270	0.10000	00	0.2059
73	7	67	72	7	66	431669.86060	0.10000	00	-0.2299
73	6	67	72	7	66	431669.86060	0.10000	00	-0.2298
73	6	67	72	6	66	431669.86060	0.10000	00	-0.2299
73	7	67	72	6	66	431669.86060	0.10000	00	-0.2299
74	6	69	73	6	68	432295.83110	0.10000	00	0.2170
74	6	69	73	5	68	432295.83110	0.10000	00	0.2170
74	5	69	73	6	68	432295.83110	0.10000	00	0.2170
74	5	69	73	5	68	432295.83110	0.10000	00	0.2170
75	4	71	74	4	70	432947.80310	0.10000	00	0.0436
75	5	71	74	5	70	432947.80310	0.10000	00	0.0436
75	4	71	74	5	70	432947.80310	0.10000	00	0.0436
75	5	71	74	4	70	432947.80310	0.10000	00	0.0436
76	4	73	75	3	72	433617.21100	0.10000	00	0.0690
76	3	73	75	3	72	433617.21100	0.10000	00	0.0690
76	3	73	75	4	72	433617.21100	0.10000	00	0.0690
76	4	73	75	4	72	433617.21100	0.10000	00	0.0690
77	2	75	76	3	74	434252.63550	0.10000	10	-0.0044
77	2	75	76	2	74	434252.63550	0.10000	10	-0.0044
77	3	75	76	2	74	434252.63550	0.10000	10	-0.0044
77	3	75	76	3	74	434252.63550	0.10000	10	-0.0044
77	2	75	76	3	74	434296.92070	0.10000	00	-0.0237
77	3	75	76	3	74	434296.92070	0.10000	00	-0.0237
77	3	75	76	2	74	434296.92070	0.10000	00	-0.0237
77	2	75	76	2	74	434296.92070	0.10000	00	-0.0237
78	1	77	77	2	76	434955.56780	0.10000	10	0.0440
78	2	77	77	2	76	434955.56780	0.10000	10	0.0440
78	1	77	77	1	76	434955.56780	0.10000	10	0.0440
78	2	77	77	1	76	434955.56780	0.10000	10	0.0440
78	2	77	77	1	76	434982.01000	0.10000	00	-0.0421
78	1	77	77	2	76	434982.01000	0.10000	00	-0.0421
78	2	77	77	2	76	434982.01000	0.10000	00	-0.0421

78	1	77	77	1	76	434982.01000	0.10000	00	-0.0421
79	0	79	78	1	78	435665.10490	0.10000	10	0.3284
79	0	79	78	0	78	435665.10490	0.10000	10	0.3284
79	1	79	78	1	78	435665.10490	0.10000	10	0.3284
79	1	79	78	0	78	435665.10490	0.10000	10	0.3284
79	0	79	78	0	78	435668.43720	0.10000	00	-0.0646
79	1	79	78	1	78	435668.43720	0.10000	00	-0.0646
79	0	79	78	1	78	435668.43720	0.10000	00	-0.0646
79	1	79	78	0	78	435668.43720	0.10000	00	-0.0646
72	8	64	71	9	63	436004.84850	0.10000	00	0.5423
72	8	64	71	8	63	436004.84850	0.10000	00	0.5385
72	9	64	71	8	63	436004.84850	0.10000	00	0.5363
72	9	64	71	9	63	436004.84850	0.10000	00	0.5401
73	8	66	72	8	65	436538.13420	0.10000	00	0.3747
73	8	66	72	7	65	436538.13420	0.10000	00	0.3746
73	7	66	72	7	65	436538.13420	0.10000	00	0.3747
73	7	66	72	8	65	436538.13420	0.10000	00	0.3748
74	6	68	73	6	67	437128.83900	0.10000	00	0.7785
74	7	68	73	7	67	437128.83900	0.10000	00	0.7785
74	6	68	73	7	67	437128.83900	0.10000	00	0.7785
74	7	68	73	6	67	437128.83900	0.10000	00	0.7785
75	5	70	74	6	69	437756.69760	0.10000	00	0.1048
75	6	70	74	6	69	437756.69760	0.10000	00	0.1048
75	5	70	74	5	69	437756.69760	0.10000	00	0.1048
75	6	70	74	5	69	437756.69760	0.10000	00	0.1048
76	4	72	75	4	71	438410.68410	0.10000	00	0.0064
76	5	72	75	4	71	438410.68410	0.10000	00	0.0064
76	4	72	75	5	71	438410.68410	0.10000	00	0.0064
76	5	72	75	5	71	438410.68410	0.10000	00	0.0064
77	3	74	76	4	73	439081.39670	0.10000	00	0.0507
77	3	74	76	3	73	439081.39670	0.10000	00	0.0507
77	4	74	76	3	73	439081.39670	0.10000	00	0.0507
77	4	74	76	4	73	439081.39670	0.10000	00	0.0507
78	3	76	77	3	75	439717.78190	0.10000	10	-0.0056
78	3	76	77	2	75	439717.78190	0.10000	10	-0.0056
78	2	76	77	3	75	439717.78190	0.10000	10	-0.0056
78	2	76	77	2	75	439717.78190	0.10000	10	-0.0056
78	3	76	77	3	75	439762.02210	0.10000	00	-0.0138
78	3	76	77	2	75	439762.02210	0.10000	00	-0.0138
78	2	76	77	3	75	439762.02210	0.10000	00	-0.0138
78	2	76	77	2	75	439762.02210	0.10000	00	-0.0138
79	1	78	78	1	77	440421.29680	0.10000	10	0.0157
79	2	78	78	1	77	440421.29680	0.10000	10	0.0157
79	1	78	78	2	77	440421.29680	0.10000	10	0.0157
79	2	78	78	2	77	440421.29680	0.10000	10	0.0157
79	1	78	78	2	77	440447.76040	0.10000	00	-0.0310
79	2	78	78	2	77	440447.76040	0.10000	00	-0.0310
79	2	78	78	1	77	440447.76040	0.10000	00	-0.0310

79	1	78	78	1	77	440447.76040	0.10000	00	-0.0310
80	1	80	79	1	79	441131.44300	0.10000	10	0.3556
80	0	80	79	0	79	441131.44300	0.10000	10	0.3556
80	0	80	79	1	79	441131.44300	0.10000	10	0.3556
80	1	80	79	0	79	441131.44300	0.10000	10	0.3556
80	0	80	79	0	79	441134.68190	0.10000	00	-0.0644
80	1	80	79	0	79	441134.68190	0.10000	00	-0.0644
80	0	80	79	1	79	441134.68190	0.10000	00	-0.0644
80	1	80	79	1	79	441134.68190	0.10000	00	-0.0644
73	8	65	72	9	64	441450.37270	0.10000	00	0.3556
73	8	65	72	8	64	441450.37270	0.10000	00	0.3535
75	6	69	74	7	68	442585.67280	0.10000	00	0.1074
75	7	69	74	6	68	442585.67280	0.10000	00	0.1074
75	7	69	74	6	68	442585.67280	0.10000	00	0.1074
75	7	69	74	7	68	442585.67280	0.10000	00	0.1074
75	6	69	74	6	68	442585.67280	0.10000	00	0.1074
75	6	69	74	7	68	442585.67280	0.10000	00	0.1074
75	7	69	74	7	68	442585.67280	0.10000	00	0.1074
75	6	69	74	6	68	442585.67280	0.10000	00	0.1074
76	6	71	75	6	70	443217.06700	0.10000	00	0.0834
76	6	71	75	5	70	443217.06700	0.10000	00	0.0834
76	5	71	75	5	70	443217.06700	0.10000	00	0.0834
76	5	71	75	6	70	443217.06700	0.10000	00	0.0834
77	4	73	76	5	72	443873.02220	0.10000	00	0.0745
77	5	73	76	4	72	443873.02220	0.10000	00	0.0745
77	4	73	76	4	72	443873.02220	0.10000	00	0.0745
77	5	73	76	5	72	443873.02220	0.10000	00	0.0745
78	4	75	77	4	74	444544.88760	0.10000	00	0.0120
78	3	75	77	4	74	444544.88760	0.10000	00	0.0120
78	3	75	77	3	74	444544.88760	0.10000	00	0.0120
78	4	75	77	3	74	444544.88760	0.10000	00	0.0120
79	2	77	78	3	76	445182.22430	0.10000	10	-0.0265
79	3	77	78	2	76	445182.22430	0.10000	10	-0.0265
79	3	77	78	3	76	445182.22430	0.10000	10	-0.0265
79	2	77	78	2	76	445182.22430	0.10000	10	-0.0265
79	3	77	78	2	76	445226.45090	0.10000	00	0.0058
79	3	77	78	3	76	445226.45090	0.10000	00	0.0058
79	2	77	78	3	76	445226.45090	0.10000	00	0.0058
79	2	77	78	2	76	445226.45090	0.10000	00	0.0058
80	2	79	79	2	78	445912.79160	0.10000	00	-0.0580
80	1	79	79	2	78	445912.79160	0.10000	00	-0.0580
80	1	79	79	1	78	445912.79160	0.10000	00	-0.0580
80	2	79	79	1	78	445912.79160	0.10000	00	-0.0580
81	0	81	80	1	80	446600.22720	0.10000	00	-0.0875
81	1	81	80	1	80	446600.22720	0.10000	00	-0.0875
81	1	81	80	0	80	446600.22720	0.10000	00	-0.0875
81	0	81	80	0	80	446600.22720	0.10000	00	-0.0875
74	8	66	73	9	65	446896.26790	0.10000	00	0.3996

74	8	66	73	8	65	446896.26790	0.10000	00	0.3984
76	6	70	75	7	69	448042.76620	0.10000	00	0.1866
76	6	70	75	6	69	448042.76620	0.10000	00	0.1866
76	7	70	75	7	69	448042.76620	0.10000	00	0.1866
76	7	70	75	6	69	448042.76620	0.10000	00	0.1866
77	5	72	76	6	71	448676.90880	0.10000	00	0.1387
77	5	72	76	5	71	448676.90880	0.10000	00	0.1387
77	6	72	76	5	71	448676.90880	0.10000	00	0.1387
77	6	72	76	6	71	448676.90880	0.10000	00	0.1387
78	4	74	77	4	73	449334.62230	0.10000	00	0.0647
78	4	74	77	5	73	449334.62230	0.10000	00	0.0647
78	5	74	77	4	73	449334.62230	0.10000	00	0.0647
78	5	74	77	5	73	449334.62230	0.10000	00	0.0647
79	4	76	78	4	75	450007.70720	0.10000	00	-0.0138
79	3	76	78	4	75	450007.70720	0.10000	00	-0.0138
79	3	76	78	3	75	450007.70720	0.10000	00	-0.0138
79	4	76	78	3	75	450007.70720	0.10000	00	-0.0138
80	2	78	79	3	77	450690.17540	0.10000	00	0.0122
80	3	78	79	2	77	450690.17540	0.10000	00	0.0122
80	3	78	79	3	77	450690.17540	0.10000	00	0.0122
80	2	78	79	2	77	450690.17540	0.10000	00	0.0122
81	2	80	80	2	79	451377.15380	0.10000	00	-0.0646
81	2	80	80	1	79	451377.15380	0.10000	00	-0.0646
81	1	80	80	1	79	451377.15380	0.10000	00	-0.0646
81	1	80	80	2	79	451377.15380	0.10000	00	-0.0646
82	2	81	81	1	80	456840.84170	0.10000	00	-0.0474
82	1	81	81	1	80	456840.84170	0.10000	00	-0.0474
82	2	81	81	2	80	456840.84170	0.10000	00	-0.0474
82	1	81	81	2	80	456840.84170	0.10000	00	-0.0474
83	0	83	82	1	82	457529.30040	0.10000	00	-0.0892
83	1	83	82	0	82	457529.30040	0.10000	00	-0.0892
83	0	83	82	0	82	457529.30040	0.10000	00	-0.0892
83	1	83	82	1	82	457529.30040	0.10000	00	-0.0892
78	6	72	77	7	71	458955.44010	0.10000	00	0.3996
78	6	72	77	6	71	458955.44010	0.10000	00	0.3996
78	7	72	77	7	71	458955.44010	0.10000	00	0.3996
78	7	72	77	6	71	458955.44010	0.10000	00	0.3996
82	3	80	81	3	79	461615.34310	0.10000	00	-0.1479
82	2	80	81	3	79	461615.34310	0.10000	00	-0.1479
82	3	80	81	2	79	461615.34310	0.10000	00	-0.1479
82	2	80	81	2	79	461615.34310	0.10000	00	-0.1479
83	2	82	82	1	81	462303.80670	0.10000	00	-0.0467
83	2	82	82	2	81	462303.80670	0.10000	00	-0.0467
83	1	82	82	1	81	462303.80670	0.10000	00	-0.0467
83	1	82	82	2	81	462303.80670	0.10000	00	-0.0467
79	7	73	78	7	72	464410.70030	0.10000	00	0.2576
79	6	73	78	6	72	464410.70030	0.10000	00	0.2576
79	7	73	78	6	72	464410.70030	0.10000	00	0.2576

79	6	73	78	7	72	464410.70030	0.10000	00	0.2576
80	5	75	79	6	74	465052.48840	0.10000	00	0.1380
80	6	75	79	5	74	465052.48840	0.10000	00	0.1380
80	6	75	79	6	74	465052.48840	0.10000	00	0.1380
80	5	75	79	5	74	465052.48840	0.10000	00	0.1380
83	3	81	82	2	80	467077.13960	0.10000	00	0.0565
83	2	81	82	3	80	467077.13960	0.10000	00	0.0565
83	3	81	82	3	80	467077.13960	0.10000	00	0.0565
83	2	81	82	2	80	467077.13960	0.10000	00	0.0565
84	1	83	83	1	82	467766.00460	0.10000	00	-0.0981
84	2	83	83	1	82	467766.00460	0.10000	00	-0.0981
84	2	83	83	2	82	467766.00460	0.10000	00	-0.0981
84	1	83	83	2	82	467766.00460	0.10000	00	-0.0981
85	1	85	84	0	84	468455.66490	0.10000	00	0.0053
85	1	85	84	1	84	468455.66490	0.10000	00	0.0053
85	0	85	84	0	84	468455.66490	0.10000	00	0.0053
85	0	85	84	1	84	468455.66490	0.10000	00	0.0053
80	7	74	79	7	73	469865.59060	0.10000	00	0.3258
80	7	74	79	6	73	469865.59060	0.10000	00	0.3258
80	6	74	79	7	73	469865.59060	0.10000	00	0.3258
80	6	74	79	6	73	469865.59060	0.10000	00	0.3258
84	2	82	83	2	81	472538.21280	0.10000	00	0.2637
84	2	82	83	3	81	472538.21280	0.10000	00	0.2637
84	3	82	83	3	81	472538.21280	0.10000	00	0.2637
84	3	82	83	2	81	472538.21280	0.10000	00	0.2637
85	2	84	84	2	83	473227.64910	0.10000	00	0.0204
85	1	84	84	2	83	473227.64910	0.10000	00	0.0204
85	2	84	84	1	83	473227.64910	0.10000	00	0.0204
85	1	84	84	1	83	473227.64910	0.10000	00	0.0204
86	0	86	85	0	85	473917.68390	0.10000	00	-0.0378
86	0	86	85	1	85	473917.68390	0.10000	00	-0.0378
86	1	86	85	1	85	473917.68390	0.10000	00	-0.0378
86	1	86	85	0	85	473917.68390	0.10000	00	-0.0378
81	6	75	80	6	74	475319.82430	0.10000	00	0.3373
81	7	75	80	6	74	475319.82430	0.10000	00	0.3373
81	7	75	80	7	74	475319.82430	0.10000	00	0.3373
81	6	75	80	7	74	475319.82430	0.10000	00	0.3373
85	2	83	84	2	82	477998.07300	0.10000	00	-0.0071
85	3	83	84	3	82	477998.07300	0.10000	00	-0.0071
85	3	83	84	2	82	477998.07300	0.10000	00	-0.0071
85	2	83	84	3	82	477998.07300	0.10000	00	-0.0071
86	2	85	85	2	84	478688.19970	0.10000	00	-0.2230
86	1	85	85	2	84	478688.19970	0.10000	00	-0.2230
86	1	85	85	1	84	478688.19970	0.10000	00	-0.2230
86	2	85	85	1	84	478688.19970	0.10000	00	-0.2230
87	1	87	86	0	86	479378.96850	0.10000	00	-0.0890
87	0	87	86	0	86	479378.96850	0.10000	00	-0.0890
87	0	87	86	1	86	479378.96850	0.10000	00	-0.0890

87	1	87	86	1	86	479378.96850	0.10000	00	-0.0890
87	0	87	86	0	86	479378.97260	0.10000	00	-0.0849
87	1	87	86	0	86	479378.97260	0.10000	00	-0.0849
87	1	87	86	1	86	479378.97260	0.10000	00	-0.0849
87	0	87	86	1	86	479378.97260	0.10000	00	-0.0849
87	2	86	86	1	85	484148.39550	0.10000	00	-0.0810
87	2	86	86	2	85	484148.39550	0.10000	00	-0.0810
87	1	86	86	1	85	484148.39550	0.10000	00	-0.0810
87	1	86	86	2	85	484148.39550	0.10000	00	-0.0810
88	0	88	87	1	87	484839.51590	0.10000	00	-0.1426
88	1	88	87	1	87	484839.51590	0.10000	00	-0.1426
88	1	88	87	0	87	484839.51590	0.10000	00	-0.1426
88	0	88	87	0	87	484839.51590	0.10000	00	-0.1426
88	1	87	87	1	86	489607.69100	0.10000	00	-0.0904
88	2	87	87	2	86	489607.69100	0.10000	00	-0.0904
88	1	87	87	2	86	489607.69100	0.10000	00	-0.0904
88	2	87	87	1	86	489607.69100	0.10000	00	-0.0904
89	0	89	88	1	88	490299.38110	0.10000	00	-0.1353
89	1	89	88	1	88	490299.38110	0.10000	00	-0.1353
89	1	89	88	0	88	490299.38110	0.10000	00	-0.1353
89	0	89	88	0	88	490299.38110	0.10000	00	-0.1353
89	1	88	88	2	87	495066.31570	0.10000	00	-0.0134
89	2	88	88	2	87	495066.31570	0.10000	00	-0.0134
89	2	88	88	1	87	495066.31570	0.10000	00	-0.0134
89	1	88	88	1	87	495066.31570	0.10000	00	-0.0134
90	0	90	89	0	89	495758.42060	0.10000	00	-0.2021
90	1	90	89	1	89	495758.42060	0.10000	00	-0.2021
90	0	90	89	1	89	495758.42060	0.10000	00	-0.2021
90	1	90	89	0	89	495758.42060	0.10000	00	-0.2021
90	2	89	89	2	88	500523.96980	0.10000	00	-0.1413
90	1	89	89	2	88	500523.96980	0.10000	00	-0.1413
90	1	89	89	1	88	500523.96980	0.10000	00	-0.1413
90	2	89	89	1	88	500523.96980	0.10000	00	-0.1413
91	0	91	90	1	90	501217.01320	0.10000	00	0.0440
91	1	91	90	0	90	501217.01320	0.10000	00	0.0440
91	0	91	90	0	90	501217.01320	0.10000	00	0.0440
91	1	91	90	1	90	501217.01320	0.10000	00	0.0440
91	1	90	90	1	89	505981.03920	0.10000	00	-0.0798
91	2	90	90	1	89	505981.03920	0.10000	00	-0.0798
91	2	90	90	2	89	505981.03920	0.10000	00	-0.0798
91	1	90	90	2	89	505981.03920	0.10000	00	-0.0798
92	1	92	91	0	91	506674.39020	0.10000	00	-0.1571
92	0	92	91	1	91	506674.39020	0.10000	00	-0.1571
92	0	92	91	0	91	506674.39020	0.10000	00	-0.1571
92	1	92	91	1	91	506674.39020	0.10000	00	-0.1571
92	2	91	91	1	90	511437.34800	0.10000	00	0.0037
92	2	91	91	2	90	511437.34800	0.10000	00	0.0037
92	1	91	91	2	90	511437.34800	0.10000	00	0.0037

92	1	91	91	1	90	511437.34800	0.10000	00	0.0037
93	0	93	92	1	92	512131.28820	0.10000	00	-0.0606
93	0	93	92	0	92	512131.28820	0.10000	00	-0.0606
93	1	93	92	1	92	512131.28820	0.10000	00	-0.0606
93	1	93	92	0	92	512131.28820	0.10000	00	-0.0606
93	2	92	92	2	91	516892.65420	0.10000	00	-0.1243
93	1	92	92	2	91	516892.65420	0.10000	00	-0.1243
93	1	92	92	1	91	516892.65420	0.10000	00	-0.1243
93	2	92	92	1	91	516892.65420	0.10000	00	-0.1243
94	0	94	93	1	93	517587.08990	0.10000	00	-0.2753
94	1	94	93	0	93	517587.08990	0.10000	00	-0.2753
94	1	94	93	1	93	517587.08990	0.10000	00	-0.2753
94	0	94	93	0	93	517587.08990	0.10000	00	-0.2753
94	1	93	93	1	92	522347.31330	0.10000	00	-0.0999
94	2	93	93	1	92	522347.31330	0.10000	00	-0.0999
94	2	93	93	2	92	522347.31330	0.10000	00	-0.0999
94	1	93	93	2	92	522347.31330	0.10000	00	-0.0999
95	1	95	94	1	94	523042.56790	0.10000	00	-0.0204
95	0	95	94	1	94	523042.56790	0.10000	00	-0.0204
95	1	95	94	0	94	523042.56790	0.10000	00	-0.0204
95	0	95	94	0	94	523042.56790	0.10000	00	-0.0204
95	1	94	94	1	93	527801.12690	0.10000	00	-0.1131
95	2	94	94	2	93	527801.12690	0.10000	00	-0.1131
95	1	94	94	2	93	527801.12690	0.10000	00	-0.1131
95	2	94	94	1	93	527801.12690	0.10000	00	-0.1131
96	0	96	95	1	95	528496.60550	0.10000	00	-0.4040
96	1	96	95	1	95	528496.60550	0.10000	00	-0.4040
96	0	96	95	0	95	528496.60550	0.10000	00	-0.4040
96	1	96	95	0	95	528496.60550	0.10000	00	-0.4040
96	1	95	95	2	94	533253.88650	0.10000	00	-0.3640
96	2	95	95	1	94	533253.88650	0.10000	00	-0.3640
96	1	95	95	1	94	533253.88650	0.10000	00	-0.3640
96	2	95	95	2	94	533253.88650	0.10000	00	-0.3640
98	0	98	97	0	97	539403.37530	0.10000	00	-0.0376
98	0	98	97	1	97	539403.37530	0.10000	00	-0.0376
98	1	98	97	1	97	539403.37530	0.10000	00	-0.0376
98	1	98	97	0	97	539403.37530	0.10000	00	-0.0376
99	1	99	98	0	98	544855.32810	0.10000	00	-0.0503
99	1	99	98	1	98	544855.32810	0.10000	00	-0.0503
99	0	99	98	1	98	544855.32810	0.10000	00	-0.0503
99	0	99	98	0	98	544855.32810	0.10000	00	-0.0503
3	1	2	3	0	3	9323.23010	0.10000	00	0.2302
4	1	3	4	0	4	11640.36010	0.10000	00	0.1766
5	1	4	5	0	5	14828.76370	0.10000	00	0.2833
5	2	3	5	1	4	15951.11970	0.10000	00	0.4171
6	2	4	6	1	5	16170.72260	0.10000	00	0.3906
7	2	5	7	1	6	17203.45650	0.10000	00	0.3174
2	1	2	1	0	1	17819.04680	0.10000	00	0.3015

16	0	16	15	1	15	90286.56180	0.10000	10	-0.1976
16	1	16	15	0	15	90298.83900	0.10000	10	-0.0580
17	0	17	16	1	16	95780.89770	0.10000	10	-0.1237
17	1	17	16	0	16	95787.30960	0.10000	10	-0.0976
18	0	18	17	1	17	101273.68210	0.10000	10	-0.2354
18	1	18	17	0	17	101277.17200	0.10000	10	-0.0848
18	1	17	17	2	16	106042.45100	0.10000	10	-0.0489
19	0	19	18	1	18	106765.94080	0.10000	10	-0.0956
19	1	19	18	0	18	106767.66310	0.10000	10	-0.1101
19	1	18	18	2	17	111560.21410	0.10000	10	-0.1189
19	2	18	18	1	17	111642.74110	0.10000	10	-0.3581
20	0	20	19	1	19	112257.56010	0.10000	10	-0.1255
20	1	20	19	0	19	112258.54500	0.10000	10	-0.0397
20	1	19	19	2	18	117064.85030	0.10000	10	-0.2138
20	2	19	19	1	18	117110.55060	0.10000	10	-0.3120
21	0	21	20	1	20	117749.18220	0.10000	10	0.1612
21	1	21	20	0	20	117749.18220	0.10000	10	-0.3022
21	1	20	20	2	19	122562.17810	0.10000	10	-0.2318
21	2	20	20	1	19	122587.24450	0.10000	10	-0.2921
22	0	22	21	1	21	123240.16840	0.10000	10	0.0511
22	1	22	21	0	21	123240.16840	0.10000	10	-0.1868
24	1	23	23	2	22	139036.32630	0.10000	10	-0.2023
24	2	23	23	1	22	139040.28900	0.10000	10	-0.2162
25	0	25	24	1	24	139712.16760	0.10000	10	-0.0306
25	1	25	24	0	24	139712.16760	0.10000	10	-0.0622
24	2	22	23	3	21	143863.47360	0.10000	10	-0.2208
24	3	22	23	2	21	143973.60130	0.10000	10	-0.3401
25	1	24	24	2	23	144525.50490	0.10000	10	-0.1969
25	2	24	24	1	23	144527.58610	0.10000	10	-0.2411
25	2	23	24	3	22	149365.81720	0.10000	10	-0.2917
25	3	23	24	2	22	149428.27660	0.10000	10	-0.2991
26	1	25	25	2	24	150014.28610	0.10000	10	-0.2156
26	2	25	25	1	24	150015.43150	0.10000	10	-0.2005
26	2	24	25	3	23	154859.58970	0.10000	10	-0.3348
26	3	24	25	2	23	154894.68940	0.10000	10	-0.3323
27	1	26	26	2	25	155502.82080	0.10000	10	-0.2441
27	2	26	26	1	25	155503.40080	0.10000	10	-0.2624
28	3	25	27	4	24	170683.23720	0.10000	10	-0.3167
29	3	26	28	4	25	176194.22640	0.10000	10	-0.3304
29	4	26	28	3	25	176319.72040	0.10000	10	-0.2093
30	3	27	29	4	26	181689.87450	0.10000	10	-0.3041
30	4	27	29	3	26	181762.20610	0.10000	10	-0.2349
31	3	28	30	4	27	187176.98290	0.10000	10	-0.1954
31	4	28	30	3	27	187218.30200	0.10000	10	-0.1912
32	3	29	31	4	28	192659.31110	0.10000	10	-0.2496
32	4	29	31	3	28	192682.31170	0.10000	10	-0.6962
33	3	30	32	4	29	198139.37670	0.10000	10	-0.2583
33	4	30	32	3	29	198152.64240	0.10000	10	-0.2095

34	3	31	33	4	30	203618.47000	0.10000	10	-0.2198
34	4	31	33	3	30	203625.87860	0.10000	10	-0.2150
34	4	30	33	5	29	208544.71850	0.10000	10	-0.2644
34	5	30	33	4	29	208675.67850	0.10000	10	0.0642
35	3	32	34	4	31	209097.16570	0.10000	10	-0.2467
35	4	32	34	3	31	209101.36070	0.10000	10	-0.1752
36	3	33	35	4	32	214575.95730	0.10000	10	-0.1859
36	4	33	35	3	32	214578.24380	0.10000	10	-0.1836
37	3	34	36	4	33	220054.80240	0.10000	10	-0.2257
37	4	34	36	3	33	220055.83460	0.10000	10	-0.4526
37	4	33	36	5	32	224982.40570	0.10000	10	-0.1293
37	5	33	36	4	32	225008.00360	0.10000	10	0.0383
38	3	35	37	4	34	225534.30960	0.10000	10	0.2022
38	3	35	37	3	34	225534.30960	0.10000	10	-0.2443
38	4	35	37	3	34	225534.30960	0.10000	10	-0.4885
38	4	35	37	4	34	225534.30960	0.10000	10	-0.0420
38	4	34	37	5	33	230454.28540	0.10000	10	-0.2505
38	5	34	37	4	33	230469.05630	0.10000	10	-0.0151
39	4	36	38	3	35	231013.43320	0.10000	10	-0.3105
39	3	36	38	3	35	231013.43320	0.10000	10	-0.1775
39	4	36	38	4	35	231013.43320	0.10000	10	-0.0663
39	3	36	38	4	35	231013.43320	0.10000	10	0.0668
38	5	33	37	6	32	235420.19550	0.10000	10	-0.2777
39	4	35	38	5	34	235925.86480	0.10000	10	-0.0604
39	5	35	38	4	34	235934.21350	0.10000	10	0.0305
40	3	37	39	3	36	236492.77060	0.10000	10	-0.1269
40	4	37	39	3	36	236492.77060	0.10000	10	-0.1991
40	4	37	39	4	36	236492.77060	0.10000	10	-0.0661
40	3	37	39	4	36	236492.77060	0.10000	10	0.0061
40	4	36	39	5	35	241397.83120	0.10000	10	0.4831
40	5	36	39	4	35	241401.40680	0.10000	10	-0.6061
41	4	38	40	3	37	241972.19830	0.10000	10	-0.1631
41	3	38	40	3	37	241972.19830	0.10000	10	-0.1240
41	4	38	40	4	37	241972.19830	0.10000	10	-0.0909
41	3	38	40	4	37	241972.19830	0.10000	10	-0.0518
40	5	35	39	6	34	246381.33300	0.10000	10	0.0250
40	6	35	39	5	34	246457.77600	0.10000	10	0.4756
41	4	37	40	5	36	246869.04630	0.10000	10	-0.0639
41	5	37	40	4	36	246871.70370	0.10000	10	-0.0276
42	4	39	41	3	38	247451.65800	0.10000	10	-0.1717
42	3	39	41	3	38	247451.65800	0.10000	10	-0.1506
42	4	39	41	4	38	247451.65800	0.10000	10	-0.1326
42	3	39	41	4	38	247451.65800	0.10000	10	-0.1116
41	5	36	40	6	35	251848.59710	0.10000	10	-0.0261
41	6	36	40	5	35	251893.58180	0.10000	10	0.4529
42	4	38	41	5	37	252341.26620	0.10000	10	-0.0590
42	5	38	41	4	37	252342.96190	0.10000	10	0.1712
43	3	40	42	3	39	252931.19120	0.10000	10	-0.1006

43	4	40	42	4	39	252931.19120	0.10000	10	-0.0908
43	3	40	42	4	39	252931.19120	0.10000	10	-0.0795
43	4	40	42	3	39	252931.19120	0.10000	10	-0.1119
42	5	37	41	6	36	257312.71980	0.10000	10	0.0241
42	6	37	41	5	36	257338.94790	0.10000	10	0.3632
43	4	39	42	4	38	257814.59940	0.10000	10	0.0715
43	5	39	42	5	38	257814.59940	0.10000	10	0.3050
43	4	39	42	5	38	257814.59940	0.10000	10	0.5960
43	5	39	42	4	38	257814.59940	0.10000	10	-0.2195
44	4	41	43	3	40	258410.58170	0.10000	10	-0.1404
44	3	41	43	3	40	258410.58170	0.10000	10	-0.1344
44	4	41	43	4	40	258410.58170	0.10000	10	-0.1291
44	3	41	43	4	40	258410.58170	0.10000	10	-0.1231
43	5	38	42	6	37	262775.79340	0.10000	10	0.2454
43	6	38	42	5	37	262790.73930	0.10000	10	0.2265
44	5	40	43	4	39	263287.35890	0.10000	10	-0.1947
44	4	40	43	4	39	263287.35890	0.10000	10	-0.0339
44	5	40	43	5	39	263287.35890	0.10000	10	0.0964
44	4	40	43	5	39	263287.35890	0.10000	10	0.2572
45	3	42	44	3	41	263889.88860	0.10000	10	-0.1445
45	4	42	44	4	41	263889.88860	0.10000	10	-0.1417
45	3	42	44	4	41	263889.88860	0.10000	10	-0.1385
45	4	42	44	3	41	263889.88860	0.10000	10	-0.1477
43	6	37	42	7	36	267802.34410	0.10000	10	-0.2791
44	5	39	43	6	38	268238.44060	0.10000	10	0.1507
44	6	39	43	5	38	268247.10800	0.10000	10	0.2188
45	4	41	44	4	40	268760.68000	0.10000	10	-0.0337
45	5	41	44	5	40	268760.68000	0.10000	10	0.0387
45	4	41	44	5	40	268760.68000	0.10000	10	0.1272
45	5	41	44	4	40	268760.68000	0.10000	10	-0.1222
46	4	43	45	3	42	269369.08610	0.10000	10	-0.1158
46	3	43	45	3	42	269369.08610	0.10000	10	-0.1140
46	4	43	45	4	42	269369.08610	0.10000	10	-0.1125
46	3	43	45	4	42	269369.08610	0.10000	10	-0.1108
44	6	38	43	7	37	273274.42270	0.10000	10	-0.1035
44	7	38	43	6	37	273397.82970	0.10000	10	0.9875
45	5	40	44	6	39	273701.63220	0.10000	10	0.1458
45	6	40	44	5	39	273706.70700	0.10000	10	0.3064
46	4	42	45	4	41	274234.21990	0.10000	10	-0.1495
46	5	42	45	5	41	274234.21990	0.10000	10	-0.1095
46	4	42	45	5	41	274234.21990	0.10000	10	-0.0609
46	5	42	45	4	41	274234.21990	0.10000	10	-0.1980
47	4	44	46	3	43	274848.06560	0.10000	10	-0.1145
47	3	44	46	3	43	274848.06560	0.10000	10	-0.1136
47	4	44	46	4	43	274848.06560	0.10000	10	-0.1128
47	3	44	46	4	43	274848.06560	0.10000	10	-0.1119
45	6	39	44	7	38	278735.83310	0.10000	10	0.0872
45	7	39	44	6	38	278809.37880	0.10000	10	0.8655

46	5	41	45	6	40	279165.53150	0.10000	10	0.1455
46	6	41	45	5	40	279168.40180	0.10000	10	0.2220
47	5	43	46	4	42	279708.27260	0.10000	10	-0.0119
47	4	43	46	4	42	279708.27260	0.10000	10	0.0146
47	5	43	46	5	42	279708.27260	0.10000	10	0.0366
47	4	43	46	5	42	279708.27260	0.10000	10	0.0631
48	4	45	47	3	44	280326.86310	0.10000	10	-0.0737
48	4	45	47	4	44	280326.86310	0.10000	10	-0.0728
48	3	45	47	4	44	280326.86310	0.10000	10	-0.0723
48	3	45	47	3	44	280326.86310	0.10000	10	-0.0732
46	6	40	45	7	39	284191.93170	0.10000	10	0.3860
46	7	40	45	6	39	284235.28050	0.10000	10	0.7444
47	5	42	46	6	41	284629.86880	0.10000	10	-0.1902
47	6	42	46	5	41	284631.83360	0.10000	10	0.1940
48	4	44	47	4	43	285182.40880	0.10000	10	0.1162
48	5	44	47	5	43	285182.40880	0.10000	10	0.1283
48	4	44	47	5	43	285182.40880	0.10000	10	0.1427
48	5	44	47	4	43	285182.40880	0.10000	10	0.1018
49	3	46	48	4	45	285805.37620	0.10000	10	-0.0639
49	4	46	48	3	45	285805.37620	0.10000	10	-0.0646
49	3	46	48	3	45	285805.37620	0.10000	10	-0.0643
49	4	46	48	4	45	285805.37620	0.10000	10	-0.0641
50	2	48	49	2	47	286515.22810	0.10000	00	0.0250
47	6	41	46	7	40	289645.32390	0.10000	10	0.2822
47	7	41	46	6	40	289670.92850	0.10000	10	0.6525
48	5	43	47	6	42	290095.94140	0.10000	10	0.4621
48	6	43	47	5	42	290096.46170	0.10000	10	0.0924
49	4	45	48	4	44	290656.41500	0.10000	10	0.0170
49	5	45	48	5	44	290656.41500	0.10000	10	0.0236
49	4	45	48	5	44	290656.41500	0.10000	10	0.0314
49	5	45	48	4	44	290656.41500	0.10000	10	0.0092
50	4	47	49	3	46	291283.60620	0.10000	10	-0.0579
50	3	47	49	3	46	291283.60620	0.10000	10	-0.0577
50	4	47	49	4	46	291283.60620	0.10000	10	-0.0576
50	3	47	49	4	46	291283.60620	0.10000	10	-0.0575
48	6	42	47	7	41	295098.14600	0.10000	10	0.1368
48	7	42	47	6	41	295113.22650	0.10000	10	0.4949
49	6	44	48	5	43	295562.12870	0.10000	10	0.0568
49	5	44	48	5	43	295562.12870	0.10000	10	0.2358
49	6	44	48	6	43	295562.12870	0.10000	10	0.3769
49	5	44	48	6	43	295562.12870	0.10000	10	0.5559
50	4	46	49	4	45	296130.56050	0.10000	10	0.0520
50	5	46	49	5	45	296130.56050	0.10000	10	0.0556
50	4	46	49	5	45	296130.56050	0.10000	10	0.0598
50	5	46	49	4	45	296130.56050	0.10000	10	0.0478
51	4	48	50	4	47	296761.54290	0.10000	10	-0.0379
51	3	48	50	3	47	296761.54290	0.10000	10	-0.0379
51	4	48	50	3	47	296761.54290	0.10000	10	-0.0380

51	3	48	50	4	47	296761.54290	0.10000	10	-0.0378
49	6	43	48	7	42	300551.65910	0.10000	10	0.2556
49	7	43	48	6	42	300560.37300	0.10000	10	0.4287
50	5	45	49	5	44	301028.55490	0.10000	10	0.1310
50	6	45	49	6	44	301028.55490	0.10000	10	0.2103
50	5	45	49	6	44	301028.55490	0.10000	10	0.3099
50	6	45	49	5	44	301028.55490	0.10000	10	0.0313
51	5	47	50	4	46	301604.63670	0.10000	10	0.0683
51	4	47	50	4	46	301604.63670	0.10000	10	0.0706
51	5	47	50	5	46	301604.63670	0.10000	10	0.0725
51	4	47	50	5	46	301604.63670	0.10000	10	0.0748
52	3	49	51	3	48	302239.05060	0.10000	10	-0.1170
52	4	49	51	4	48	302239.05060	0.10000	10	-0.1170
52	3	49	51	4	48	302239.05060	0.10000	10	-0.1169
52	4	49	51	3	48	302239.05060	0.10000	10	-0.1170
50	6	44	49	7	43	306005.73280	0.10000	10	0.0426
50	7	44	49	6	43	306010.80400	0.10000	10	0.1857
51	5	46	50	5	45	306495.65790	0.10000	10	0.1631
51	6	46	50	6	45	306495.65790	0.10000	10	0.2075
51	5	46	50	6	45	306495.65790	0.10000	10	0.2628
51	6	46	50	5	45	306495.65790	0.10000	10	0.1078
52	5	48	51	4	47	307078.58030	0.10000	10	0.0598
52	4	48	51	4	47	307078.58030	0.10000	10	0.0611
52	5	48	51	5	47	307078.58030	0.10000	10	0.0621
52	4	48	51	5	47	307078.58030	0.10000	10	0.0634
53	3	50	52	4	49	307716.38290	0.10000	10	-0.0194
53	4	50	52	3	49	307716.38290	0.10000	10	-0.0194
53	3	50	52	3	49	307716.38290	0.10000	10	-0.0194
53	4	50	52	4	49	307716.38290	0.10000	10	-0.0194
50	7	43	49	8	42	311088.99520	0.10000	10	0.1439
50	8	43	49	7	42	311157.59540	0.10000	10	1.0286
51	6	45	50	7	44	311461.22230	0.10000	10	0.1726
51	7	45	50	6	44	311464.18790	0.10000	10	0.3089
52	6	47	51	5	46	311963.13870	0.10000	10	0.1279
52	5	47	51	5	46	311963.13870	0.10000	10	0.1585
52	6	47	51	6	46	311963.13870	0.10000	10	0.1832
52	5	47	51	6	46	311963.13870	0.10000	10	0.2138
53	4	49	52	4	48	312552.38960	0.10000	10	0.0679
53	5	49	52	5	48	312552.38960	0.10000	10	0.0685
53	4	49	52	5	48	312552.38960	0.10000	10	0.0691
53	5	49	52	4	48	312552.38960	0.10000	10	0.0673
54	4	51	53	3	50	313193.21070	0.10000	10	-0.0539
54	3	51	53	3	50	313193.21070	0.10000	10	-0.0538
54	4	51	53	4	50	313193.21070	0.10000	10	-0.0538
54	3	51	53	4	50	313193.21070	0.10000	10	-0.0538
51	7	44	50	8	43	316532.89400	0.10000	10	0.2979
51	8	44	50	7	43	316573.57310	0.10000	10	0.6787
52	6	46	51	7	45	316917.72050	0.10000	10	0.2176

52	7	46	51	6	45	316919.50820	0.10000	10	0.3887
53	6	48	52	5	47	317430.90740	0.10000	10	0.1182
53	5	48	52	5	47	317430.90740	0.10000	10	0.1350
53	6	48	52	6	47	317430.90740	0.10000	10	0.1487
53	5	48	52	6	47	317430.90740	0.10000	10	0.1656
54	5	50	53	4	49	318025.99420	0.10000	10	0.0620
54	4	50	53	5	49	318025.99420	0.10000	10	0.0630
54	5	50	53	5	49	318025.99420	0.10000	10	0.0627
54	4	50	53	4	49	318025.99420	0.10000	10	0.0623
55	4	52	54	3	51	318669.69080	0.10000	10	-0.0444
55	3	52	54	3	51	318669.69080	0.10000	10	-0.0444
55	4	52	54	4	51	318669.69080	0.10000	10	-0.0444
55	3	52	54	4	51	318669.69080	0.10000	10	-0.0444
52	8	45	51	7	44	321999.32590	0.10000	10	0.4858
53	6	47	52	7	46	322375.54380	0.10000	10	0.5581
54	6	49	53	5	48	322898.91500	0.10000	10	0.1283
54	5	49	53	5	48	322898.91500	0.10000	10	0.1376
54	6	49	53	6	48	322898.91500	0.10000	10	0.1452
54	5	49	53	6	48	322898.91500	0.10000	10	0.1544
55	5	51	54	4	50	323499.34430	0.10000	10	0.0321
55	4	51	54	4	50	323499.34430	0.10000	10	0.0323
55	5	51	54	5	50	323499.34430	0.10000	10	0.0325
55	4	51	54	5	50	323499.34430	0.10000	10	0.0327
56	4	53	55	4	52	324145.78750	0.10000	10	-0.0089
56	3	53	55	4	52	324145.78750	0.10000	10	-0.0089
56	4	53	55	3	52	324145.78750	0.10000	10	-0.0089
56	3	53	55	3	52	324145.78750	0.10000	10	-0.0089
53	7	46	52	8	45	327417.79370	0.10000	10	0.2036
53	8	46	52	7	45	327432.04130	0.10000	10	0.4365
54	7	48	53	6	47	327833.83560	0.10000	10	-0.0780
54	6	48	53	6	47	327833.83560	0.10000	10	0.1100
54	7	48	53	7	47	327833.83560	0.10000	10	0.2548
54	6	48	53	7	47	327833.83560	0.10000	10	0.4428
56	4	52	55	5	51	328972.47650	0.10000	10	0.0490
56	5	52	55	5	51	328972.47650	0.10000	10	0.0489
56	5	52	55	4	51	328972.47650	0.10000	10	0.0487
56	4	52	55	4	51	328972.47650	0.10000	10	0.0488
57	4	54	56	4	53	329621.35400	0.10000	10	-0.0770
57	4	54	56	3	53	329621.35400	0.10000	10	-0.0770
57	3	54	56	3	53	329621.35400	0.10000	10	-0.0770
57	3	54	56	4	53	329621.35400	0.10000	10	-0.0770
54	7	47	53	8	46	332861.46470	0.10000	10	0.3277
54	8	47	53	7	46	332869.76020	0.10000	10	0.4274
55	7	49	54	7	48	333292.94460	0.10000	10	0.2358
55	7	49	54	6	48	333292.94460	0.10000	10	0.0478
55	6	49	54	6	48	333292.94460	0.10000	10	0.1536
55	6	49	54	7	48	333292.94460	0.10000	10	0.3416
56	5	51	55	5	50	333835.32700	0.10000	10	0.2212

56	6	51	55	6	50	333835.32700	0.10000	10	0.2235
56	5	51	55	6	50	333835.32700	0.10000	10	0.2263
56	6	51	55	5	50	333835.32700	0.10000	10	0.2184
57	5	53	56	4	52	334445.36710	0.10000	10	0.1195
57	4	53	56	4	52	334445.36710	0.10000	10	0.1196
57	4	53	56	5	52	334445.36710	0.10000	10	0.1197
57	5	53	56	5	52	334445.36710	0.10000	10	0.1196
58	4	55	57	4	54	335096.68100	0.10000	10	0.0580
58	4	55	57	3	54	335096.68100	0.10000	10	0.0580
58	3	55	57	3	54	335096.68100	0.10000	10	0.0580
58	3	55	57	4	54	335096.68100	0.10000	10	0.0580
55	7	48	54	8	47	338306.26620	0.10000	10	0.2609
55	8	48	54	8	47	338308.07680	0.10000	10	0.3213
56	7	50	55	7	49	338752.82250	0.10000	10	0.2707
56	7	50	55	6	49	338752.82250	0.10000	10	0.1650
56	6	50	55	6	49	338752.82250	0.10000	10	0.2242
56	6	50	55	7	49	338752.82250	0.10000	10	0.3300
57	6	52	56	6	51	339303.52380	0.10000	10	0.2340
57	5	52	56	5	51	339303.52380	0.10000	10	0.2327
57	6	52	56	5	51	339303.52380	0.10000	10	0.2312
57	5	52	56	6	51	339303.52380	0.10000	10	0.2355
58	5	54	57	5	53	339917.89710	0.10000	10	0.1548
58	4	54	57	4	53	339917.89710	0.10000	10	0.1548
58	4	54	57	5	53	339917.89710	0.10000	10	0.1548
58	5	54	57	4	53	339917.89710	0.10000	10	0.1547
59	4	56	58	3	55	340571.46640	0.10000	10	0.1094
59	4	56	58	4	55	340571.46640	0.10000	10	0.1094
59	3	56	58	4	55	340571.46640	0.10000	10	0.1094
59	3	56	58	3	55	340571.46640	0.10000	10	0.1094
56	7	49	55	8	48	343752.53560	0.10000	10	0.2317
56	8	49	55	7	48	343755.29240	0.10000	10	0.2280
57	7	51	56	6	50	344213.17950	0.10000	10	0.1451
57	6	51	56	7	50	344213.17950	0.10000	10	0.2375
57	6	51	56	6	50	344213.17950	0.10000	10	0.1782
57	7	51	56	7	50	344213.17950	0.10000	10	0.2044
58	5	53	57	6	52	344771.57870	0.10000	10	0.1699
58	5	53	57	5	52	344771.57870	0.10000	10	0.1684
58	6	53	57	5	52	344771.57870	0.10000	10	0.1676
58	6	53	57	6	52	344771.57870	0.10000	10	0.1691
59	5	55	58	4	54	345390.04610	0.10000	10	0.1607
59	4	55	58	5	54	345390.04610	0.10000	10	0.1607
59	4	55	58	4	54	345390.04610	0.10000	10	0.1607
59	5	55	58	5	54	345390.04610	0.10000	10	0.1607
60	3	57	59	3	56	346045.66250	0.10000	10	0.0441
60	4	57	59	3	56	346045.66250	0.10000	10	0.0441
60	4	57	59	4	56	346045.66250	0.10000	10	0.0441
60	3	57	59	4	56	346045.66250	0.10000	10	0.0441
56	8	48	55	9	47	348867.25460	0.10000	10	-0.1908

56	9	48	55	8	47	348904.99760	0.10000	10	0.6202
57	7	50	56	8	49	349200.15180	0.10000	10	0.1482
57	8	50	56	7	49	349201.86950	0.10000	10	0.2752
58	6	52	57	6	51	349674.03250	0.10000	10	0.1590
58	7	52	57	7	51	349674.03250	0.10000	10	0.1737
58	6	52	57	7	51	349674.03250	0.10000	10	0.1921
58	7	52	57	6	51	349674.03250	0.10000	10	0.1406
59	6	54	58	5	53	350239.59360	0.10000	10	0.1823
59	5	54	58	5	53	350239.59360	0.10000	10	0.1827
59	6	54	58	6	53	350239.59360	0.10000	10	0.1831
59	5	54	58	6	53	350239.59360	0.10000	10	0.1835
60	5	56	59	5	55	350861.83840	0.10000	10	0.1867
60	5	56	59	4	55	350861.83840	0.10000	10	0.1867
60	4	56	59	5	55	350861.83840	0.10000	10	0.1867
60	4	56	59	4	55	350861.83840	0.10000	10	0.1867
61	4	58	60	3	57	351519.46770	0.10000	10	0.0746
61	3	58	60	4	57	351519.46770	0.10000	10	0.0746
61	3	58	60	3	57	351519.46770	0.10000	10	0.0746
61	4	58	60	4	57	351519.46770	0.10000	10	0.0746
57	8	49	56	9	48	354298.31660	0.10000	10	-0.1424
57	9	49	56	8	48	354320.84270	0.10000	10	0.3990
58	8	51	57	7	50	354650.26150	0.10000	10	0.3463
58	7	51	57	8	50	354650.26150	0.10000	10	1.2589
59	6	53	58	7	52	355135.22520	0.10000	10	0.1398
59	7	53	58	6	52	355135.22520	0.10000	10	0.1112
59	6	53	58	6	52	355135.22520	0.10000	10	0.1214
59	7	53	58	7	52	355135.22520	0.10000	10	0.1296
60	6	55	59	6	54	355707.40060	0.10000	10	0.1556
60	5	55	59	5	54	355707.40060	0.10000	10	0.1554
60	6	55	59	5	54	355707.40060	0.10000	10	0.1552
60	5	55	59	6	54	355707.40060	0.10000	10	0.1559
61	5	57	60	5	56	356333.13010	0.10000	10	0.1121
61	4	57	60	4	56	356333.13010	0.10000	10	0.1121
61	5	57	60	4	56	356333.13010	0.10000	10	0.1121
61	4	57	60	5	56	356333.13010	0.10000	10	0.1121
62	3	59	61	3	58	356992.76550	0.10000	10	0.0979
62	4	59	61	4	58	356992.76550	0.10000	10	0.0979
62	3	59	61	4	58	356992.76550	0.10000	10	0.0979
62	4	59	61	3	58	356992.76550	0.10000	10	0.0979
58	8	50	57	9	49	359730.15430	0.10000	10	-0.1690
58	9	50	57	8	49	359743.23240	0.10000	10	-0.1051
59	7	52	58	8	51	360099.41790	0.10000	10	0.2520
59	8	52	58	8	51	360099.41790	0.10000	10	0.0627
59	7	52	58	7	51	360099.41790	0.10000	10	-0.0801
59	7	52	58	7	51	360099.41790	0.10000	10	-0.0801
60	6	54	59	7	53	360596.63730	0.10000	10	0.0531
60	7	54	59	7	53	360596.63730	0.10000	10	0.0475
60	7	54	59	6	53	360596.63730	0.10000	10	0.0372

60	6	54	59	6	53	360596.63730	0.10000	10	0.0429
61	5	56	60	6	55	361174.94410	0.10000	10	0.0746
61	6	56	60	6	55	361174.94410	0.10000	10	0.0745
61	6	56	60	5	55	361174.94410	0.10000	10	0.0743
61	5	56	60	5	55	361174.94410	0.10000	10	0.0744
62	4	58	61	4	57	361804.11540	0.10000	10	0.1529
62	5	58	61	4	57	361804.11540	0.10000	10	0.1529
62	5	58	61	5	57	361804.11540	0.10000	10	0.1529
62	4	58	61	5	57	361804.11540	0.10000	10	0.1529
63	4	60	62	3	59	362465.49780	0.10000	10	0.0691
63	3	60	62	3	59	362465.49780	0.10000	10	0.0691
63	4	60	62	4	59	362465.49780	0.10000	10	0.0691
63	3	60	62	4	59	362465.49780	0.10000	10	0.0691
59	8	51	58	9	50	365163.37290	0.10000	10	-0.2884
59	9	51	58	8	50	365171.21250	0.10000	10	-0.1122
60	8	53	59	8	52	365550.39280	0.10000	10	-0.0620
60	8	53	59	7	52	365550.39280	0.10000	10	-0.2513
60	7	53	59	7	52	365550.39280	0.10000	10	-0.1439
60	7	53	59	8	52	365550.39280	0.10000	10	0.0454
61	7	55	60	7	54	366058.36620	0.10000	10	0.1106
61	6	55	60	7	54	366058.36620	0.10000	10	0.1137
61	7	55	60	6	54	366058.36620	0.10000	10	0.1049
61	6	55	60	6	54	366058.36620	0.10000	10	0.1081
62	5	57	61	6	56	366642.35970	0.10000	10	0.1151
62	6	57	61	6	56	366642.35970	0.10000	10	0.1150
62	5	57	61	5	56	366642.35970	0.10000	10	0.1150
62	6	57	61	5	56	366642.35970	0.10000	10	0.1149
63	5	59	62	5	58	367274.58750	0.10000	10	0.1228
63	4	59	62	4	58	367274.58750	0.10000	10	0.1228
63	4	59	62	5	58	367274.58750	0.10000	10	0.1228
63	5	59	62	4	58	367274.58750	0.10000	10	0.1228
64	3	61	63	3	60	367937.75400	0.10000	10	0.0902
64	4	61	63	3	60	367937.75400	0.10000	10	0.0902
64	4	61	63	4	60	367937.75400	0.10000	10	0.0902
64	3	61	63	4	60	367937.75400	0.10000	10	0.0902
61	8	54	60	8	53	371002.34060	0.10000	10	-0.1221
61	7	54	60	7	53	371002.34060	0.10000	10	-0.1687
61	8	54	60	7	53	371002.34060	0.10000	10	-0.2295
61	7	54	60	8	53	371002.34060	0.10000	10	-0.0613
62	7	56	61	6	55	371520.03940	0.10000	10	0.0206
62	7	56	61	7	55	371520.03940	0.10000	10	0.0237
62	6	56	61	7	55	371520.03940	0.10000	10	0.0254
62	6	56	61	6	55	371520.03940	0.10000	10	0.0223
63	5	58	62	6	57	372109.45250	0.10000	10	0.1188
63	6	58	62	5	57	372109.45250	0.10000	10	0.1187
63	5	58	62	5	57	372109.45250	0.10000	10	0.1187
63	6	58	62	6	57	372109.45250	0.10000	10	0.1187
64	5	60	63	5	59	372744.63160	0.10000	10	0.1264

64	4	60	63	5	59	372744.63160	0.10000	10	0.1264
64	5	60	63	4	59	372744.63160	0.10000	10	0.1264
64	4	60	63	4	59	372744.63160	0.10000	10	0.1264
65	3	62	64	3	61	373409.44140	0.10000	10	0.0806
65	3	62	64	4	61	373409.44140	0.10000	10	0.0806
65	4	62	64	4	61	373409.44140	0.10000	10	0.0806
65	4	62	64	3	61	373409.44140	0.10000	10	0.0806
62	7	55	61	8	54	376454.96040	0.10000	10	-0.2310
62	8	55	61	8	54	376454.96040	0.10000	10	-0.2652
62	7	55	61	7	54	376454.96040	0.10000	10	-0.2917
62	8	55	61	7	54	376454.96040	0.10000	10	-0.3260
63	7	57	62	7	56	376981.82650	0.10000	10	0.0259
63	6	57	62	6	56	376981.82650	0.10000	10	0.0251
63	7	57	62	6	56	376981.82650	0.10000	10	0.0242
63	6	57	62	7	56	376981.82650	0.10000	10	0.0269
64	5	59	63	6	58	377576.20140	0.10000	10	0.0982
64	6	59	63	5	58	377576.20140	0.10000	10	0.0982
64	6	59	63	6	58	377576.20140	0.10000	10	0.0982
64	5	59	63	5	58	377576.20140	0.10000	10	0.0982
65	5	61	64	5	60	378214.20020	0.10000	10	0.1345
65	4	61	64	4	60	378214.20020	0.10000	10	0.1345
65	5	61	64	4	60	378214.20020	0.10000	10	0.1345
65	4	61	64	5	60	378214.20020	0.10000	10	0.1345
66	4	63	65	3	62	378880.59880	0.10000	10	0.0913
66	4	63	65	4	62	378880.59880	0.10000	10	0.0913
66	3	63	65	3	62	378880.59880	0.10000	10	0.0913
66	3	63	65	4	62	378880.59880	0.10000	10	0.0913
63	8	56	62	8	55	381908.34600	0.10000	10	-0.2608
63	7	56	62	7	55	381908.34600	0.10000	10	-0.2758
63	8	56	62	7	55	381908.34600	0.10000	10	-0.2950
63	7	56	62	8	55	381908.34600	0.10000	10	-0.2416
64	6	58	63	6	57	382443.47630	0.10000	10	-0.0713
64	7	58	63	7	57	382443.47630	0.10000	10	-0.0708
64	6	58	63	7	57	382443.47630	0.10000	10	-0.0703
64	7	58	63	6	57	382443.47630	0.10000	10	-0.0718
65	5	60	64	6	59	383042.69600	0.10000	10	0.1742
65	5	60	64	5	59	383042.69600	0.10000	10	0.1742
65	6	60	64	5	59	383042.69600	0.10000	10	0.1741
65	6	60	64	6	59	383042.69600	0.10000	10	0.1742
66	5	62	65	4	61	383683.28400	0.10000	10	0.1553
66	4	62	65	5	61	383683.28400	0.10000	10	0.1553
66	5	62	65	5	61	383683.28400	0.10000	10	0.1553
66	4	62	65	4	61	383683.28400	0.10000	10	0.1553
67	3	64	66	4	63	384351.17080	0.10000	10	0.0784
67	3	64	66	3	63	384351.17080	0.10000	10	0.0784
67	4	64	66	4	63	384351.17080	0.10000	10	0.0784
67	4	64	66	3	63	384351.17080	0.10000	10	0.0784
64	7	57	63	8	56	387362.06400	0.10000	10	-0.4089

64	8	57	63	7	56	387362.06400	0.10000	10	-0.4389
64	7	57	63	7	56	387362.06400	0.10000	10	-0.4281
64	8	57	63	8	56	387362.06400	0.10000	10	-0.4197
65	6	59	64	6	58	387905.05960	0.10000	10	-0.1387
65	6	59	64	7	58	387905.05960	0.10000	10	-0.1382
65	7	59	64	6	58	387905.05960	0.10000	10	-0.1390
65	7	59	64	7	58	387905.05960	0.10000	10	-0.1385
66	6	61	65	5	60	388508.48120	0.10000	10	-0.0795
66	5	61	65	6	60	388508.48120	0.10000	10	-0.0795
66	5	61	65	5	60	388508.48120	0.10000	10	-0.0795
66	6	61	65	6	60	388508.48120	0.10000	10	-0.0795
67	4	63	66	4	62	389151.79380	0.10000	10	0.1162
67	4	63	66	5	62	389151.79380	0.10000	10	0.1162
67	5	63	66	5	62	389151.79380	0.10000	10	0.1162
67	5	63	66	4	62	389151.79380	0.10000	10	0.1162
68	3	65	67	4	64	389821.26020	0.10000	10	0.1562
68	4	65	67	3	64	389821.26020	0.10000	10	0.1562
68	4	65	67	4	64	389821.26020	0.10000	10	0.1562
68	3	65	67	3	64	389821.26020	0.10000	10	0.1562
65	7	58	64	8	57	392816.25790	0.10000	10	-0.4826
65	8	58	64	8	57	392816.25790	0.10000	10	-0.4886
65	7	58	64	7	57	392816.25790	0.10000	10	-0.4933
65	8	58	64	7	57	392816.25790	0.10000	10	-0.4993
66	7	60	65	6	59	393366.56690	0.10000	10	-0.1346
66	6	60	65	7	59	393366.56690	0.10000	10	-0.1342
66	7	60	65	7	59	393366.56690	0.10000	10	-0.1344
66	6	60	65	6	59	393366.56690	0.10000	10	-0.1345
67	6	62	66	6	61	393974.23590	0.10000	10	0.0432
67	5	62	66	5	61	393974.23590	0.10000	10	0.0431
67	6	62	66	5	61	393974.23590	0.10000	10	0.0431
67	5	62	66	6	61	393974.23590	0.10000	10	0.0432
68	4	64	67	5	63	394619.84610	0.10000	10	0.1495
68	5	64	67	5	63	394619.84610	0.10000	10	0.1495
68	4	64	67	4	63	394619.84610	0.10000	10	0.1495
68	5	64	67	4	63	394619.84610	0.10000	10	0.1495
69	4	66	68	3	65	395290.59640	0.10000	10	0.0650
69	3	66	68	4	65	395290.59640	0.10000	10	0.0650
69	3	66	68	3	65	395290.59640	0.10000	10	0.0650
69	4	66	68	4	65	395290.59640	0.10000	10	0.0650
70	2	68	69	2	67	396022.96820	0.10000	00	0.0197
70	3	68	69	2	67	396022.96820	0.10000	00	0.0197
70	2	68	69	3	67	396022.96820	0.10000	00	0.0197
70	3	68	69	3	67	396022.96820	0.10000	00	0.0197
66	7	59	65	8	58	398270.65360	0.10000	10	-0.6395
66	8	59	65	8	58	398270.65360	0.10000	10	-0.6428
66	7	59	65	7	58	398270.65360	0.10000	10	-0.6455
66	8	59	65	7	58	398270.65360	0.10000	10	-0.6488
67	6	61	66	7	60	398827.77050	0.10000	10	-0.2382

67	7	61	66	7	60	398827.77050	0.10000	10	-0.2383
67	6	61	66	6	60	398827.77050	0.10000	10	-0.2383
67	7	61	66	6	60	398827.77050	0.10000	10	-0.2384
68	5	63	67	5	62	399439.47580	0.10000	10	0.0831
68	6	63	67	6	62	399439.47580	0.10000	10	0.0831
68	6	63	67	5	62	399439.47580	0.10000	10	0.0831
68	5	63	67	6	62	399439.47580	0.10000	10	0.0831
69	5	65	68	4	64	400087.29690	0.10000	10	0.1267
69	4	65	68	5	64	400087.29690	0.10000	10	0.1267
69	5	65	68	5	64	400087.29690	0.10000	10	0.1267
69	4	65	68	4	64	400087.29690	0.10000	10	0.1267
70	4	67	69	3	66	400759.41230	0.10000	10	0.0488
70	3	67	69	3	66	400759.41230	0.10000	10	0.0488
70	4	67	69	4	66	400759.41230	0.10000	10	0.0488
70	3	67	69	4	66	400759.41230	0.10000	10	0.0488
71	3	69	70	2	68	401492.57940	0.10000	00	0.0134
71	3	69	70	3	68	401492.57940	0.10000	00	0.0134
71	2	69	70	2	68	401492.57940	0.10000	00	0.0134
71	2	69	70	3	68	401492.57940	0.10000	00	0.0134
67	7	60	66	7	59	403725.38910	0.10000	10	-0.6570
67	8	60	66	7	59	403725.38910	0.10000	10	-0.6589
67	8	60	66	8	59	403725.38910	0.10000	10	-0.6555
67	7	60	66	8	59	403725.38910	0.10000	10	-0.6537
68	7	62	67	6	61	404288.84250	0.10000	10	-0.2343
68	6	62	67	6	61	404288.84250	0.10000	10	-0.2342
68	7	62	67	7	61	404288.84250	0.10000	10	-0.2342
68	6	62	67	7	61	404288.84250	0.10000	10	-0.2341
69	6	64	68	6	63	404904.15340	0.10000	10	0.0166
69	5	64	68	6	63	404904.15340	0.10000	10	0.0166
69	5	64	68	5	63	404904.15340	0.10000	10	0.0166
69	6	64	68	5	63	404904.15340	0.10000	10	0.0166
70	5	66	69	4	65	405554.20550	0.10000	10	0.1216
70	4	66	69	4	65	405554.20550	0.10000	10	0.1216
70	4	66	69	5	65	405554.20550	0.10000	10	0.1216
70	5	66	69	5	65	405554.20550	0.10000	10	0.1216
71	3	68	70	3	67	406227.70830	0.10000	10	0.1187
71	4	68	70	3	67	406227.70830	0.10000	10	0.1187
71	3	68	70	4	67	406227.70830	0.10000	10	0.1187
71	4	68	70	4	67	406227.70830	0.10000	10	0.1187
68	8	61	67	8	60	409180.15460	0.10000	10	-0.7560
68	7	61	67	7	60	409180.15460	0.10000	10	-0.7568
68	8	61	67	7	60	409180.15460	0.10000	10	-0.7578
68	7	61	67	8	60	409180.15460	0.10000	10	-0.7549
69	7	63	68	6	62	409749.59720	0.10000	10	-0.2674
69	6	63	68	6	62	409749.59720	0.10000	10	-0.2674
69	6	63	68	7	62	409749.59720	0.10000	10	-0.2673
69	7	63	68	7	62	409749.59720	0.10000	10	-0.2673
70	5	65	69	6	64	410368.36790	0.10000	10	-0.0347

70	6	65	69	6	64	410368.36790	0.10000	10	-0.0347
70	6	65	69	5	64	410368.36790	0.10000	10	-0.0347
70	5	65	69	5	64	410368.36790	0.10000	10	-0.0347
71	4	67	70	5	66	411020.39980	0.10000	10	-0.0236
71	5	67	70	4	66	411020.39980	0.10000	10	-0.0236
71	4	67	70	4	66	411020.39980	0.10000	10	-0.0236
71	5	67	70	5	66	411020.39980	0.10000	10	-0.0236
72	3	69	71	3	68	411695.25620	0.10000	10	0.0569
72	4	69	71	3	68	411695.25620	0.10000	10	0.0569
72	3	69	71	4	68	411695.25620	0.10000	10	0.0569
72	4	69	71	4	68	411695.25620	0.10000	10	0.0569
69	8	62	68	7	61	414634.96330	0.10000	10	-0.8589
69	7	62	68	7	61	414634.96330	0.10000	10	-0.8584
69	8	62	68	8	61	414634.96330	0.10000	10	-0.8579
69	7	62	68	8	61	414634.96330	0.10000	10	-0.8574
70	7	64	69	7	63	415209.94840	0.10000	10	-0.3864
70	6	64	69	7	63	415209.94840	0.10000	10	-0.3864
70	7	64	69	6	63	415209.94840	0.10000	10	-0.3865
70	6	64	69	6	63	415209.94840	0.10000	10	-0.3865
72	4	68	71	4	67	416486.25340	0.10000	10	0.0783
72	5	68	71	5	67	416486.25340	0.10000	10	0.0783
72	4	68	71	5	67	416486.25340	0.10000	10	0.0783
72	5	68	71	4	67	416486.25340	0.10000	10	0.0783
73	4	70	72	3	69	417162.25490	0.10000	10	0.0728
73	3	70	72	4	69	417162.25490	0.10000	10	0.0728
73	4	70	72	4	69	417162.25490	0.10000	10	0.0728
73	3	70	72	3	69	417162.25490	0.10000	10	0.0728
70	8	63	69	8	62	420089.72550	0.10000	10	-0.9847
70	7	63	69	7	62	420089.72550	0.10000	10	-0.9849
70	8	63	69	7	62	420089.72550	0.10000	10	-0.9852
70	7	63	69	8	62	420089.72550	0.10000	10	-0.9844
71	6	65	70	6	64	420670.06730	0.10000	10	-0.3856
71	6	65	70	7	64	420670.06730	0.10000	10	-0.3855
71	7	65	70	6	64	420670.06730	0.10000	10	-0.3856
71	7	65	70	7	64	420670.06730	0.10000	10	-0.3855
72	6	67	71	6	66	421295.40270	0.10000	10	-0.0130
72	5	67	71	5	66	421295.40270	0.10000	10	-0.0130
72	5	67	71	6	66	421295.40270	0.10000	10	-0.0130
72	6	67	71	5	66	421295.40270	0.10000	10	-0.0130
73	4	69	72	5	68	421951.40040	0.10000	10	0.0748
73	5	69	72	5	68	421951.40040	0.10000	10	0.0748
73	5	69	72	4	68	421951.40040	0.10000	10	0.0748
73	4	69	72	4	68	421951.40040	0.10000	10	0.0748
74	4	71	73	3	70	422628.60050	0.10000	10	0.0727
74	3	71	73	4	70	422628.60050	0.10000	10	0.0727
74	3	71	73	3	70	422628.60050	0.10000	10	0.0727
74	4	71	73	4	70	422628.60050	0.10000	10	0.0727
71	7	64	70	7	63	425544.50910	0.10000	10	-1.0077

71	7	64	70	8	63	425544.50910	0.10000	10	-1.0074
71	8	64	70	8	63	425544.50910	0.10000	10	-1.0076
71	8	64	70	7	63	425544.50910	0.10000	10	-1.0079
72	7	66	71	7	65	426129.67280	0.10000	10	-0.5134
72	6	66	71	6	65	426129.67280	0.10000	10	-0.5134
72	6	66	71	7	65	426129.67280	0.10000	10	-0.5134
72	7	66	71	6	65	426129.67280	0.10000	10	-0.5134
73	5	68	72	5	67	426758.01930	0.10000	10	-0.1046
73	5	68	72	6	67	426758.01930	0.10000	10	-0.1046
73	6	68	72	6	67	426758.01930	0.10000	10	-0.1046
73	6	68	72	5	67	426758.01930	0.10000	10	-0.1046
74	5	70	73	5	69	427415.92860	0.10000	10	0.0665
74	4	70	73	4	69	427415.92860	0.10000	10	0.0665
74	5	70	73	4	69	427415.92860	0.10000	10	0.0665
74	4	70	73	5	69	427415.92860	0.10000	10	0.0665
75	3	72	74	3	71	428094.28600	0.10000	10	0.0596
75	4	72	74	4	71	428094.28600	0.10000	10	0.0596
75	3	72	74	4	71	428094.28600	0.10000	10	0.0596
75	4	72	74	3	71	428094.28600	0.10000	10	0.0596
73	7	67	72	6	66	431589.04840	0.10000	10	-0.4561
73	6	67	72	6	66	431589.04840	0.10000	10	-0.4561
73	7	67	72	7	66	431589.04840	0.10000	10	-0.4561
73	6	67	72	7	66	431589.04840	0.10000	10	-0.4561
74	6	69	73	5	68	432220.12590	0.10000	10	-0.1492
74	5	69	73	5	68	432220.12590	0.10000	10	-0.1492
74	5	69	73	6	68	432220.12590	0.10000	10	-0.1492
74	6	69	73	6	68	432220.12590	0.10000	10	-0.1492
75	5	71	74	5	70	432879.81550	0.10000	10	0.0435
75	5	71	74	4	70	432879.81550	0.10000	10	0.0435
75	4	71	74	4	70	432879.81550	0.10000	10	0.0435
75	4	71	74	5	70	432879.81550	0.10000	10	0.0435
76	4	73	75	4	72	433559.36120	0.10000	10	0.0934
76	3	73	75	3	72	433559.36120	0.10000	10	0.0934
76	4	73	75	3	72	433559.36120	0.10000	10	0.0934
76	3	73	75	4	72	433559.36120	0.10000	10	0.0934
76	4	72	75	4	71	438343.07200	0.10000	10	0.0288
76	5	72	75	4	71	438343.07200	0.10000	10	0.0288
76	4	72	75	5	71	438343.07200	0.10000	10	0.0288
76	5	72	75	5	71	438343.07200	0.10000	10	0.0288
77	3	74	76	4	73	439023.72180	0.10000	10	0.0795
77	3	74	76	3	73	439023.72180	0.10000	10	0.0795
77	4	74	76	3	73	439023.72180	0.10000	10	0.0795
77	4	74	76	4	73	439023.72180	0.10000	10	0.0795
75	6	69	74	6	68	442506.12540	0.10000	10	-0.6594
75	7	69	74	6	68	442506.12540	0.10000	10	-0.6594
75	6	69	74	7	68	442506.12540	0.10000	10	-0.6594
75	7	69	74	7	68	442506.12540	0.10000	10	-0.6594
76	5	71	75	6	70	443142.66000	0.10000	10	-0.1780

76	6	71	75	5	70	443142.66000	0.10000	10	-0.1780
76	5	71	75	5	70	443142.66000	0.10000	10	-0.1780
76	6	71	75	6	70	443142.66000	0.10000	10	-0.1780
77	5	73	76	4	72	443805.71280	0.10000	10	0.0493
77	5	73	76	5	72	443805.71280	0.10000	10	0.0493
77	4	73	76	4	72	443805.71280	0.10000	10	0.0493
77	4	73	76	5	72	443805.71280	0.10000	10	0.0493
78	4	75	77	3	74	444487.35840	0.10000	10	0.0184
78	3	75	77	4	74	444487.35840	0.10000	10	0.0184
78	4	75	77	4	74	444487.35840	0.10000	10	0.0184
78	3	75	77	3	74	444487.35840	0.10000	10	0.0184
75	7	68	74	7	67	447361.94350	0.10000	10	-0.9269
75	8	68	74	8	67	447361.94350	0.10000	10	-0.9269
75	7	68	74	8	67	447361.94350	0.10000	10	-0.9269
75	8	68	74	7	67	447361.94350	0.10000	10	-0.9270
76	6	70	75	7	69	447963.92960	0.10000	10	-0.7654
76	7	70	75	6	69	447963.92960	0.10000	10	-0.7654
76	6	70	75	6	69	447963.92960	0.10000	10	-0.7654
76	7	70	75	7	69	447963.92960	0.10000	10	-0.7654
77	5	72	76	5	71	448602.99780	0.10000	10	-0.2190
77	6	72	76	6	71	448602.99780	0.10000	10	-0.2190
77	6	72	76	5	71	448602.99780	0.10000	10	-0.2190
77	5	72	76	6	71	448602.99780	0.10000	10	-0.2190
78	5	74	77	5	73	449267.66010	0.10000	10	0.0387
78	4	74	77	5	73	449267.66010	0.10000	10	0.0387
78	5	74	77	4	73	449267.66010	0.10000	10	0.0387
78	4	74	77	4	73	449267.66010	0.10000	10	0.0387
15	1	15	14	0	14	84812.82650	0.10000	10	-0.1146
15	0	15	14	1	14	84790.02200	0.10000	10	-0.0086
14	1	14	13	0	13	79331.58520	0.10000	10	-0.1318
14	0	14	13	1	13	79288.80570	0.10000	10	-0.0116
13	1	13	12	0	12	73858.79890	0.10000	10	-0.2795
13	0	13	12	1	12	73779.44370	0.10000	10	-0.0532
12	1	12	11	0	11	68401.24020	0.10000	10	-0.4725
16	1	15	15	2	14	94923.19900	0.10000	10	0.6383
17	2	16	16	1	15	100763.39490	0.10000	10	-0.6630
17	1	16	16	2	15	100502.07490	0.10000	10	0.1856
18	2	17	17	1	16	106190.19220	0.10000	10	-0.4352
28	1	27	27	1	26	160991.30580	0.10000	10	-0.3504
28	2	27	27	1	26	160991.30580	0.10000	10	-0.4591
28	1	27	27	2	26	160991.30580	0.10000	10	-0.1437
28	2	27	27	2	26	160991.30580	0.10000	10	-0.2524
27	2	25	26	3	24	160348.72740	0.10000	10	-0.2972
27	2	25	26	3	24	160348.70870	0.10000	10	-0.3159
28	2	26	27	3	25	165835.30070	0.10000	10	-0.3328
28	3	26	27	2	25	165846.19570	0.10000	10	-0.2749
27	3	24	26	4	23	165145.86950	0.10000	10	-0.1736
27	4	24	26	3	23	165512.72560	0.10000	10	-0.3805

26	4	23	25	3	22	160181.60880	0.10000	10	-0.6354
26	3	23	25	4	22	159564.28050	0.10000	10	0.1198
25	3	22	24	4	21	153910.59850	0.10000	10	0.6025
25	4	22	24	3	21	154936.68150	0.10000	10	-1.1135
29	4	25	28	5	24	180574.30010	0.10000	10	0.4639
28	5	24	27	4	23	177481.94040	0.10000	00	0.1086
28	4	24	27	5	23	174702.90610	0.10000	00	0.1662
27	5	23	26	4	22	172881.31560	0.10000	00	0.0330
26	5	22	25	4	21	168677.41110	0.10000	00	0.0839
27	4	23	26	5	22	168517.52240	0.10000	00	0.1610
25	5	21	24	4	20	164987.03040	0.10000	00	0.0561
32	2	30	31	3	29	187774.40720	0.10000	10	-0.3047
32	3	30	31	2	29	187775.50340	0.10000	10	-0.1699
30	4	26	29	5	25	186386.19350	0.10000	00	0.0976
30	4	26	29	5	25	186317.40590	0.10000	10	0.0105
30	5	26	29	4	25	187459.01170	0.10000	00	0.1247
30	5	26	29	4	25	187340.84060	0.10000	10	-0.0839
29	5	25	28	4	24	182370.46250	0.10000	00	0.1050
29	5	25	28	4	24	182236.90050	0.10000	10	-0.5840
31	4	27	30	5	26	191952.38070	0.10000	10	-0.3024
31	5	27	30	4	26	192574.49090	0.10000	10	0.1759
32	5	28	31	4	27	197893.01590	0.10000	10	0.0702
32	4	28	31	5	27	197519.37410	0.10000	10	-0.3177
35	4	31	34	5	30	214030.47980	0.10000	10	-0.3084
35	5	31	34	4	30	214107.10180	0.10000	10	0.0341
37	6	32	36	5	31	230273.31640	0.10000	10	0.8571
37	5	32	36	6	31	230006.58650	0.10000	00	-0.0407
37	6	32	36	5	31	230388.22830	0.10000	00	-0.0192
38	6	33	37	5	32	235747.34850	0.10000	00	-0.1559
38	6	33	37	5	32	235637.81540	0.10000	10	0.7344
38	5	33	37	6	32	235518.07860	0.10000	00	-0.0054
38	5	33	37	6	32	235420.19550	0.10000	10	-0.2777
38	6	32	37	7	31	239808.69360	0.10000	00	0.1308
38	7	32	37	6	31	242221.13320	0.10000	00	-0.2242
42	6	36	41	7	35	262310.73890	0.10000	10	-0.6668