

Bremsstrahlung Emission in Inertial Electrostatic Confinement Nuclear Fusion Reactors

Physics

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This EE was conducted under the older curriculum and does not follow current formatting and expectations.

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SCOPE AND BACKGROUND:

The Inertial electrostatic confinement (IEC) thermonuclear fusion ¹reactor is a type of nuclear fusion reactor in which potential wells in a vacuum are used to ionize, accelerate, and confine high energy deuterons to a central location and thus create optimal conditions for nuclear fusion. The entire process involving the acceleration and deceleration of ions is subject to potentially dangerous bremsstrahlung emission. In addition to being dangerous for the operator, the bremsstrahlung emission poses a severe threat to the performance of such a device, as a lot of energy is carried off via this type of emission. Therefore, the aim of this experiment is attempt to find a relation between pressure and bremsstrahlung emission so as to find the optimal operating pressure for devices that utilize similar operating parameters so as to improve efficiency losses and make the device safer for operation.

Although the fusor, due to fundamental limitiations in its construction, cannot be used to produce energy, the fusor's efficiency is worth imporving as there are many other other applications for fusors. Some applications include industrial neutron sources and fusion research.

²It is important to improve the performance of these devices so we can improve their usefullness and operating costs in the aforementioned applications. Furthermore, while the efficiency improvemnets are not applicable to IEC fusion energy production they are useful in other more viable energy producing thermonuclear fusion candidates such as the tokamak. Because the efficiency improvements in the following experiments are as a result of pressure manipulation within plasma devices and not a unique characteristic of IEC fusion, the method can be applied

¹ These Devices are informally called Fusors or Fusor in the singular form

² "The IEC star-mode fusion neutron source for NAA--status and next-step designs". *Appl Radiat Isot* **53** (4-5): 779–83. October 2000.[PMID 11003520](#).

"Phoenix Nuclear Labs meets neutron production milestone", PNL press release May 1, 2013, Ross Radel, Evan Sengbusch

to all plasma utilizing reactors. In doing the above, nuclear fusion will come one step closer to becoming a viable power source in inertial or magnetic confinement style reactors. The experiment will combine theoretical understanding of particle physics, quantum mechanics, particle accelerators, and nuclear physics, as well as concepts such as Panchen's law with experimental physics to formulate a relevant hypothesis and to test said hypothesis

HISTORY:

The inertial electrostatic confinement fusion reactor (IEC fusor) was first created by Philo T. Farnsworth in 1964 and improved upon later in 1967 by Robert Hirsch.³ The variant of the device used in this experiment was a reconstruction of the Farnsworth-Hirsch reactor. The System originally contained ion guns but was later substituted for just an inner grid in the improvement by Hirsch.⁴ This reactor will never achieve breakeven due to the inner grid which allows the reactor to function but is also its downfall due to the amount of energy it takes away from the plasma⁵.

HYPOTHESIS:

Hypothesis: If the operational pressure is increased from the conventional 10-20 mTorr \pm 1mTorr range to the \sim 40mTorr \pm 1mTorr range, then bremsstrahlung emissions will go down in both amount and energy per photon. This led to the following research question: **Is there a relationship between operating pressure and bremsstrahlung radiation?**

Explanation: The reason this is hypothesized is that bremsstrahlung is a direct result of the immediate deceleration of particles causing them to emit a photon. If pressure is increased then the mean free path will decrease, which in turn will not allow for a very fast velocity as acceleration time is decreased. Because of this, particles in the reactor will lose energy within the plasma or in collision with other particles before reaching a high enough velocity to emit significant bremsstrahlung due to elastic nature of collisions on this scale. This will also lower

³ Robert L. Hirsch, "Inertial-Electrostatic Confinement of Ionized Fusion Gases", Journal of Applied Physics, v. 38, no. 7, October 1967

⁴ Ibid

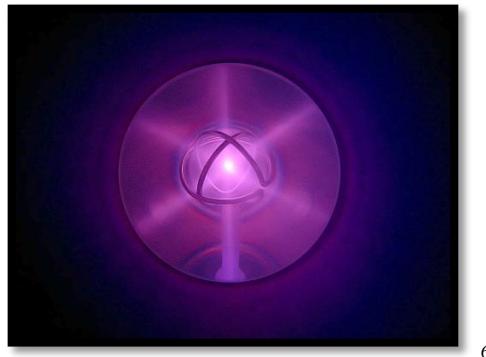
⁵ The in depth mechanics of how the grid saps energy from the plasma is beyond the scope of this paper and will not be explained.

the amount of particles emitting bremsstrahlung radiation because a smaller mean free path will reduce acceleration time for majority of particles therefore decreasing their total overall kinetic energy before a potentially bremsstrahlung emitting collision.

SYSTEMS:

Vacuum and Plasma Containment Systems:

The plasma containment system consists of a 2.75in CF cross with a viewport and a simple geodesic arrangement of thin 304 stainless steel wire to act as an acceleratory grid by providing a potential well due to its high negative bias (30KeV up to 50KeV) for a long enough period that the reactor is able to stabilize a virtual cathode known as a poissor. Below is a picture of a grid in “star mode” which houses at the center an ideal virtual cathode:



6

The vacuum pump systems consists of a 22.4 mTorr ultimate vacuum 2 stage roughing pump that prepares the system pressure for a 150L/s diffusion pump to pump the system down to $\sim 1.5 \times 10^{-6}$ Torr. The system is then partially vented to air (10-100mTorr range for these tests) using a throttle and leak valve to control inflow and outflow rates of the system. Due to plasma heating a further adjustment of these valves is necessary to maintain a constant pressure.

⁶ plasma-focus-sharp-small. Rtftechnologies.org [Internet] [cited 2014 December 19]. <http://www.rtftechnologies.org/Design/Assets/device-images/fusor-mark3/test-runs/03-27-08/plasma-focus-sharp-small.jpg>

Gas Handling Systems:

Normally the accelerator is operated with deuterium as its primary fuel source fed in by a needle metering valve in series with a laser drilled orifice and D2 gas is released at a rate of 20 standard cubic centimeters per minute. For these trials the deuterium has been removed from the gas delivery system and replaced with a vent valve that is slightly unscrewed to allow for air as a substitution to the deuterium as it is less expensive and results are applicable to plasmas of any gas composition. The pressure is monitored with a vg-64 digital thermistor gauge in the range of experimentation (10^{-2} to 10^{-3} Torr) and with an ion gauge in the primary evacuation phase (10^{-6} Torr). Since the digital thermistor gauge is more apt to operate in the experimental range it was used. The vg-64 digital thermistor gauge was new and thus factory calibrated with an error margin of $\pm 10\%$

Electrical Systems:

To provide power to the inner grid a transformer has been built capable of safely providing a maximum of 50KeV at 15 mA. The Transformer consists of a 100Kv X-ray transformer that is center tapped and half wave bridge rectified with 4 diode strings, each acting as one larger diode capable of withstanding 100kv at 30mA from the output. The transformer can either be controlled with a Variable autotransformer (Variac) or a phase angle controller, but a variac has been chosen as it allows more easily the integration of a 750 watt resistive ballast in series with the primary of the X-ray transformer for current control. The transformer has been half wave bridge rectified with the diodes connected in anti-parallel, thus each string conducts half the time

and therefore can withstand the full 30 mA, double their rated amperage throughput. The positive output of the bridge has been grounded and thus the transformer output is negatively biased.

Since this is a center tapped transformer and since the core is not floated for safety reasons, the transformer is only capable of 50kV with 120V on the primary instead of the full 100kV. Current is monitored with a 100ohm resistor in series with the positive end of the bridge rectifier before the grounding on the center tap where the scale is 1 Volt output = 10mA. Voltage is monitored by attaching a 1000MOhm 1000:1 scale high voltage divider in parallel with the output of the transformer. Refer to diagram Set 2 for a graphical representation of the transformer assembly.

Detection Systems:

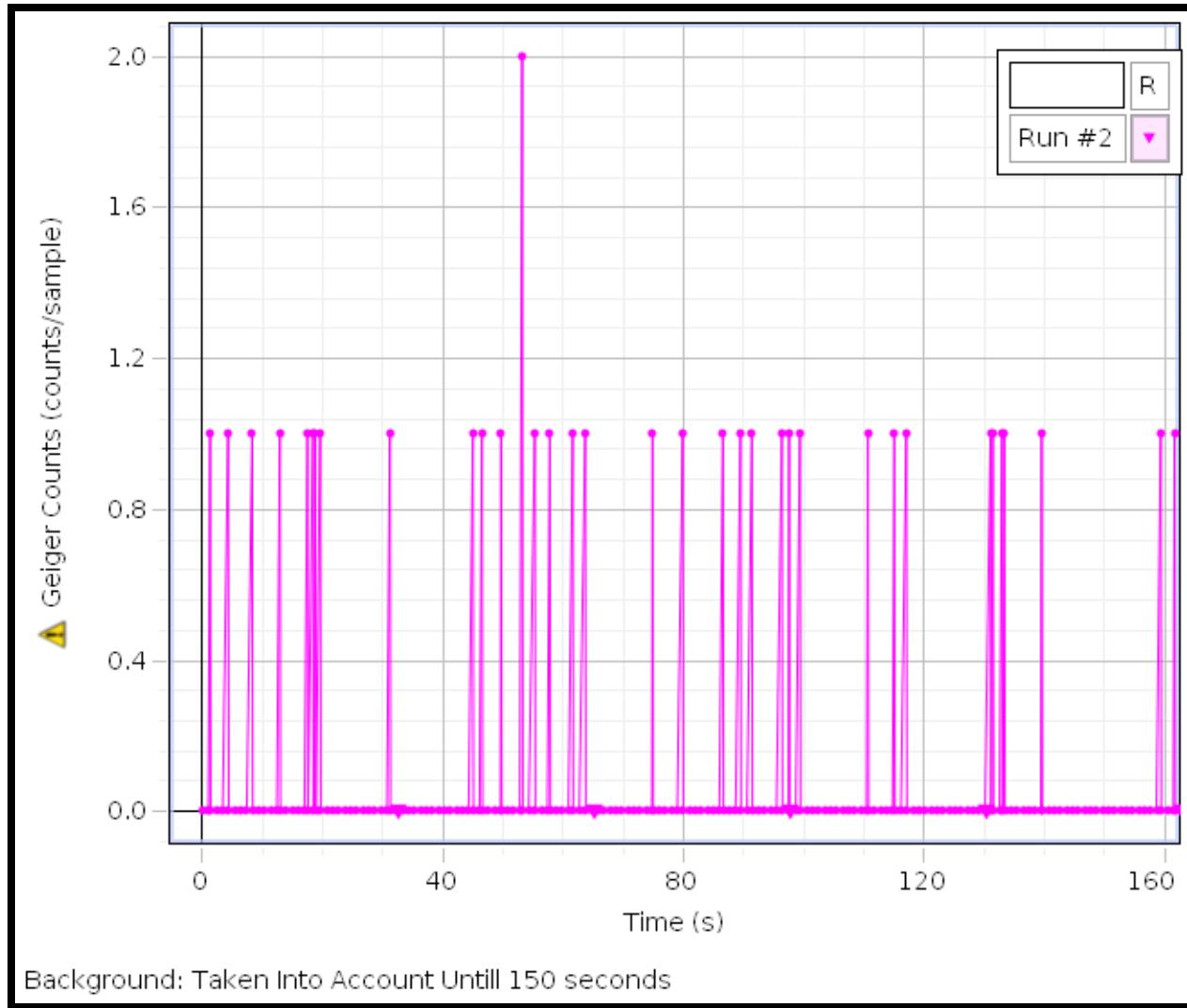
The detection systems consist of a Pasco capstone software package with a Pasco explorer and Geiger counter plugin with 10Hz polling rate. The Entire system was also shielded using a lead box to prevent irradiation to the experimenter or equipment.

Variables:

Number	Controlled	Independent	Dependent
1	Magnetic field	Pressure	Voltage*
2	Electrostatic field		Amperage*
3	Acceleration Space		Radiation Counts
4	Voltage		
5	Amperage		
6	Pumping Rate		

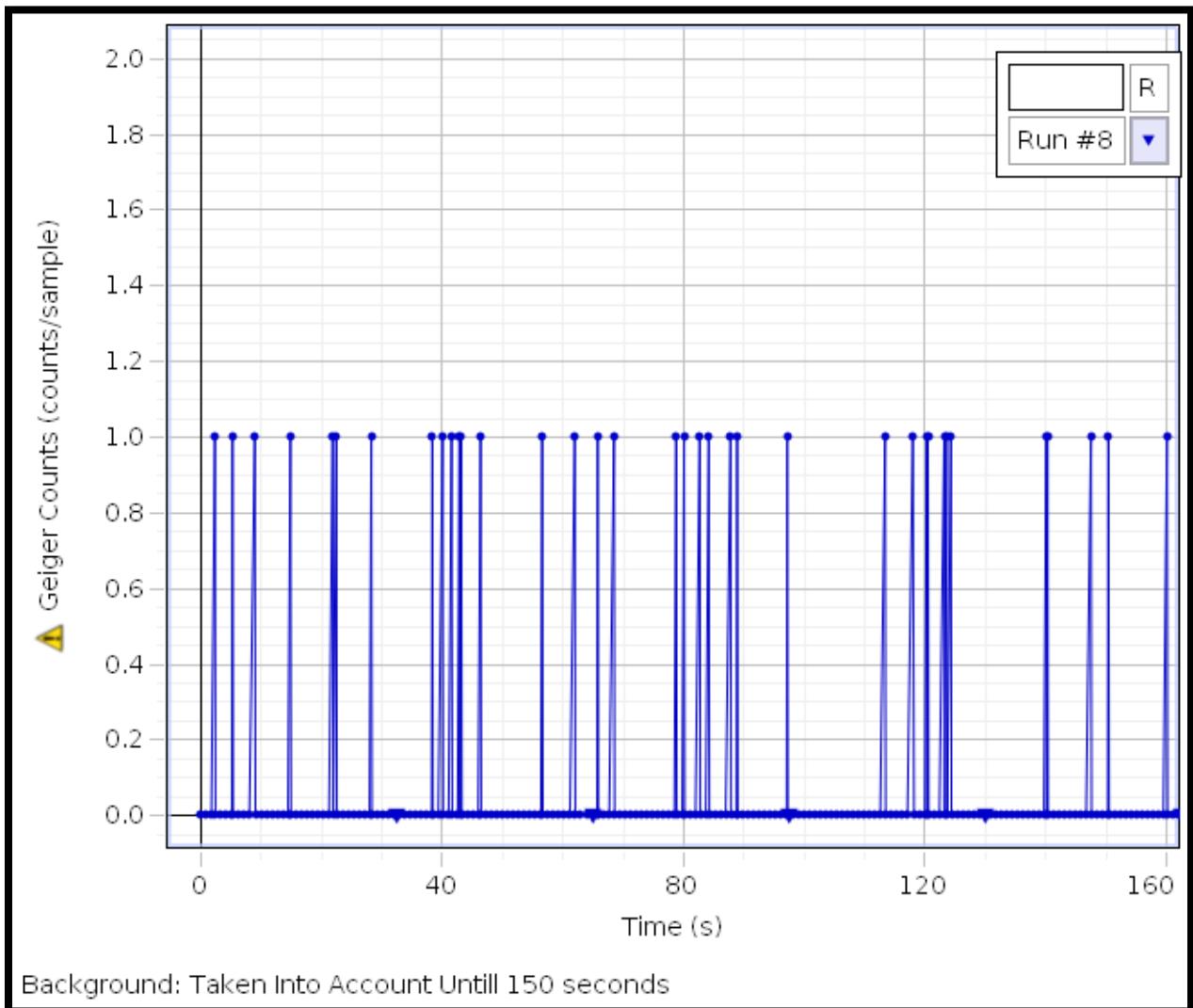
Note* Due to Panchen's law voltage and amperage will fluctuate within a small range as a function of pressure but by the same law both will be controlled with current limiting via a resistive ballast in the primary of the transformer.

Processed Data and Explanations:



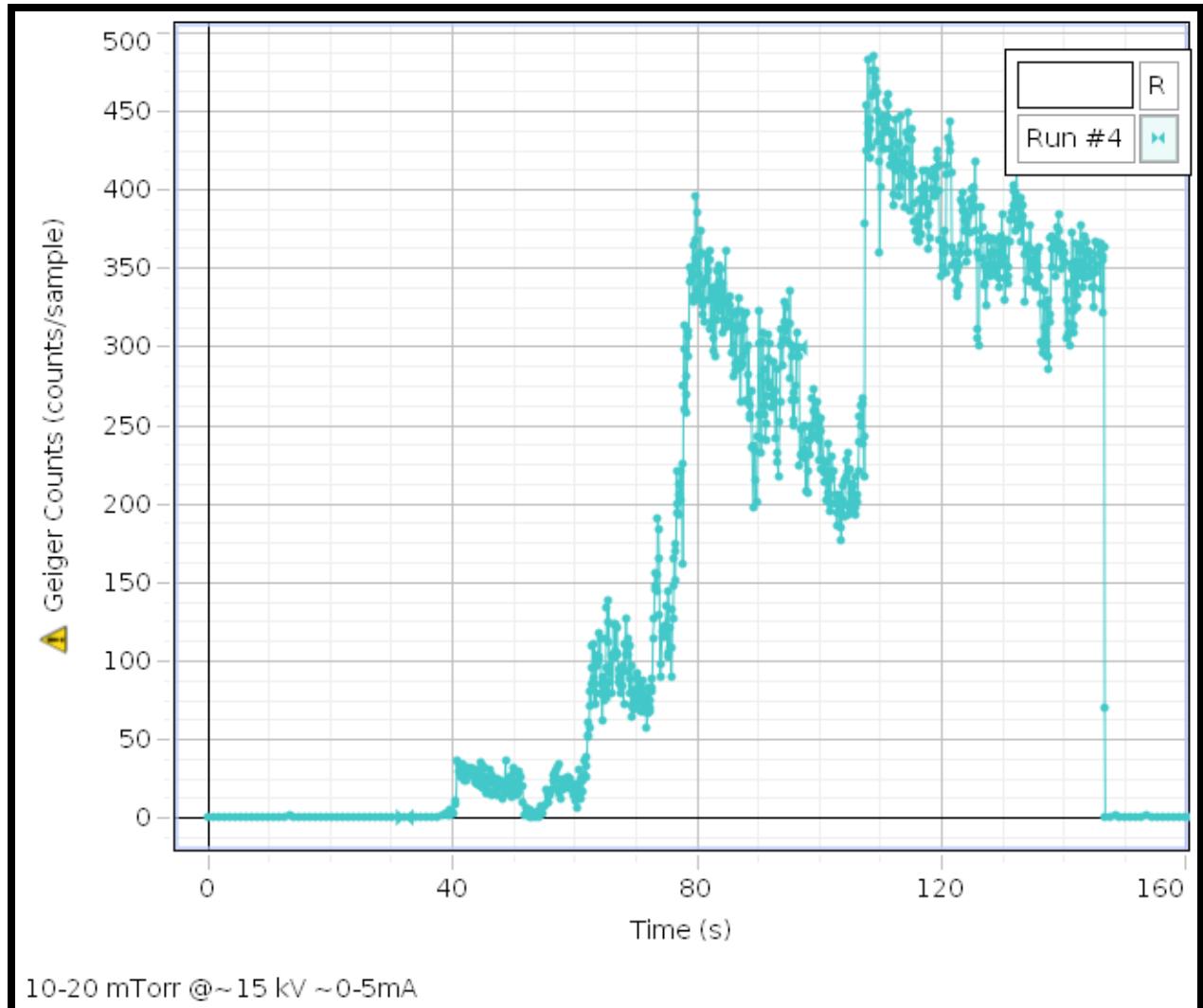
One of the two background radiation runs that were taken to correct data of actual runs

Since the data has been gathered over a few days the background radiation has been taken into account. To gather this data the capstone software was enabled and polling rate for the Geiger-Muller tube was set to 10Hz and left to run in as close to a noise free environment as could be achieved similar to the one used in operation of the fusor. The Geiger Muller tubes used were new and thus factory calibrated.



One of the two background radiation runs that were taken to correct data of actual runs

Another background radiation data run that was taken in a as close to a noise free environment as could be achieved similar to the one used in operation of the fusor. As with the previous run the polling rate on the Geiger-Muller tube was set to 10Hz.



This run was in the 10-20 mTorr range. A range was given as opposed to an exact pressure as it was very difficult to keep pressure stable due to plasma heating and a very sensitive valve system. As mentioned in the gas handling systems, the margin of error on the thermistor gauge is +/- 10%. The voltage in all runs was kept at 15.0KV +/- 1KV. Finally the amperage was kept in the 0-5mA range +/- 1mA as it too varied with pressure in order to keep voltage constant but was kept constant when system stabilized.⁷

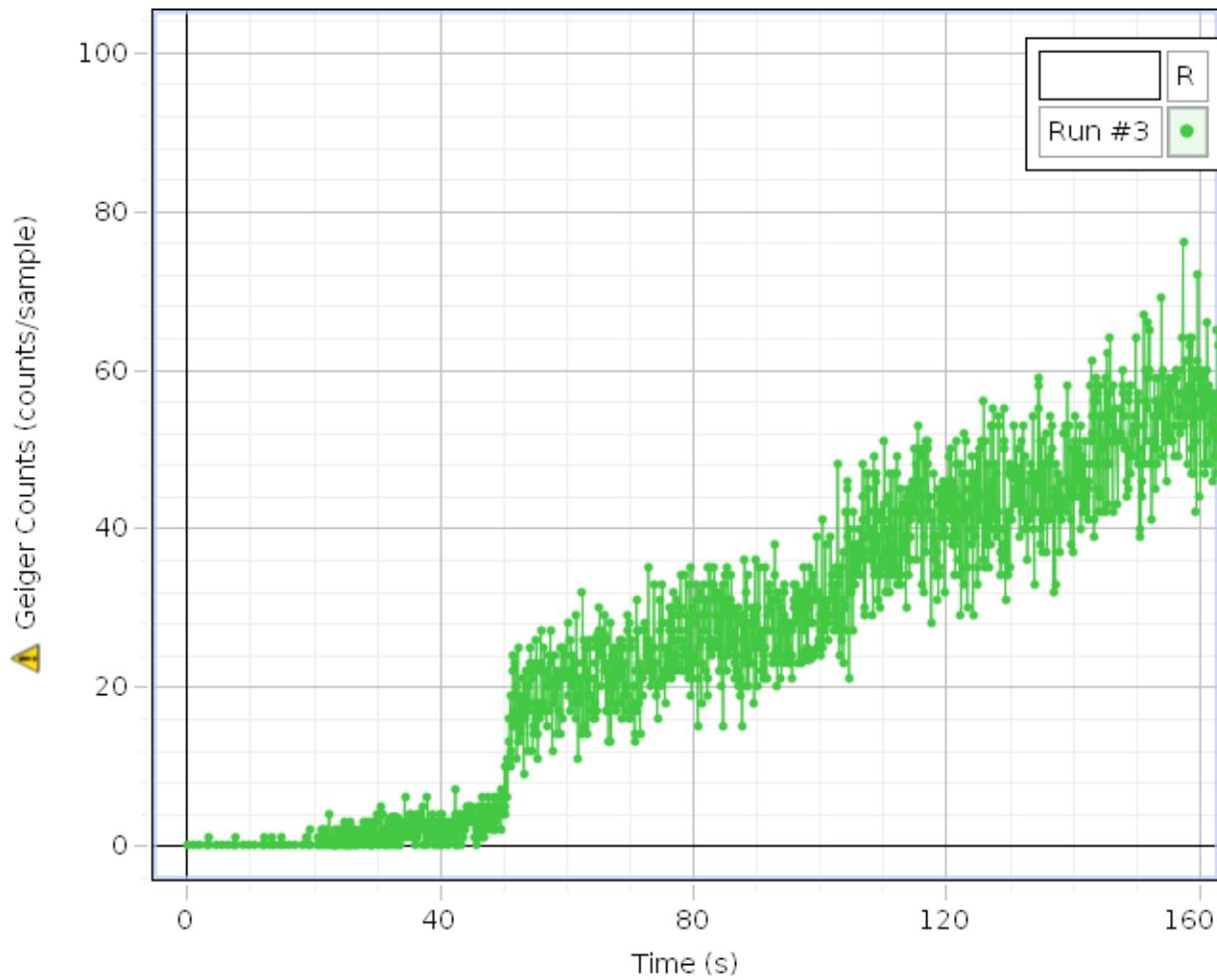
⁷ This variance in operational parameters results from Panchen's law, which states that:

$$V_B = \frac{apd}{\ln(pd) + b}$$

Where VB = Breakdown voltage for a plasma discharge to start.

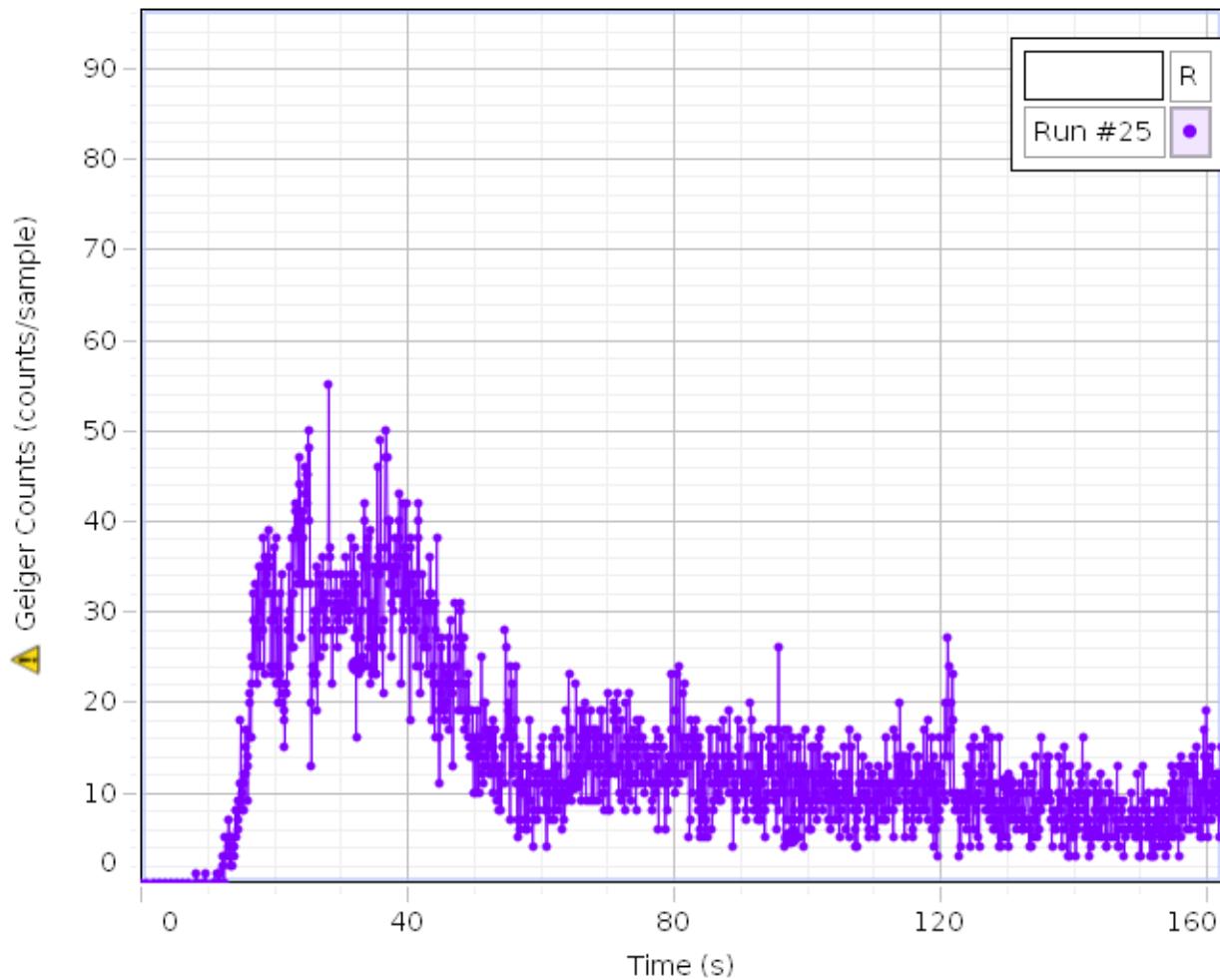
The graph has several regions where the count rate spikes, which is due to the plasma lighting off (being established) and the voltage being applied to the poissor spiking as more or less fuel was fed into the reactor. Because a vacuum environment like this one can go from being almost a perfect insulator to almost a perfect conductor, when the plasma lights off the values (pressure, count rate, voltage, and amperage) all spike briefly until the system stabilizes. Not every spike however is plasma lighting off, because the system “consumes fuel” as it runs the ion density goes down and so does electron density to participate in ionization, especially because the electrons are not contained by any magnetic field and because point charges cannot be kept in an area of space just as a result of the electrostatic interactions between them, as dictated by Earnshaw’s theorem. As such there are fewer electrons present to participate in ionization in the central grid and more need to be supplied. The drain and supply rates are not balanced so amount of plasma formed fluctuates. As a result of this there are less particles to ionize and less potential to ionize and therefore less particles to accelerate and therefore less particles to suddenly brake and emit braking radiation, and thus the count rate goes down, as can be seen from about 80 to 110 seconds for example. A similar effect in reverse can occur when more fuel is flooded in, there will be a higher drain on the power supply and more electrons will be pulled off of the central grid to participate in ionization and thus the count rate will spike up. So essentially, as fuel is consumed count rate will go down momentarily and when fuel is reintroduced count rate will spike up. In addition, the final drop off in the graph, at 145 seconds, is due to a circuit breaker was tripping. This meant that the system had to be shut down, thus the immediate drop in count rate.

Continued from pg 12: **a** and **b** are constants which vary by gas composition (each gas composition has unique **a** and **b** values). **Ln()** is the natural logarithm. **D** is the distance between the anode and the cathode. **P** is pressure in the vacuum chamber.



30-40 mTorr @~15 kV ~0-5mA

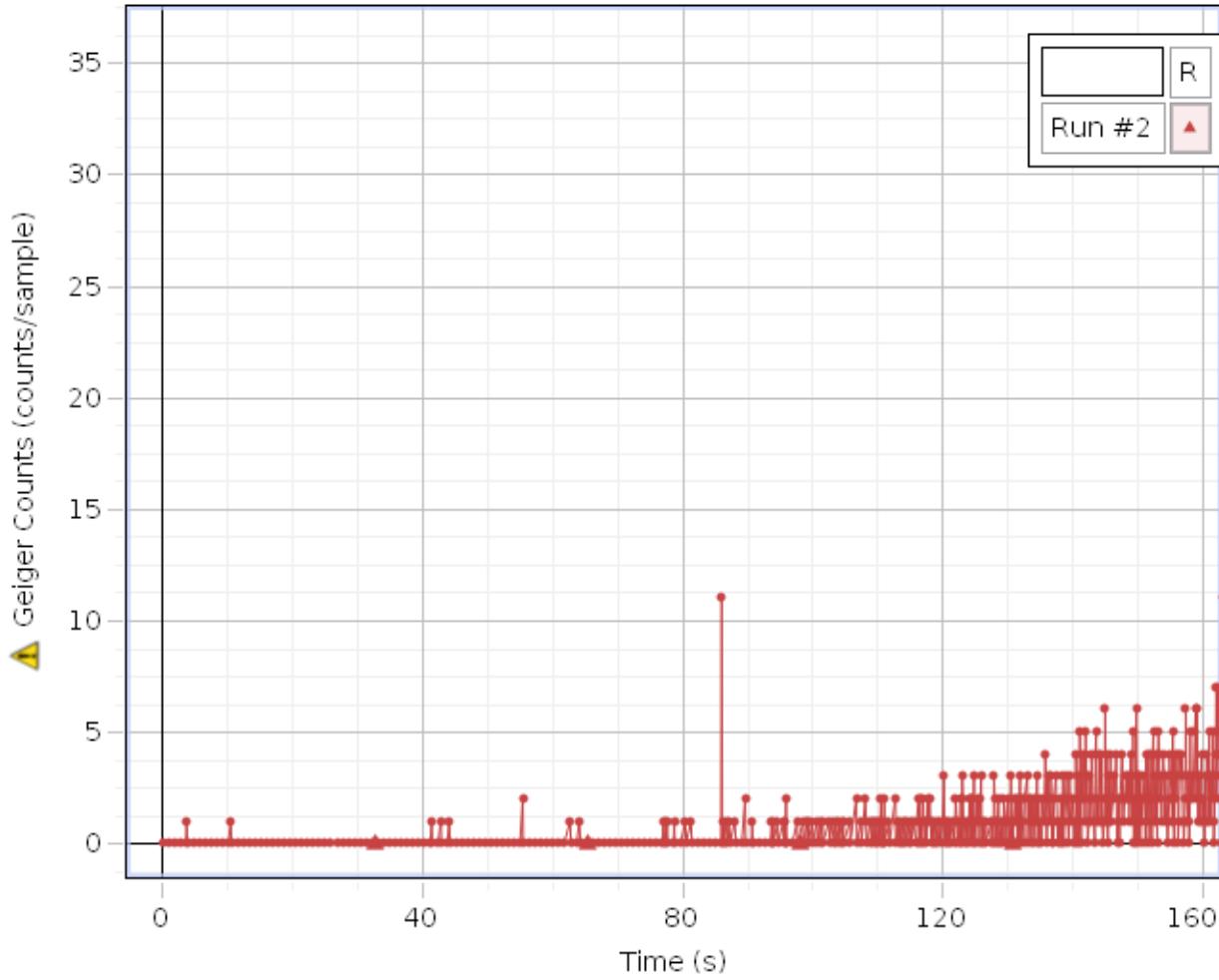
All pertinent information such as devices used and margins or error as stated above remained constant in the run. The only modified value was pressure and therefore amount of braking radiation emitted from the device. As a result of increasing the pressure the amperage went up to about the 1-2 mA range but still always stayed in the 0-5mA range. The spike at around 50 seconds was due to more fuel being introduced in the system. This was done to ensure the pressure range of 30-40 mTorr was met.



50-60 mTorr Range @ ~15kV ~0-5mA

All pertinent information such as devices used and margins or error as stated above remained constant in the run. The only modified value was pressure and therefore amount of braking radiation emitted from the device. As a result of increasing pressure the mA went up to about the 1-2 mA range but still always stayed in the 0-5mA range. This time the amount of fuel loaded in

was decreased to ensure that the run stayed within the pressure range (an attempt to mitigate the spike at about 30-40 seconds due to plasma heating). Unfortunately it is harder to adjust temperature in the device as more fuel is introduced (as pressure ranges for runs get higher).



70-80 mTorr @~15 kV ~0-5mA

All pertinent information such as devices used and margins or error as stated above remained constant in the run. The only modified value was pressure and therefore amount of braking radiation emitted from the device. As a result of increasing pressure the mA went up to about the 4-5 mA range but still always stayed in the 0-5mA range. No new fuel had to be introduced after the initial fuel loading period or removed, due to the relative stability of this operational range.

DIAGRAMS AND PICTURES:

Diagram Sets:

Diagrams Set 1: Ion Trajectories

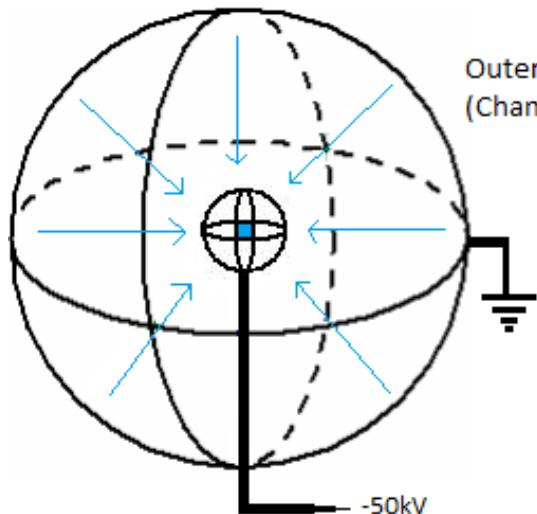


Diagram 1.1 Showing idealistic ion trajectories.

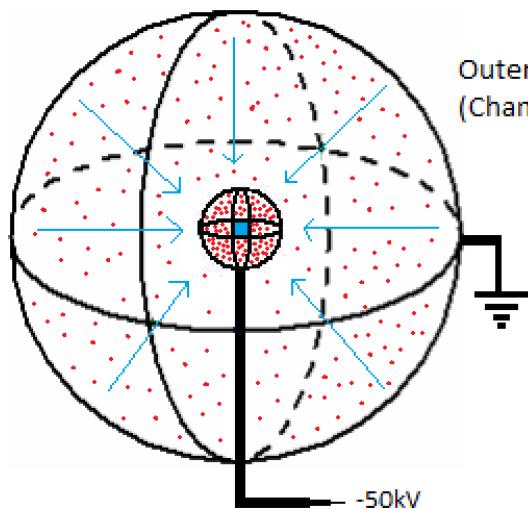


Diagram 1.2 Showing possible collision points. Red points' distribution density represents probability density of collision with the cathode showing most potential for collision.

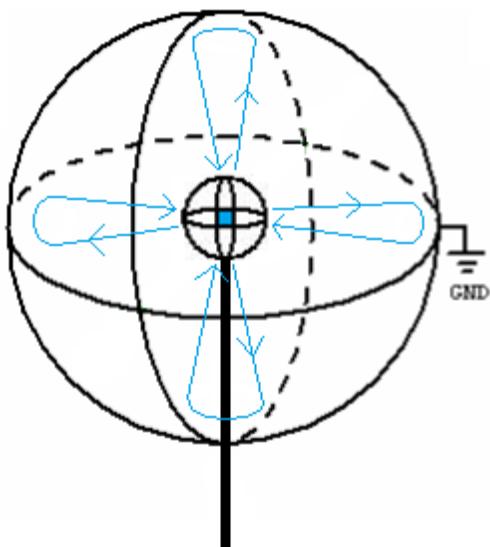
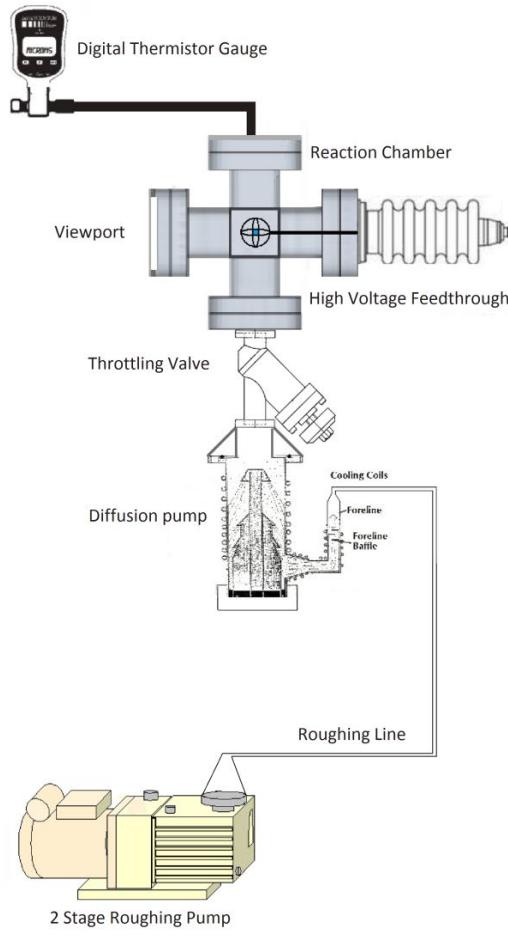


Diagram 1.3 Showing ion
recirculation occurring during

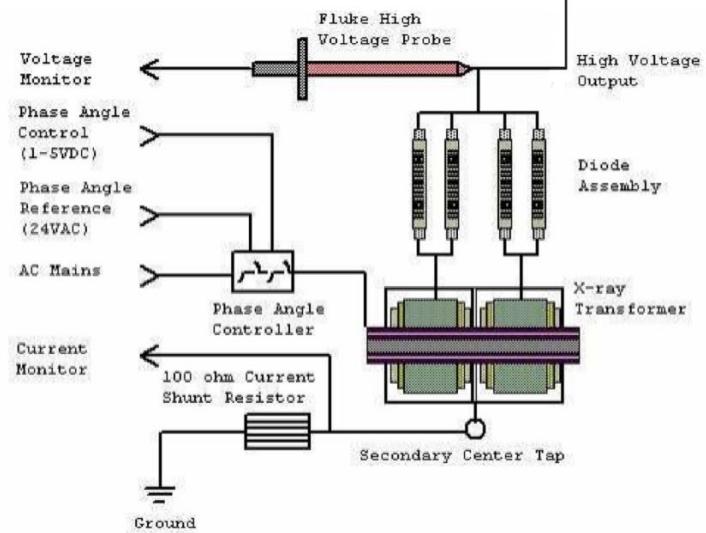
Note: The systems above utilize ideal spherical outer grid but in the context of this experiment a 2.75in conflat cross with a 1.5in inner diameter was used and the central grid (cathode) was placed at the point where all the “arms” of the cross met thus allowing for the longest acceleration paths for ions.

Diagram Set 2: Construction and Core Assemblies:



Fusor Mk. V

Diagram 2.1 showing the entire core reactor assembly.
Note: measurement and control systems not pictured.



⁸ X-ray transformer electrical diagram. smartech.gatech.edu [Internet] [cited 2014 December 19].

<http://www.rtftechnologies.org/Design/Assets/device-images/fusor-mark3/test-runs/03-27-08/plasma-focus-sharp-small.jpg>

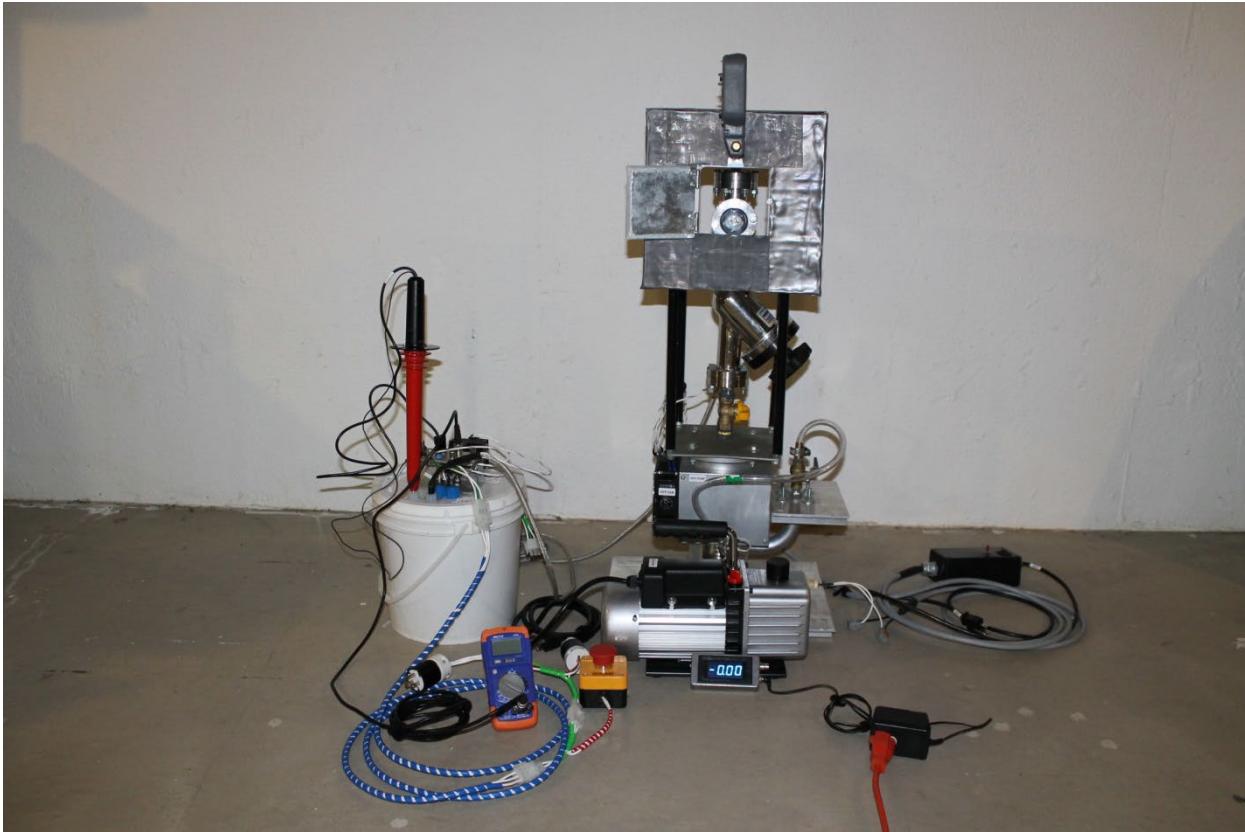
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Difffpmp. <http://www.cleanroom.byu.edu/> [Internet] [cited 2014 December 19].

<http://www.cleanroom.byu.edu/metal.parts/difffpmp.JPG>

Filter3. <http://www.sisweb.com/> [Internet] [cited 2014 December 19]. <http://www.sisweb.com/art/filter/filter3.gif>

Pictures:



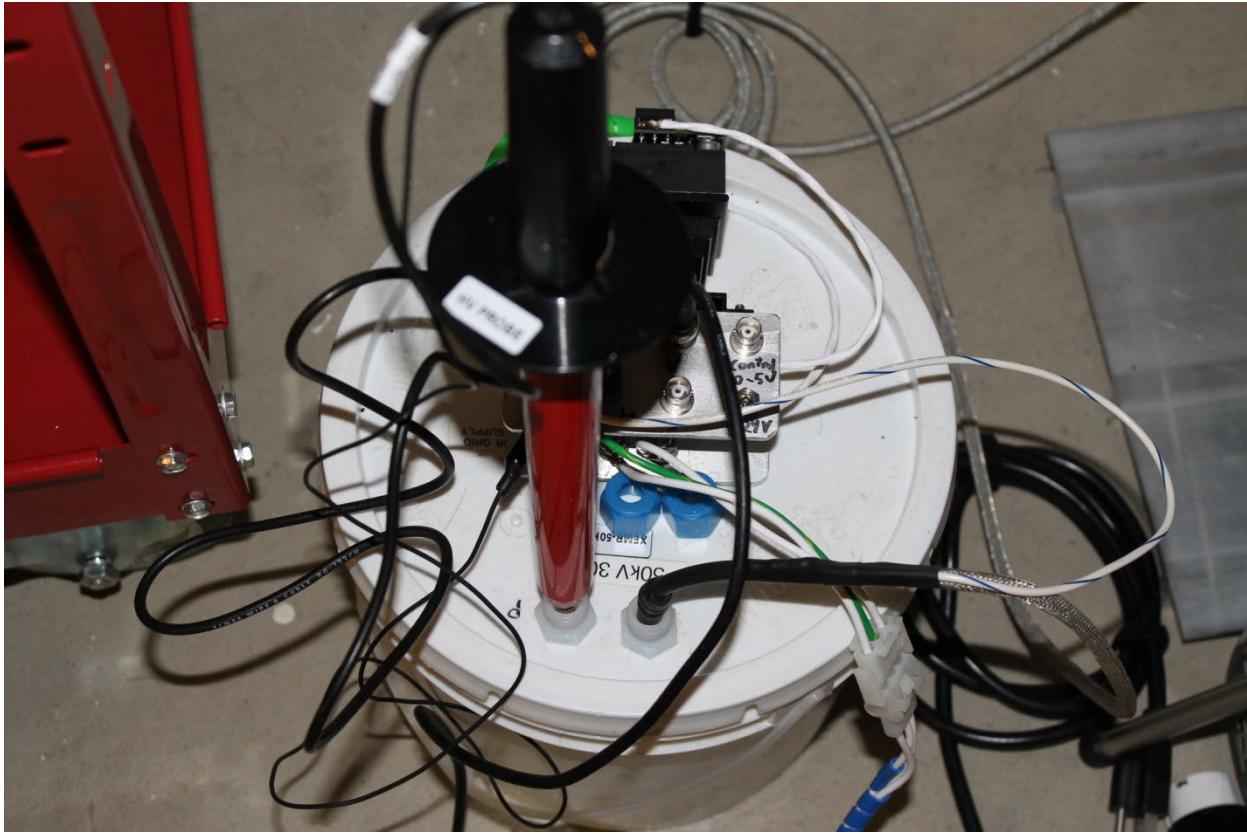
Pictured above is the entire assembly. Starting on the right, the white bucket is the transformer housing and the electrical array on top is the phase angle controller and main connection body. The red device on top of the transformer is the Fluke 80k-40 High Voltage probe. In front of the transformer bucket there is the primary power adapter with the resistive ballast adapter and SCRAM button and voltage monitor multimeter. To right of the emergency stop is the roughing pump and below it the current monitor and its power adapter. To the right of the roughing pump is the diffusion pump power supply. Behind the roughing pump is the diffusion pump and above it is the main foreline valve. Above the foreline valve is the throttling valve and then the main reactor core in inside the lead box with the thermistor gauge on top.



Pictured above is the Variac used for adjusting the primary voltage for the x ray transformer. It is rated for 20 amps.



Pictured above is the Geiger-Muller tube on the stand as it was used to record radiation output.



Closer view of transformer top showing output locations.



Picture Showing all measurement equipment.



Picture of Reactor set up for presentation and inspection at Ferris State University under the supervision of Professor Jeff Christafferson. Experimentor is pictured on the left.

CONCLUSION:

The experiment yeilded some rather interesting results in that several expectations were not met, and although the data supports the hypothesis, it does not support the data for the reaons mentioned in the explaination of the hypothesis. Looking at the graphs given one can see that as pressure increased the total counts per second decreased, so for example graph 1 in reactor radiation output series of graphs in the 10-20 mTorr range peaks at about 490 counts per second while graph 4 in the 70-80 mTorr range peaks at about the 7 counts per second range with the same voltage (15kV) and amperage range (0-5ma) in both runs. Because this trend is seen throughout the graphs, it can be said that it is true that increases in the pressure of the device or operation of the device in higher pressure regions will result in the decrease of the emission of braking radiation. The main reason that this occurs is not largely due to shorter mean free paths or shorter acelleration times of particles as proposed above, but rather due to external limitations. For example if a glow discharge exists at 50mTorr and 10kV using only 5mA and pressure is increased to 100mTorr, then milliamperage will need to be increased greatly *(depending on geometry of the chamber, distances in the chamber, and gas composition)⁹. Because the experiment was done with a resistive ballast on the primary of the X-ray transformer the amperage was not allowed to climb more than 5mA. As a result of this whever pressure was increased it was also required to increase the amperage to maintain the voltage. Even though particles inside the reactor were still ionized and acellerated less and less of them could do so as pressure increased. This is because of the following. In the most basic scenario, assume a collection of a 100 particles each requiring .01 mA current draw from the transformer to ionize. In order to ionize all the particles it would require 1mA. Then, If we increase

$$V = \frac{apd}{\ln(pd) + b}$$

⁹ Paschen's Law: where V is breakdown voltage, a and b are constants that vary with gasses, d is the distance in meters, and p is the pressure in ATM or Bar.

the pressure to allow for 1000 particles it would require 10mA and so on. In all realistic applications transformers do not have infinite amperage to deliver in ionization, and as such voltage will fall. As voltage falls the bremsstrahlung emission will fall as well, however, this will be at the cost of performance. That is to say if higher pressure exists, voltage will fall as that pressure climbs, which in turn will cause less bremsstrahlung to be emitted thus making the device more efficient, but it will also allow for less fusions per second to occur. Essentially as pressure goes up so does the current draw that is required to maintain a constant voltage across the negatively biased inner grid, which means more power will have to be drawn from the transformer, which naturally will have a limit on the power it can supply.

If, as the hypothesis states that pressure alone would be responsible for a decrease in the bremsstrahlung radiation output, then sustained voltage input levels with increasing amperage as pressure increases should yield less and less bremsstrahlung as a function of pressure. What the experiment found was that as pressure increased in every graph of radiation output given from the 10 mTorr region to the 80mTorr region, more and more amperage was required to keep a voltage level constant. It was also for this reason that an amperage range was given (0-5ma) because it would have been impossible to increase pressure without an increase in amperage. As for high pressure reducing acceleration times because of shorter mean free paths, no realistic pressures in the range of operation would be enough to shorten the mean free path enough to significantly decrease the velocity of any particles before they break. Even if that were possible, those pressures would be so high that a plasma environment could not be created nor sustained. If the objective is to lower the bremsstrahlung emission in an IEC fusion device, ultimately one could only do so and keep the voltage and thus fusion rates constant by drawing significantly more amperage and thus put strain on the power supply and on the grid itself, most likely resulting in a melting of the grid. In the end, heating of the grid to an extreme

degree as well as causing it to melt, would also dramatically decrease fusion potential in any electrostatic device. Ultimately, if one's priority would be to reduce efficiency losses in terms of bremsstrahlung and protect the user more from harmful x and gamma rays, then one could increase the pressure so as to put a strain on the power supply and take it to its maximum amperage throughput and thus lower its available voltage.

REASONS FOR ERROR:

- Inaccurate pressure data: thermistor gauge has big margin of error +/- 10%.
- Possible Plasma contamination with diffusion pump oil: diffusion pump backsteaming .
- Unstable pressures: plasma heating.
- Some counts missed: limitations in detection setup (not a high performance probe).
- Power supply overheating: no power supply cooling system, and power supply not designed to run continuously.
- The Geiger- Geiger-Muller tube has a limited measuring window all counts could not be accounted for.
- There was lead shielding some of the x-rays that escaped from areas other than the viewport they were not measured.

IMPROVEMENTS:

Because of the financial constraints that I had while creating and testing an experimental platform I was not able to get the highest performance out of it. A few systems could have been improved to yield more, and more accurate data points. First, the detection systems, because a lot of other radiation and electromagnetic noise existed there were some counts that were not experimentally desirable counts, such as some of the few gamma rays and few x-rays not in the desired range. To improve this, a NIM module system with a single channel analyzer and a sodium-iodide scintillator for x-ray spectroscopy would have been preferable to a geiger muller tube of very small detection range. Another alternative to the costly NIM based detection

system would be usage of the Bragg X-ray spectroscopy technique with a proper viewport (depening desired intesity) and 100 or 001 planar silicon wafers could be used as the band pass filter before counting with a pinhole detector. For the Vacuum systems a spherical conflat system with a 15-25 cm diameter and a turbomolecular pump would be ideal. This is the case because sudden changes in temperature due to plasma heating would not be a as big of a problem for stability because it would allow for a bigger outer to inner grid ratio thus lowering the overall heating amount per centimeter squared and thus keeping pressure more stable. A turbomolecular pump is more favorable over a diffusion pump for two reaons, first the lack of oil means no backstreaming is possible and thus no plasma contamination is possible, and finally because the pumping rate can be more easily adjusted by adjusting roatar speed on the pump instead of having to balance pressure with only a throttling valve. Finally, it would be nice to have an industrial power supply such as a spellman or glassman brand capable of supplying high voltage at fairly high milliamperage so that the run times could be extended. If the experiment was continued with the xray transformer it would need to be placed in a larger mineral oil tankwith a cyclin pump to cool the oil. This is because since each secondary is 71k Ohms at 30mA rms the coils will dissapte 64 watts and since it is half wave rectified each coil will dissapte only 32 watts which with run currents of 5 to 10 ma limits run times to only about 15-10 minutes with 10-20 minutes breaks for cooling. If the transformer had more adequate cooling then the cooling times could be significantly reduced and run time interruptions would be virtually non existant.

Another important improvement for the precision of the pressure data would be if a thermocouple gauge were used instead of a thermistory it would be easier to gather more precise pressure data. Finally, on the topic of pressure there is a key issue, which can be explained as follows.

Because pressure is an important variable to control it had to be controlled with manipulation of the amount of fuel present. The problem with this is as follows. Pressure is not only dependent on the amount of atoms within a space but the overall energy of those atoms. For example, two identical boxes with 5 liters of gas at standard temperature and pressure will have the same amount of pressure on the walls of that box. However, as soon as temperature of the particles in box a is increased, box a's particles will produce a higher pressure on its walls than box b's particles even though there is the same amount of particles present in both. Another possibility exists however, assume now that one introduces 5 liters of particles at standard temperature and pressure into box a, and that 10 liters of particles at standard temperature and pressure is introduced into box b. Given the same volume of those boxes box b will have more pressure exerted on its walls because it has more particles.

Attempting to control the pressure in the fusor via manipulation of the amount of fuel that is present or not is very much like scenario 2 where the initial temperature is constant within each box. In reality the fusor environment is a combination of both scenarios where not only amount of particles differs but also the amount of heating that occurs, and while the pressure adjustment method works in this scenario it fails to keep constant the amount of particles in each run. To ameliorate this another solution is proposed, instead of brief introductions of fuel, a steady stream of fuel should be used in combination with a steady evacuation rate for the chamber to ensure that new fuel is always entering and doesn't get as large of an opportunity to be heated by interactions with the chamber or grids in comparison to fuel that would otherwise be injected in brief segments and would have more time to heat up and thus change its pressure. An alternative means of testing this, which could be done as further work is to test the same parameters within those pressure and power ranges with magnetic confinement of the plasma

instead of, as this would also for the manipulation of plasma pressure without the need to additionally heat each atom or increase pressure inside the chamber by adding more fuel.

Magnetic confinement fusion is the ideal solution to the problems of this experiment as it circumvents the above problems of attempting to manipulate pressure by adjusting the amount of fuel present for fusion in the reactor.

Bibliography:

- "Phoenix Nuclear Labs meets neutron production milestone", PNL press release May 1, 2013, Ross Radel, Evan Sengbusch
- "The IEC star-mode fusion neutron source for NAA--status and next-step designs". *Appl Radiat Isot* **53** (4-5): 779–83. October 2000. [PMID 11003520](#).
- Robert L. Hirsch, "Inertial-Electrostatic Confinement of Ionized Fusion Gases", Journal of Applied Physics, v. 38, no. 7, October 1967
- plasma-focus-sharp-small. Rtftechnologies.org [Internet] [cited 2014 December 19]. <http://www.rftechnologies.org/Design/Assets/device-images/fusor-mark3/test-runs/03-27-08/plasma-focus-sharp-small.jpg>
- X-ray transformer electrical diagram. smartech.gatech.edu [Internet] [cited 2014 December 19]. <http://www.rftechnologies.org/Design/Assets/device-images/fusor-mark3/test-runs/03-27-08/plasma-focus-sharp-small.jpg>
- MarkIIITop. <http://wjscience.com/#jp-carousel-95>
- Diffpmp. <http://www.cleanroom.byu.edu/> [Internet] [cited 2014 December 19]. <http://www.cleanroom.byu.edu/metal.parts/diffpmp.JPG>
- Filter3. <http://www.sisweb.com/> [Internet] [cited 2014 December 19]. <http://www.sisweb.com/art/filter/filter3.gif>

Appendix:

Raw Data and Operating Procedure

Operating procedure:

Procedure to Gather Data

Reactor Prestart

1. Verify that Grid HV switches are in the OFF position.
2. Verify that roughing pump, diffusion pump, and diffusion pump fan switches are in the OFF position.
3. Release SCRAM switch on reactor front panel.
4. Turn the thermistor gauge on.
5. Set the thermistor to the micron or Mtorr scale.
6. Connect GM tube to laptop running capstone via Pasco explorer and setup system for detection.
7. Calibrate if necessary using americium 241 check source. See end note 1. For calibration procedure.
8. Initiate a background counting run for at least 10 minutes.
9. Do a visual inspection of all parts to ensure that there was no overnight damage.
10. Open roughing valve and diffusion pump fore line valve.
11. Activate backing pump.
12. When pressure is below 100mTorr as measured on reactor core as indicated by thermistor, activate diffusion pump and diffusion pump fan.
13. Allow about 30 minutes for Diffusion pump to fully start and check the chamber for oil contamination regularly.
14. Connect star ground to proper ground location and ensure that all connections are wired correctly to ground.

Core High Voltage systems

1. Ensure high voltage interlock is switched off and ensure master off is turned off.
2. Connect tertiary redundant ground to a nearby ground to discharge capacitance in diode array and mineral oil.
3. Reengage SCRAM switch during transformer preparation.
4. Select desired control method. Computerized (Phase angle controller) or manual (Variac).

If Phase angle control

1. Connect to ARC (automated reactor control) computer.
2. Locate and load ARC control console and run initial diagnostics.
3. Allow for 3 beeps from the uninterruptable power supply in ARC.
4. Once diagnostics test comes back with “All tests passed – Standby” connect voltage BNC to multimeter and set multimeter to 20V DC range.
5. Connect high voltage probe (fluke 80k-40, 40kv probe) into nylon Swagelok port and press firmly so that it makes contact with inner electrode.
6. Place high voltage probe connectors into the I/O connector array with the hot lead in the blue banana plug location and the other in the ground

location. Finally connect the redundant ground clip to power supply ground and connect that to star ground (Main confinement and reaction chamber is being used as star ground location in this configuration).

7. Connect amperage BNC to "I" location on connection array and connect BNC to panel meter. Plug in panel meter. Once capacitor charges properly (for voltage smoothing) Panel meter should return to 0.00 or -0.00 Volts, where both operating modes are fine, as -0.00 V output mode will read + Voltage when current is flowing. See endnote 2 about scale on panel meter.
8. Connect phase reference for solid state random fire relay.
9. Connect 0-5 reference voltage circuit from ARC and ensure that it is recognized. Since the X-Ray transformer being used is half wave rectified and center tapped only 50kV out of the 100kV at VAC can be supplied so 0-5v corresponds to 0-50kV where 1V = 10kV. All DC voltage is at negative polarity.
10. Plug power supply into mains power, ensuring still that SCRAM button is depressed and interlock switches are off and all other sources of mains power besides mains to the transformer is off.
11. Select standby mode by leaving the transformer energized but not in operation.

If Variac Control

1. Connect Variac control adapter to transformer. Ensure all other I/O is disconnected.
2. Connect primary ballasting adapter and connect 750W resistive or inductive ballast via the primary ballasting adapter.
3. Connect primary ballasting adapter to mains feed line and connect new cable assembly to the power supply and Variac. Ensure that Variac is off in three ways. Ensure ON/OFF switch is set to the OFF position, ensure the Variac is unplugged, and ensure that the variable voltage selector is set to 0VAC.
4. Connect high voltage probe (fluke 80k-40, 40kv probe) into nylon Swagelok port and press firmly so that it makes contact with inner electrode.
5. Place high voltage probe connectors into the I/O connector array with the hot lead in the blue banana plug location and the other in the ground location. Finally connect the redundant ground clip to power supply ground and connect that to star ground (Main confinement and reaction chamber is being used as star ground location in this configuration).
6. Connect amperage BNC to "I" location on connection array and connect BNC to panel meter. Plug in panel meter. Once capacitor charges properly (for voltage smoothing) Panel meter should return to 0.00 or -0.00 Volts, where both operating modes are fine, as -0.00 V output mode will read + Voltage when current is flowing. See endnote 2 about scale on panel meter.
7. Plug mains adapter in and turn on, plug Variac into mains adapter and turn on, plug transformer into Variac and ensure the ballast is on. Leave the SCRAM button DEPRESSED.
8. Select standby mode by leaving the transformer energized but not in operation.

Note: For both ARC and manual control turn off all interlock and/or Variac and/or adapter switches after transformer has been energized and was confirmed working.

Fuel loading

1. Ensure that fore line valve is adjusted in such a way that outgassing/leak rate is matched with molecular flow rate such that desired pressure is achieved.

Reactor power up to standby

1. Verify grid integrity by visual inspection.
2. Activate high energy photon flux monitoring in Capstone and verify connection to GM counter by ensuring that the power on indicator light is on and hearing a beep occasionally (which signifies a count).
3. Set power supply control to remote by connecting appropriate connectors, either phase angle control via ARC or manual remote via a 20A Variac.
4. Ensure that all electrical connections are insulated properly to shield from corona and/or potential electrical hazards or damages that may occur. Do this by visually inspecting the entire reactor chamber and high voltage power supply.

Reactor operation

1. Turn on Grid HV switch enabling acceleration potential supply by rotating the SCRAM button to active.
2. Move to about 5 feet from reactor core or distance that is deemed safe in operating environment.
3. Activate remote HV enable switch.
4. Activate Grid supply by turning on adapter switches, interlock switches, Variac, phase angle control, and mains switch if any is used.
5. Adjust grid potentials to obtain desired high energy photon flux.

Reactor Shutdown

1. Set Grid HV through ARC program or manually.
2. Deactivate Grid supply by turning off all switches connected to power supply.
3. De-activate remote HV enable switch.
4. Close fore line valve.
5. Close roughing valve shut down roughing pump.
6. Disconnect grid supply to power mains.
7. Shutdown diffusion pumps but leave diffusion pump fan on.
8. Valve off reactor core if any extra gas systems/modules are being used.
9. After diffusion pump has stopped, vent vacuum pumping system to atmospheric.
10. Turn all other switches to OFF position and press the SCRAM button.

Emergency Shutdown

The following actions will De-energize the HV supply.

1. Hit remote scram button at reactor control station.
2. If using ARC set value in input field to “0” and hit enter or type “full emergency stop” in input field and hit enter. If using Variac, return selector switch to 0VAC and turn every switch in conduit to OFF position.
3. Valve off reactor and turn every switch to OFF position.
4. Assure the safety of all operations personnel and check radiation output Capstone capture for information necessary to calculate radiation dose.
5. If reactor was run at full power (50kV 15 mA) or (50kv 15+mA without ballast) then ensure no radiation sickness symptoms are felt.

After any manually triggered scram due to radiation leakage or HV supply failure, all of the above should be implemented.

Raw Data:

Background-1: Where first value is time in seconds and second value is counts per sample

0.100	0	2.000	0	3.900	0	5.800	0
0.200	0	2.100	0	4.000	0	5.900	0
0.300	0	2.200	0	4.100	0	6.000	0
0.400	0	2.300	0	4.200	0	6.100	0
0.500	0	2.400	0	4.300	0	6.200	0
0.600	0	2.500	0	4.400	1	6.300	0
0.700	0	2.600	0	4.500	0	6.400	0
0.800	0	2.700	0	4.600	0	6.500	0
0.900	0	2.800	0	4.700	0	6.600	0
1.000	0	2.900	0	4.800	0	6.700	0
1.100	0	3.000	0	4.900	0	6.800	0
1.200	0	3.100	0	5.000	0	6.900	0
1.300	0	3.200	0	5.100	0	7.000	0
1.400	1	3.300	0	5.200	0	7.100	0
1.500	0	3.400	0	5.300	0	7.200	0
1.600	0	3.500	0	5.400	0	7.300	0
1.700	0	3.600	0	5.500	0	7.400	0
1.800	0	3.700	0	5.600	0	7.500	0
1.900	0	3.800	0	5.700	0	7.600	0

7.700	0	10.800	0	13.900	0	17.000	0
7.800	0	10.900	0	14.000	0	17.100	0
7.900	0	11.000	0	14.100	0	17.200	0
8.000	0	11.100	0	14.200	0	17.300	0
8.100	0	11.200	0	14.300	0	17.400	0
8.200	0	11.300	0	14.400	0	17.500	0
8.300	0	11.400	0	14.500	0	17.600	1
8.400	1	11.500	0	14.600	0	17.700	0
8.500	0	11.600	0	14.700	0	17.800	0
8.600	0	11.700	0	14.800	0	17.900	0
8.700	0	11.800	0	14.900	0	18.000	0
8.800	0	11.900	0	15.000	0	18.100	0
8.900	0	12.000	0	15.100	0	18.200	0
9.000	0	12.100	0	15.200	0	18.300	0
9.100	0	12.200	0	15.300	0	18.400	0
9.200	0	12.300	0	15.400	0	18.500	1
9.300	0	12.400	0	15.500	0	18.600	0
9.400	0	12.500	0	15.600	0	18.700	0
9.500	0	12.600	0	15.700	0	18.800	0
9.600	0	12.700	0	15.800	0	18.900	1
9.700	0	12.800	0	15.900	0	19.000	0
9.800	0	12.900	0	16.000	0	19.100	0
9.900	0	13.000	1	16.100	0	19.200	0
10.000	0	13.100	0	16.200	0	19.300	0
10.100	0	13.200	0	16.300	0	19.400	0
10.200	0	13.300	0	16.400	0	19.500	0
10.300	0	13.400	0	16.500	0	19.600	0
10.400	0	13.500	0	16.600	0	19.700	1
10.500	0	13.600	0	16.700	0	19.800	0
10.600	0	13.700	0	16.800	0	19.900	0
10.700	0	13.800	0	16.900	0	20.000	0

20.100	0	23.200	0	26.300	0	29.400	0
20.200	0	23.300	0	26.400	0	29.500	0
20.300	0	23.400	0	26.500	0	29.600	0
20.400	0	23.500	0	26.600	0	29.700	0
20.500	0	23.600	0	26.700	0	29.800	0
20.600	0	23.700	0	26.800	0	29.900	0
20.700	0	23.800	0	26.900	0	30.000	0
20.800	0	23.900	0	27.000	0	30.100	0
20.900	0	24.000	0	27.100	0	30.200	0
21.000	0	24.100	0	27.200	0	30.300	0
21.100	0	24.200	0	27.300	0	30.400	0
21.200	0	24.300	0	27.400	0	30.500	0
21.300	0	24.400	0	27.500	0	30.600	0
21.400	0	24.500	0	27.600	0	30.700	0
21.500	0	24.600	0	27.700	0	30.800	0
21.600	0	24.700	0	27.800	0	30.900	0
21.700	0	24.800	0	27.900	0	31.000	0
21.800	0	24.900	0	28.000	0	31.100	0
21.900	0	25.000	0	28.100	0	31.200	0
22.000	0	25.100	0	28.200	0	31.300	1
22.100	0	25.200	0	28.300	0	31.400	0
22.200	0	25.300	0	28.400	0	31.500	0
22.300	0	25.400	0	28.500	0	31.600	0
22.400	0	25.500	0	28.600	0	31.700	0
22.500	0	25.600	0	28.700	0	31.800	0
22.600	0	25.700	0	28.800	0	31.900	0
22.700	0	25.800	0	28.900	0	32.000	0
22.800	0	25.900	0	29.000	0	32.100	0
22.900	0	26.000	0	29.100	0	32.200	0
23.000	0	26.100	0	29.200	0	32.300	0
23.100	0	26.200	0	29.300	0	32.400	0

32.500	0	35.600	0	38.700	0	41.800	0
32.600	0	35.700	0	38.800	0	41.900	0
32.700	0	35.800	0	38.900	0	42.000	0
32.800	0	35.900	0	39.000	0	42.100	0
32.900	0	36.000	0	39.100	0	42.200	0
33.000	0	36.100	0	39.200	0	42.300	0
33.100	0	36.200	0	39.300	0	42.400	0
33.200	0	36.300	0	39.400	0	42.500	0
33.300	0	36.400	0	39.500	0	42.600	0
33.400	0	36.500	0	39.600	0	42.700	0
33.500	0	36.600	0	39.700	0	42.800	0
33.600	0	36.700	0	39.800	0	42.900	0
33.700	0	36.800	0	39.900	0	43.000	0
33.800	0	36.900	0	40.000	0	43.100	0
33.900	0	37.000	0	40.100	0	43.200	0
34.000	0	37.100	0	40.200	0	43.300	0
34.100	0	37.200	0	40.300	0	43.400	0
34.200	0	37.300	0	40.400	0	43.500	0
34.300	0	37.400	0	40.500	0	43.600	0
34.400	0	37.500	0	40.600	0	43.700	0
34.500	0	37.600	0	40.700	0	43.800	0
34.600	0	37.700	0	40.800	0	43.900	0
34.700	0	37.800	0	40.900	0	44.000	0
34.800	0	37.900	0	41.000	0	44.100	0
34.900	0	38.000	0	41.100	0	44.200	0
35.000	0	38.100	0	41.200	0	44.300	0
35.100	0	38.200	0	41.300	0	44.400	0
35.200	0	38.300	0	41.400	0	44.500	0
35.300	0	38.400	0	41.500	0	44.600	0
35.400	0	38.500	0	41.600	0	44.700	0
35.500	0	38.600	0	41.700	0	44.800	0

44.900	0	48.000	0	51.100	0	54.200	0
45.000	0	48.100	0	51.200	0	54.300	0
45.100	1	48.200	0	51.300	0	54.400	0
45.200	0	48.300	0	51.400	0	54.500	0
45.300	0	48.400	0	51.500	0	54.600	0
45.400	0	48.500	0	51.600	0	54.700	0
45.500	0	48.600	0	51.700	0	54.800	0
45.600	0	48.700	0	51.800	0	54.900	0
45.700	0	48.800	0	51.900	0	55.000	0
45.800	0	48.900	0	52.000	0	55.100	0
45.900	0	49.000	0	52.100	0	55.200	0
46.000	0	49.100	0	52.200	0	55.300	0
46.100	0	49.200	0	52.300	0	55.400	1
46.200	0	49.300	0	52.400	0	55.500	0
46.300	0	49.400	0	52.500	0	55.600	0
46.400	0	49.500	0	52.600	0	55.700	0
46.500	0	49.600	0	52.700	0	55.800	0
46.600	1	49.700	0	52.800	0	55.900	0
46.700	0	49.800	1	52.900	0	56.000	0
46.800	0	49.900	0	53.000	0	56.100	0
46.900	0	50.000	0	53.100	0	56.200	0
47.000	0	50.100	0	53.200	0	56.300	0
47.100	0	50.200	0	53.300	2	56.400	0
47.200	0	50.300	0	53.400	0	56.500	0
47.300	0	50.400	0	53.500	0	56.600	0
47.400	0	50.500	0	53.600	0	56.700	0
47.500	0	50.600	0	53.700	0	56.800	0
47.600	0	50.700	0	53.800	0	56.900	0
47.700	0	50.800	0	53.900	0	57.000	0
47.800	0	50.900	0	54.000	0	57.100	0
47.900	0	51.000	0	54.100	0	57.200	0

57.300	0	60.400	0	63.500	0	66.600	0
57.400	0	60.500	0	63.600	0	66.700	0
57.500	0	60.600	0	63.700	0	66.800	0
57.600	0	60.700	0	63.800	1	66.900	0
57.700	0	60.800	0	63.900	0	67.000	0
57.800	0	60.900	0	64.000	0	67.100	0
57.900	1	61.000	0	64.100	0	67.200	0
58.000	0	61.100	0	64.200	0	67.300	0
58.100	0	61.200	0	64.300	0	67.400	0
58.200	0	61.300	0	64.400	0	67.500	0
58.300	0	61.400	0	64.500	0	67.600	0
58.400	0	61.500	0	64.600	0	67.700	0
58.500	0	61.600	0	64.700	0	67.800	0
58.600	0	61.700	1	64.800	0	67.900	0
58.700	0	61.800	0	64.900	0	68.000	0
58.800	0	61.900	0	65.000	0	68.100	0
58.900	0	62.000	0	65.100	0	68.200	0
59.000	0	62.100	0	65.200	0	68.300	0
59.100	0	62.200	0	65.300	0	68.400	0
59.200	0	62.300	0	65.400	0	68.500	0
59.300	0	62.400	0	65.500	0	68.600	0
59.400	0	62.500	0	65.600	0	68.700	0
59.500	0	62.600	0	65.700	0	68.800	0
59.600	0	62.700	0	65.800	0	68.900	0
59.700	0	62.800	0	65.900	0	69.000	0
59.800	0	62.900	0	66.000	0	69.100	0
59.900	0	63.000	0	66.100	0	69.200	0
60.000	0	63.100	0	66.200	0	69.300	0
60.100	0	63.200	0	66.300	0	69.400	0
60.200	0	63.300	0	66.400	0	69.500	0
60.300	0	63.400	0	66.500	0	69.600	0

69.700	0	72.800	0	75.900	0	79.000	0
69.800	0	72.900	0	76.000	0	79.100	0
69.900	0	73.000	0	76.100	0	79.200	0
70.000	0	73.100	0	76.200	0	79.300	0
70.100	0	73.200	0	76.300	0	79.400	0
70.200	0	73.300	0	76.400	0	79.500	0
70.300	0	73.400	0	76.500	0	79.600	0
70.400	0	73.500	0	76.600	0	79.700	0
70.500	0	73.600	0	76.700	0	79.800	0
70.600	0	73.700	0	76.800	0	79.900	0
70.700	0	73.800	0	76.900	0	80.000	1
70.800	0	73.900	0	77.000	0	80.100	0
70.900	0	74.000	0	77.100	0	80.200	0
71.000	0	74.100	0	77.200	0	80.300	0
71.100	0	74.200	0	77.300	0	80.400	0
71.200	0	74.300	0	77.400	0	80.500	0
71.300	0	74.400	0	77.500	0	80.600	0
71.400	0	74.500	0	77.600	0	80.700	0
71.500	0	74.600	0	77.700	0	80.800	0
71.600	0	74.700	0	77.800	0	80.900	0
71.700	0	74.800	0	77.900	0	81.000	0
71.800	0	74.900	0	78.000	0	81.100	0
71.900	0	75.000	1	78.100	0	81.200	0
72.000	0	75.100	0	78.200	0	81.300	0
72.100	0	75.200	0	78.300	0	81.400	0
72.200	0	75.300	0	78.400	0	81.500	0
72.300	0	75.400	0	78.500	0	81.600	0
72.400	0	75.500	0	78.600	0	81.700	0
72.500	0	75.600	0	78.700	0	81.800	0
72.600	0	75.700	0	78.800	0	81.900	0
72.700	0	75.800	0	78.900	0	82.000	0

82.100	0	85.200	0	88.300	0	91.400	0
82.200	0	85.300	0	88.400	0	91.500	1
82.300	0	85.400	0	88.500	0	91.600	0
82.400	0	85.500	0	88.600	0	91.700	0
82.500	0	85.600	0	88.700	0	91.800	0
82.600	0	85.700	0	88.800	0	91.900	0
82.700	0	85.800	0	88.900	0	92.000	0
82.800	0	85.900	0	89.000	0	92.100	0
82.900	0	86.000	0	89.100	0	92.200	0
83.000	0	86.100	0	89.200	0	92.300	0
83.100	0	86.200	0	89.300	0	92.400	0
83.200	0	86.300	0	89.400	0	92.500	0
83.300	0	86.400	0	89.500	0	92.600	0
83.400	0	86.500	0	89.600	1	92.700	0
83.500	0	86.600	0	89.700	0	92.800	0
83.600	0	86.700	1	89.800	0	92.900	0
83.700	0	86.800	0	89.900	0	93.000	0
83.800	0	86.900	0	90.000	0	93.100	0
83.900	0	87.000	0	90.100	0	93.200	0
84.000	0	87.100	0	90.200	0	93.300	0
84.100	0	87.200	0	90.300	0	93.400	0
84.200	0	87.300	0	90.400	0	93.500	0
84.300	0	87.400	0	90.500	0	93.600	0
84.400	0	87.500	0	90.600	0	93.700	0
84.500	0	87.600	0	90.700	0	93.800	0
84.600	0	87.700	0	90.800	0	93.900	0
84.700	0	87.800	0	90.900	0	94.000	0
84.800	0	87.900	0	91.000	0	94.100	0
84.900	0	88.000	0	91.100	0	94.200	0
85.000	0	88.100	0	91.200	0	94.300	0
85.100	0	88.200	0	91.300	0	94.400	0

94.500	0	97.600	0	100.700	0	103.800	0
94.600	0	97.700	1	100.800	0	103.900	0
94.700	0	97.800	0	100.900	0	104.000	0
94.800	0	97.900	0	101.000	0	104.100	0
94.900	0	98.000	0	101.100	0	104.200	0
95.000	0	98.100	0	101.200	0	104.300	0
95.100	0	98.200	0	101.300	0	104.400	0
95.200	0	98.300	0	101.400	0	104.500	0
95.300	0	98.400	0	101.500	0	104.600	0
95.400	0	98.500	0	101.600	0	104.700	0
95.500	0	98.600	0	101.700	0	104.800	0
95.600	0	98.700	0	101.800	0	104.900	0
95.700	0	98.800	0	101.900	0	105.000	0
95.800	0	98.900	0	102.000	0	105.100	0
95.900	0	99.000	0	102.100	0	105.200	0
96.000	0	99.100	0	102.200	0	105.300	0
96.100	0	99.200	0	102.300	0	105.400	0
96.200	0	99.300	0	102.400	0	105.500	0
96.300	0	99.400	0	102.500	0	105.600	0
96.400	0	99.500	1	102.600	0	105.700	0
96.500	1	99.600	0	102.700	0	105.800	0
96.600	0	99.700	0	102.800	0	105.900	0
96.700	0	99.800	0	102.900	0	106.000	0
96.800	0	99.900	0	103.000	0	106.100	0
96.900	0	100.000	0	103.100	0	106.200	0
97.000	0	100.100	0	103.200	0	106.300	0
97.100	0	100.200	0	103.300	0	106.400	0
97.200	0	100.300	0	103.400	0	106.500	0
97.300	0	100.400	0	103.500	0	106.600	0
97.400	0	100.500	0	103.600	0	106.700	0
97.500	0	100.600	0	103.700	0	106.800	0

106.900	0	110.000	0	113.100	0	116.200	0
107.000	0	110.100	0	113.200	0	116.300	0
107.100	0	110.200	0	113.300	0	116.400	0
107.200	0	110.300	0	113.400	0	116.500	0
107.300	0	110.400	0	113.500	0	116.600	0
107.400	0	110.500	0	113.600	0	116.700	0
107.500	0	110.600	0	113.700	0	116.800	0
107.600	0	110.700	0	113.800	0	116.900	0
107.700	0	110.800	1	113.900	0	117.000	0
107.800	0	110.900	0	114.000	0	117.100	0
107.900	0	111.000	0	114.100	0	117.200	1
108.000	0	111.100	0	114.200	0	117.300	0
108.100	0	111.200	0	114.300	0	117.400	0
108.200	0	111.300	0	114.400	0	117.500	0
108.300	0	111.400	0	114.500	0	117.600	0
108.400	0	111.500	0	114.600	0	117.700	0
108.500	0	111.600	0	114.700	0	117.800	0
108.600	0	111.700	0	114.800	0	117.900	0
108.700	0	111.800	0	114.900	0	118.000	0
108.800	0	111.900	0	115.000	0	118.100	0
108.900	0	112.000	0	115.100	0	118.200	0
109.000	0	112.100	0	115.200	1	118.300	0
109.100	0	112.200	0	115.300	0	118.400	0
109.200	0	112.300	0	115.400	0	118.500	0
109.300	0	112.400	0	115.500	0	118.600	0
109.400	0	112.500	0	115.600	0	118.700	0
109.500	0	112.600	0	115.700	0	118.800	0
109.600	0	112.700	0	115.800	0	118.900	0
109.700	0	112.800	0	115.900	0	119.000	0
109.800	0	112.900	0	116.000	0	119.100	0
109.900	0	113.000	0	116.100	0	119.200	0

119.300	0	122.400	0	125.500	0	128.600	0
119.400	0	122.500	0	125.600	0	128.700	0
119.500	0	122.600	0	125.700	0	128.800	0
119.600	0	122.700	0	125.800	0	128.900	0
119.700	0	122.800	0	125.900	0	129.000	0
119.800	0	122.900	0	126.000	0	129.100	0
119.900	0	123.000	0	126.100	0	129.200	0
120.000	0	123.100	0	126.200	0	129.300	0
120.100	0	123.200	0	126.300	0	129.400	0
120.200	0	123.300	0	126.400	0	129.500	0
120.300	0	123.400	0	126.500	0	129.600	0
120.400	0	123.500	0	126.600	0	129.700	0
120.500	0	123.600	0	126.700	0	129.800	0
120.600	0	123.700	0	126.800	0	129.900	0
120.700	0	123.800	0	126.900	0	130.000	0
120.800	0	123.900	0	127.000	0	130.100	0
120.900	0	124.000	0	127.100	0	130.200	0
121.000	0	124.100	0	127.200	0	130.300	0
121.100	0	124.200	0	127.300	0	130.400	0
121.200	0	124.300	0	127.400	0	130.500	0
121.300	0	124.400	0	127.500	0	130.600	0
121.400	0	124.500	0	127.600	0	130.700	0
121.500	0	124.600	0	127.700	0	130.800	0
121.600	0	124.700	0	127.800	0	130.900	0
121.700	0	124.800	0	127.900	0	131.000	0
121.800	0	124.900	0	128.000	0	131.100	0
121.900	0	125.000	0	128.100	0	131.200	1
122.000	0	125.100	0	128.200	0	131.300	0
122.100	0	125.200	0	128.300	0	131.400	0
122.200	0	125.300	0	128.400	0	131.500	0
122.300	0	125.400	0	128.500	0	131.600	1

131.700	0	134.800	0	137.900	0	141.000	0
131.800	0	134.900	0	138.000	0	141.100	0
131.900	0	135.000	0	138.100	0	141.200	0
132.000	0	135.100	0	138.200	0	141.300	0
132.100	0	135.200	0	138.300	0	141.400	0
132.200	0	135.300	0	138.400	0	141.500	0
132.300	0	135.400	0	138.500	0	141.600	0
132.400	0	135.500	0	138.600	0	141.700	0
132.500	0	135.600	0	138.700	0	141.800	0
132.600	0	135.700	0	138.800	0	141.900	0
132.700	0	135.800	0	138.900	0	142.000	0
132.800	0	135.900	0	139.000	0	142.100	0
132.900	0	136.000	0	139.100	0	142.200	0
133.000	0	136.100	0	139.200	0	142.300	0
133.100	1	136.200	0	139.300	0	142.400	0
133.200	0	136.300	0	139.400	0	142.500	0
133.300	0	136.400	0	139.500	0	142.600	0
133.400	0	136.500	0	139.600	0	142.700	0
133.500	1	136.600	0	139.700	1	142.800	0
133.600	0	136.700	0	139.800	0	142.900	0
133.700	0	136.800	0	139.900	0	143.000	0
133.800	0	136.900	0	140.000	0	143.100	0
133.900	0	137.000	0	140.100	0	143.200	0
134.000	0	137.100	0	140.200	0	143.300	0
134.100	0	137.200	0	140.300	0	143.400	0
134.200	0	137.300	0	140.400	0	143.500	0
134.300	0	137.400	0	140.500	0	143.600	0
134.400	0	137.500	0	140.600	0	143.700	0
134.500	0	137.600	0	140.700	0	143.800	0
134.600	0	137.700	0	140.800	0	143.900	0
134.700	0	137.800	0	140.900	0	144.000	0

144.100	0	145.600	0	147.100	0	148.600	0
144.200	0	145.700	0	147.200	0	148.700	0
144.300	0	145.800	0	147.300	0	148.800	0
144.400	0	145.900	0	147.400	0	148.900	0
144.500	0	146.000	0	147.500	0	149.000	0
144.600	0	146.100	0	147.600	0	149.100	0
144.700	0	146.200	0	147.700	0	149.200	0
144.800	0	146.300	0	147.800	0	149.300	0
144.900	0	146.400	0	147.900	0	149.400	0
145.000	0	146.500	0	148.000	0	149.500	0
145.100	0	146.600	0	148.100	0	149.600	0
145.200	0	146.700	0	148.200	0	149.700	0
145.300	0	146.800	0	148.300	0	149.800	0
145.400	0	146.900	0	148.400	0	149.900	0
145.500	0	147.000	0	148.500	0	150.000	0

Background-2: Where first value is time in seconds and second value is counts per sample

0.100	0	1.500	0	2.900	0	4.300	0
0.200	0	1.600	0	3.000	0	4.400	1
0.300	0	1.700	0	3.100	0	4.500	0
0.400	0	1.800	0	3.200	0	4.600	0
0.500	0	1.900	0	3.300	0	4.700	0
0.600	0	2.000	0	3.400	0	4.800	0
0.700	0	2.100	0	3.500	0	4.900	0
0.800	0	2.200	0	3.600	0	5.000	0
0.900	0	2.300	0	3.700	0	5.100	0
1.000	0	2.400	0	3.800	0	5.200	0
1.100	0	2.500	0	3.900	0	5.300	0
1.200	0	2.600	0	4.000	0	5.400	0
1.300	0	2.700	0	4.100	0	5.500	0
1.400	1	2.800	0	4.200	0	5.600	0

5.700	0	8.800	0	11.900	0	15.000	0
5.800	0	8.900	0	12.000	0	15.100	0
5.900	0	9.000	0	12.100	0	15.200	0
6.000	0	9.100	0	12.200	0	15.300	0
6.100	0	9.200	0	12.300	0	15.400	0
6.200	0	9.300	0	12.400	0	15.500	0
6.300	0	9.400	0	12.500	0	15.600	0
6.400	0	9.500	0	12.600	0	15.700	0
6.500	0	9.600	0	12.700	0	15.800	0
6.600	0	9.700	0	12.800	0	15.900	0
6.700	0	9.800	0	12.900	0	16.000	0
6.800	0	9.900	0	13.000	1	16.100	0
6.900	0	10.000	0	13.100	0	16.200	0
7.000	0	10.100	0	13.200	0	16.300	0
7.100	0	10.200	0	13.300	0	16.400	0
7.200	0	10.300	0	13.400	0	16.500	0
7.300	0	10.400	0	13.500	0	16.600	0
7.400	0	10.500	0	13.600	0	16.700	0
7.500	0	10.600	0	13.700	0	16.800	0
7.600	0	10.700	0	13.800	0	16.900	0
7.700	0	10.800	0	13.900	0	17.000	0
7.800	0	10.900	0	14.000	0	17.100	0
7.900	0	11.000	0	14.100	0	17.200	0
8.000	0	11.100	0	14.200	0	17.300	0
8.100	0	11.200	0	14.300	0	17.400	0
8.200	0	11.300	0	14.400	0	17.500	0
8.300	0	11.400	0	14.500	0	17.600	1
8.400	1	11.500	0	14.600	0	17.700	0
8.500	0	11.600	0	14.700	0	17.800	0
8.600	0	11.700	0	14.800	0	17.900	0
8.700	0	11.800	0	14.900	0	18.000	0

18.100	0	21.200	0	24.300	0	27.400	0
18.200	0	21.300	0	24.400	0	27.500	0
18.300	0	21.400	0	24.500	0	27.600	0
18.400	0	21.500	0	24.600	0	27.700	0
18.500	1	21.600	0	24.700	0	27.800	0
18.600	0	21.700	0	24.800	0	27.900	0
18.700	0	21.800	0	24.900	0	28.000	0
18.800	0	21.900	0	25.000	0	28.100	0
18.900	1	22.000	0	25.100	0	28.200	0
19.000	0	22.100	0	25.200	0	28.300	0
19.100	0	22.200	0	25.300	0	28.400	0
19.200	0	22.300	0	25.400	0	28.500	0
19.300	0	22.400	0	25.500	0	28.600	0
19.400	0	22.500	0	25.600	0	28.700	0
19.500	0	22.600	0	25.700	0	28.800	0
19.600	0	22.700	0	25.800	0	28.900	0
19.700	1	22.800	0	25.900	0	29.000	0
19.800	0	22.900	0	26.000	0	29.100	0
19.900	0	23.000	0	26.100	0	29.200	0
20.000	0	23.100	0	26.200	0	29.300	0
20.100	0	23.200	0	26.300	0	29.400	0
20.200	0	23.300	0	26.400	0	29.500	0
20.300	0	23.400	0	26.500	0	29.600	0
20.400	0	23.500	0	26.600	0	29.700	0
20.500	0	23.600	0	26.700	0	29.800	0
20.600	0	23.700	0	26.800	0	29.900	0
20.700	0	23.800	0	26.900	0	30.000	0
20.800	0	23.900	0	27.000	0	30.100	0
20.900	0	24.000	0	27.100	0	30.200	0
21.000	0	24.100	0	27.200	0	30.300	0
21.100	0	24.200	0	27.300	0	30.400	0

30.500	0	33.600	0	36.700	0	39.800	0
30.600	0	33.700	0	36.800	0	39.900	0
30.700	0	33.800	0	36.900	0	40.000	0
30.800	0	33.900	0	37.000	0	40.100	0
30.900	0	34.000	0	37.100	0	40.200	0
31.000	0	34.100	0	37.200	0	40.300	0
31.100	0	34.200	0	37.300	0	40.400	0
31.200	0	34.300	0	37.400	0	40.500	0
31.300	1	34.400	0	37.500	0	40.600	0
31.400	0	34.500	0	37.600	0	40.700	0
31.500	0	34.600	0	37.700	0	40.800	0
31.600	0	34.700	0	37.800	0	40.900	0
31.700	0	34.800	0	37.900	0	41.000	0
31.800	0	34.900	0	38.000	0	41.100	0
31.900	0	35.000	0	38.100	0	41.200	0
32.000	0	35.100	0	38.200	0	41.300	0
32.100	0	35.200	0	38.300	0	41.400	0
32.200	0	35.300	0	38.400	0	41.500	0
32.300	0	35.400	0	38.500	0	41.600	0
32.400	0	35.500	0	38.600	0	41.700	0
32.500	0	35.600	0	38.700	0	41.800	0
32.600	0	35.700	0	38.800	0	41.900	0
32.700	0	35.800	0	38.900	0	42.000	0
32.800	0	35.900	0	39.000	0	42.100	0
32.900	0	36.000	0	39.100	0	42.200	0
33.000	0	36.100	0	39.200	0	42.300	0
33.100	0	36.200	0	39.300	0	42.400	0
33.200	0	36.300	0	39.400	0	42.500	0
33.300	0	36.400	0	39.500	0	42.600	0
33.400	0	36.500	0	39.600	0	42.700	0
33.500	0	36.600	0	39.700	0	42.800	0

42.900	0	46.000	0	49.100	0	52.200	0
43.000	0	46.100	0	49.200	0	52.300	0
43.100	0	46.200	0	49.300	0	52.400	0
43.200	0	46.300	0	49.400	0	52.500	0
43.300	0	46.400	0	49.500	0	52.600	0
43.400	0	46.500	0	49.600	0	52.700	0
43.500	0	46.600	1	49.700	0	52.800	0
43.600	0	46.700	0	49.800	1	52.900	0
43.700	0	46.800	0	49.900	0	53.000	0
43.800	0	46.900	0	50.000	0	53.100	0
43.900	0	47.000	0	50.100	0	53.200	0
44.000	0	47.100	0	50.200	0	53.300	2
44.100	0	47.200	0	50.300	0	53.400	0
44.200	0	47.300	0	50.400	0	53.500	0
44.300	0	47.400	0	50.500	0	53.600	0
44.400	0	47.500	0	50.600	0	53.700	0
44.500	0	47.600	0	50.700	0	53.800	0
44.600	0	47.700	0	50.800	0	53.900	0
44.700	0	47.800	0	50.900	0	54.000	0
44.800	0	47.900	0	51.000	0	54.100	0
44.900	0	48.000	0	51.100	0	54.200	0
45.000	0	48.100	0	51.200	0	54.300	0
45.100	1	48.200	0	51.300	0	54.400	0
45.200	0	48.300	0	51.400	0	54.500	0
45.300	0	48.400	0	51.500	0	54.600	0
45.400	0	48.500	0	51.600	0	54.700	0
45.500	0	48.600	0	51.700	0	54.800	0
45.600	0	48.700	0	51.800	0	54.900	0
45.700	0	48.800	0	51.900	0	55.000	0
45.800	0	48.900	0	52.000	0	55.100	0
45.900	0	49.000	0	52.100	0	55.200	0

55.300	0	58.400	0	61.500	0	64.600	0
55.400	1	58.500	0	61.600	0	64.700	0
55.500	0	58.600	0	61.700	1	64.800	0
55.600	0	58.700	0	61.800	0	64.900	0
55.700	0	58.800	0	61.900	0	65.000	0
55.800	0	58.900	0	62.000	0	65.100	0
55.900	0	59.000	0	62.100	0	65.200	0
56.000	0	59.100	0	62.200	0	65.300	0
56.100	0	59.200	0	62.300	0	65.400	0
56.200	0	59.300	0	62.400	0	65.500	0
56.300	0	59.400	0	62.500	0	65.600	0
56.400	0	59.500	0	62.600	0	65.700	0
56.500	0	59.600	0	62.700	0	65.800	0
56.600	0	59.700	0	62.800	0	65.900	0
56.700	0	59.800	0	62.900	0	66.000	0
56.800	0	59.900	0	63.000	0	66.100	0
56.900	0	60.000	0	63.100	0	66.200	0
57.000	0	60.100	0	63.200	0	66.300	0
57.100	0	60.200	0	63.300	0	66.400	0
57.200	0	60.300	0	63.400	0	66.500	0
57.300	0	60.400	0	63.500	0	66.600	0
57.400	0	60.500	0	63.600	0	66.700	0
57.500	0	60.600	0	63.700	0	66.800	0
57.600	0	60.700	0	63.800	1	66.900	0
57.700	0	60.800	0	63.900	0	67.000	0
57.800	0	60.900	0	64.000	0	67.100	0
57.900	1	61.000	0	64.100	0	67.200	0
58.000	0	61.100	0	64.200	0	67.300	0
58.100	0	61.200	0	64.300	0	67.400	0
58.200	0	61.300	0	64.400	0	67.500	0
58.300	0	61.400	0	64.500	0	67.600	0

67.700	0	70.800	0	73.900	0	77.000	0
67.800	0	70.900	0	74.000	0	77.100	0
67.900	0	71.000	0	74.100	0	77.200	0
68.000	0	71.100	0	74.200	0	77.300	0
68.100	0	71.200	0	74.300	0	77.400	0
68.200	0	71.300	0	74.400	0	77.500	0
68.300	0	71.400	0	74.500	0	77.600	0
68.400	0	71.500	0	74.600	0	77.700	0
68.500	0	71.600	0	74.700	0	77.800	0
68.600	0	71.700	0	74.800	0	77.900	0
68.700	0	71.800	0	74.900	0	78.000	0
68.800	0	71.900	0	75.000	1	78.100	0
68.900	0	72.000	0	75.100	0	78.200	0
69.000	0	72.100	0	75.200	0	78.300	0
69.100	0	72.200	0	75.300	0	78.400	0
69.200	0	72.300	0	75.400	0	78.500	0
69.300	0	72.400	0	75.500	0	78.600	0
69.400	0	72.500	0	75.600	0	78.700	0
69.500	0	72.600	0	75.700	0	78.800	0
69.600	0	72.700	0	75.800	0	78.900	0
69.700	0	72.800	0	75.900	0	79.000	0
69.800	0	72.900	0	76.000	0	79.100	0
69.900	0	73.000	0	76.100	0	79.200	0
70.000	0	73.100	0	76.200	0	79.300	0
70.100	0	73.200	0	76.300	0	79.400	0
70.200	0	73.300	0	76.400	0	79.500	0
70.300	0	73.400	0	76.500	0	79.600	0
70.400	0	73.500	0	76.600	0	79.700	0
70.500	0	73.600	0	76.700	0	79.800	0
70.600	0	73.700	0	76.800	0	79.900	0
70.700	0	73.800	0	76.900	0	80.000	1

80.100	0	83.200	0	86.300	0	89.400	0
80.200	0	83.300	0	86.400	0	89.500	0
80.300	0	83.400	0	86.500	0	89.600	1
80.400	0	83.500	0	86.600	0	89.700	0
80.500	0	83.600	0	86.700	1	89.800	0
80.600	0	83.700	0	86.800	0	89.900	0
80.700	0	83.800	0	86.900	0	90.000	0
80.800	0	83.900	0	87.000	0	90.100	0
80.900	0	84.000	0	87.100	0	90.200	0
81.000	0	84.100	0	87.200	0	90.300	0
81.100	0	84.200	0	87.300	0	90.400	0
81.200	0	84.300	0	87.400	0	90.500	0
81.300	0	84.400	0	87.500	0	90.600	0
81.400	0	84.500	0	87.600	0	90.700	0
81.500	0	84.600	0	87.700	0	90.800	0
81.600	0	84.700	0	87.800	0	90.900	0
81.700	0	84.800	0	87.900	0	91.000	0
81.800	0	84.900	0	88.000	0	91.100	0
81.900	0	85.000	0	88.100	0	91.200	0
82.000	0	85.100	0	88.200	0	91.300	0
82.100	0	85.200	0	88.300	0	91.400	0
82.200	0	85.300	0	88.400	0	91.500	1
82.300	0	85.400	0	88.500	0	91.600	0
82.400	0	85.500	0	88.600	0	91.700	0
82.500	0	85.600	0	88.700	0	91.800	0
82.600	0	85.700	0	88.800	0	91.900	0
82.700	0	85.800	0	88.900	0	92.000	0
82.800	0	85.900	0	89.000	0	92.100	0
82.900	0	86.000	0	89.100	0	92.200	0
83.000	0	86.100	0	89.200	0	92.300	0
83.100	0	86.200	0	89.300	0	92.400	0

92.500	0	95.600	0	98.700	0	101.800	0
92.600	0	95.700	0	98.800	0	101.900	0
92.700	0	95.800	0	98.900	0	102.000	0
92.800	0	95.900	0	99.000	0	102.100	0
92.900	0	96.000	0	99.100	0	102.200	0
93.000	0	96.100	0	99.200	0	102.300	0
93.100	0	96.200	0	99.300	0	102.400	0
93.200	0	96.300	0	99.400	0	102.500	0
93.300	0	96.400	0	99.500	1	102.600	0
93.400	0	96.500	1	99.600	0	102.700	0
93.500	0	96.600	0	99.700	0	102.800	0
93.600	0	96.700	0	99.800	0	102.900	0
93.700	0	96.800	0	99.900	0	103.000	0
93.800	0	96.900	0	100.000	0	103.100	0
93.900	0	97.000	0	100.100	0	103.200	0
94.000	0	97.100	0	100.200	0	103.300	0
94.100	0	97.200	0	100.300	0	103.400	0
94.200	0	97.300	0	100.400	0	103.500	0
94.300	0	97.400	0	100.500	0	103.600	0
94.400	0	97.500	0	100.600	0	103.700	0
94.500	0	97.600	0	100.700	0	103.800	0
94.600	0	97.700	1	100.800	0	103.900	0
94.700	0	97.800	0	100.900	0	104.000	0
94.800	0	97.900	0	101.000	0	104.100	0
94.900	0	98.000	0	101.100	0	104.200	0
95.000	0	98.100	0	101.200	0	104.300	0
95.100	0	98.200	0	101.300	0	104.400	0
95.200	0	98.300	0	101.400	0	104.500	0
95.300	0	98.400	0	101.500	0	104.600	0
95.400	0	98.500	0	101.600	0	104.700	0
95.500	0	98.600	0	101.700	0	104.800	0

104.900	0	108.000	0	111.100	0	114.200	0
105.000	0	108.100	0	111.200	0	114.300	0
105.100	0	108.200	0	111.300	0	114.400	0
105.200	0	108.300	0	111.400	0	114.500	0
105.300	0	108.400	0	111.500	0	114.600	0
105.400	0	108.500	0	111.600	0	114.700	0
105.500	0	108.600	0	111.700	0	114.800	0
105.600	0	108.700	0	111.800	0	114.900	0
105.700	0	108.800	0	111.900	0	115.000	0
105.800	0	108.900	0	112.000	0	115.100	0
105.900	0	109.000	0	112.100	0	115.200	1
106.000	0	109.100	0	112.200	0	115.300	0
106.100	0	109.200	0	112.300	0	115.400	0
106.200	0	109.300	0	112.400	0	115.500	0
106.300	0	109.400	0	112.500	0	115.600	0
106.400	0	109.500	0	112.600	0	115.700	0
106.500	0	109.600	0	112.700	0	115.800	0
106.600	0	109.700	0	112.800	0	115.900	0
106.700	0	109.800	0	112.900	0	116.000	0
106.800	0	109.900	0	113.000	0	116.100	0
106.900	0	110.000	0	113.100	0	116.200	0
107.000	0	110.100	0	113.200	0	116.300	0
107.100	0	110.200	0	113.300	0	116.400	0
107.200	0	110.300	0	113.400	0	116.500	0
107.300	0	110.400	0	113.500	0	116.600	0
107.400	0	110.500	0	113.600	0	116.700	0
107.500	0	110.600	0	113.700	0	116.800	0
107.600	0	110.700	0	113.800	0	116.900	0
107.700	0	110.800	1	113.900	0	117.000	0
107.800	0	110.900	0	114.000	0	117.100	0
107.900	0	111.000	0	114.100	0	117.200	1

117.300	0	120.400	0	123.500	0	126.600	0
117.400	0	120.500	0	123.600	0	126.700	0
117.500	0	120.600	0	123.700	0	126.800	0
117.600	0	120.700	0	123.800	0	126.900	0
117.700	0	120.800	0	123.900	0	127.000	0
117.800	0	120.900	0	124.000	0	127.100	0
117.900	0	121.000	0	124.100	0	127.200	0
118.000	0	121.100	0	124.200	0	127.300	0
118.100	0	121.200	0	124.300	0	127.400	0
118.200	0	121.300	0	124.400	0	127.500	0
118.300	0	121.400	0	124.500	0	127.600	0
118.400	0	121.500	0	124.600	0	127.700	0
118.500	0	121.600	0	124.700	0	127.800	0
118.600	0	121.700	0	124.800	0	127.900	0
118.700	0	121.800	0	124.900	0	128.000	0
118.800	0	121.900	0	125.000	0	128.100	0
118.900	0	122.000	0	125.100	0	128.200	0
119.000	0	122.100	0	125.200	0	128.300	0
119.100	0	122.200	0	125.300	0	128.400	0
119.200	0	122.300	0	125.400	0	128.500	0
119.300	0	122.400	0	125.500	0	128.600	0
119.400	0	122.500	0	125.600	0	128.700	0
119.500	0	122.600	0	125.700	0	128.800	0
119.600	0	122.700	0	125.800	0	128.900	0
119.700	0	122.800	0	125.900	0	129.000	0
119.800	0	122.900	0	126.000	0	129.100	0
119.900	0	123.000	0	126.100	0	129.200	0
120.000	0	123.100	0	126.200	0	129.300	0
120.100	0	123.200	0	126.300	0	129.400	0
120.200	0	123.300	0	126.400	0	129.500	0
120.300	0	123.400	0	126.500	0	129.600	0

129.700	0	132.800	0	135.900	0	139.000	0
129.800	0	132.900	0	136.000	0	139.100	0
129.900	0	133.000	0	136.100	0	139.200	0
130.000	0	133.100	1	136.200	0	139.300	0
130.100	0	133.200	0	136.300	0	139.400	0
130.200	0	133.300	0	136.400	0	139.500	0
130.300	0	133.400	0	136.500	0	139.600	0
130.400	0	133.500	1	136.600	0	139.700	1
130.500	0	133.600	0	136.700	0	139.800	0
130.600	0	133.700	0	136.800	0	139.900	0
130.700	0	133.800	0	136.900	0	140.000	0
130.800	0	133.900	0	137.000	0	140.100	0
130.900	0	134.000	0	137.100	0	140.200	0
131.000	0	134.100	0	137.200	0	140.300	0
131.100	0	134.200	0	137.300	0	140.400	0
131.200	1	134.300	0	137.400	0	140.500	0
131.300	0	134.400	0	137.500	0	140.600	0
131.400	0	134.500	0	137.600	0	140.700	0
131.500	0	134.600	0	137.700	0	140.800	0
131.600	1	134.700	0	137.800	0	140.900	0
131.700	0	134.800	0	137.900	0	141.000	0
131.800	0	134.900	0	138.000	0	141.100	0
131.900	0	135.000	0	138.100	0	141.200	0
132.000	0	135.100	0	138.200	0	141.300	0
132.100	0	135.200	0	138.300	0	141.400	0
132.200	0	135.300	0	138.400	0	141.500	0
132.300	0	135.400	0	138.500	0	141.600	0
132.400	0	135.500	0	138.600	0	141.700	0
132.500	0	135.600	0	138.700	0	141.800	0
132.600	0	135.700	0	138.800	0	141.900	0
132.700	0	135.800	0	138.900	0	142.000	0

142.100	0	145.200	0	148.300	0
142.200	0	145.300	0	148.400	0
142.300	0	145.400	0	148.500	0
142.400	0	145.500	0	148.600	0
142.500	0	145.600	0	148.700	0
142.600	0	145.700	0	148.800	0
142.700	0	145.800	0	148.900	0
142.800	0	145.900	0	149.000	0
142.900	0	146.000	0	149.100	0
143.000	0	146.100	0	149.200	0
143.100	0	146.200	0	149.300	0
143.200	0	146.300	0	149.400	0
143.300	0	146.400	0	149.500	0
143.400	0	146.500	0	149.600	0
143.500	0	146.600	0	149.700	0
143.600	0	146.700	0	149.800	0
143.700	0	146.800	0	149.900	0
143.800	0	146.900	0	150.000	0
143.900	0	147.000	0		
144.000	0	147.100	0		
144.100	0	147.200	0		
144.200	0	147.300	0		
144.300	0	147.400	0		
144.400	0	147.500	0		
144.500	0	147.600	0		
144.600	0	147.700	0		
144.700	0	147.800	0		
144.800	0	147.900	0		
144.900	0	148.000	0		
145.000	0	148.100	0		
145.100	0	148.200	0		

Run-1 10-20 mTorr: Where first value is time in seconds and second value is counts per sample

0.100	0	3.100	0	6.100	0	9.100	0
0.200	0	3.200	0	6.200	0	9.200	0
0.300	0	3.300	0	6.300	0	9.300	0
0.400	0	3.400	0	6.400	0	9.400	0
0.500	0	3.500	0	6.500	0	9.500	0
0.600	1	3.600	0	6.600	0	9.600	0
0.700	0	3.700	0	6.700	0	9.700	0
0.800	0	3.800	0	6.800	0	9.800	0
0.900	0	3.900	0	6.900	0	9.900	0
1.000	0	4.000	0	7.000	0	10.000	0
1.100	0	4.100	1	7.100	0	10.100	0
1.200	0	4.200	0	7.200	0	10.200	0
1.300	0	4.300	0	7.300	0	10.300	0
1.400	0	4.400	0	7.400	0	10.400	0
1.500	0	4.500	0	7.500	0	10.500	0
1.600	0	4.600	0	7.600	0	10.600	0
1.700	0	4.700	0	7.700	0	10.700	0
1.800	0	4.800	0	7.800	0	10.800	0
1.900	0	4.900	0	7.900	0	10.900	0
2.000	0	5.000	0	8.000	0	11.000	0
2.100	0	5.100	0	8.100	0	11.100	0
2.200	0	5.200	0	8.200	0	11.200	0
2.300	0	5.300	0	8.300	1	11.300	0
2.400	0	5.400	0	8.400	0	11.400	0
2.500	1	5.500	0	8.500	0	11.500	0
2.600	0	5.600	0	8.600	0	11.600	0
2.700	0	5.700	0	8.700	0	11.700	0
2.800	0	5.800	0	8.800	0	11.800	0
2.900	0	5.900	0	8.900	0	11.900	0
3.000	0	6.000	0	9.000	0	12.000	0

12.100	0	15.200	0	18.300	0	21.400	0
12.200	0	15.300	0	18.400	0	21.500	0
12.300	0	15.400	0	18.500	0	21.600	0
12.400	0	15.500	0	18.600	0	21.700	0
12.500	0	15.600	0	18.700	0	21.800	0
12.600	0	15.700	0	18.800	0	21.900	0
12.700	0	15.800	0	18.900	0	22.000	0
12.800	0	15.900	0	19.000	0	22.100	0
12.900	0	16.000	0	19.100	0	22.200	0
13.000	0	16.100	0	19.200	0	22.300	0
13.100	0	16.200	0	19.300	0	22.400	0
13.200	0	16.300	0	19.400	0	22.500	0
13.300	0	16.400	0	19.500	0	22.600	0
13.400	1	16.500	0	19.600	0	22.700	0
13.500	0	16.600	0	19.700	0	22.800	0
13.600	0	16.700	0	19.800	0	22.900	0
13.700	0	16.800	0	19.900	0	23.000	0
13.800	0	16.900	0	20.000	0	23.100	0
13.900	0	17.000	0	20.100	0	23.200	0
14.000	0	17.100	0	20.200	0	23.300	0
14.100	0	17.200	0	20.300	0	23.400	0
14.200	0	17.300	0	20.400	0	23.500	0
14.300	0	17.400	0	20.500	0	23.600	0
14.400	0	17.500	0	20.600	0	23.700	0
14.500	0	17.600	0	20.700	0	23.800	0
14.600	0	17.700	0	20.800	0	23.900	0
14.700	0	17.800	0	20.900	0	24.000	0
14.800	0	17.900	0	21.000	0	24.100	0
14.900	0	18.000	0	21.100	0	24.200	0
15.000	0	18.100	0	21.200	0	24.300	0
15.100	0	18.200	0	21.300	0	24.400	0

24.500	0	27.600	0	30.700	0	33.800	0
24.600	0	27.700	0	30.800	0	33.900	0
24.700	0	27.800	0	30.900	0	34.000	0
24.800	0	27.900	0	31.000	0	34.100	0
24.900	0	28.000	0	31.100	0	34.200	0
25.000	0	28.100	0	31.200	0	34.300	0
25.100	0	28.200	0	31.300	0	34.400	0
25.200	0	28.300	0	31.400	0	34.500	0
25.300	0	28.400	0	31.500	0	34.600	0
25.400	0	28.500	0	31.600	0	34.700	0
25.500	0	28.600	1	31.700	0	34.800	0
25.600	0	28.700	0	31.800	0	34.900	0
25.700	0	28.800	0	31.900	0	35.000	0
25.800	0	28.900	0	32.000	0	35.100	0
25.900	0	29.000	0	32.100	0	35.200	0
26.000	0	29.100	0	32.200	0	35.300	0
26.100	0	29.200	0	32.300	0	35.400	1
26.200	0	29.300	0	32.400	0	35.500	0
26.300	0	29.400	0	32.500	0	35.600	0
26.400	0	29.500	0	32.600	0	35.700	0
26.500	0	29.600	0	32.700	0	35.800	0
26.600	0	29.700	0	32.800	0	35.900	0
26.700	0	29.800	0	32.900	0	36.000	0
26.800	0	29.900	0	33.000	0	36.100	0
26.900	0	30.000	0	33.100	0	36.200	0
27.000	0	30.100	0	33.200	0	36.300	0
27.100	0	30.200	0	33.300	0	36.400	0
27.200	0	30.300	0	33.400	0	36.500	0
27.300	0	30.400	0	33.500	0	36.600	0
27.400	0	30.500	0	33.600	0	36.700	0
27.500	0	30.600	0	33.700	0	36.800	0

36.900	0	40.000	2	43.100	30	46.200	22
37.000	1	40.100	3	43.200	31	46.300	21
37.100	0	40.200	2	43.300	28	46.400	27
37.200	0	40.300	3	43.400	30	46.500	14
37.300	0	40.400	5	43.500	26	46.600	26
37.400	0	40.500	11	43.600	23	46.700	23
37.500	0	40.600	9	43.700	22	46.800	22
37.600	0	40.700	8	43.800	26	46.900	23
37.700	0	40.800	11	43.900	27	47.000	17
37.800	0	40.900	36	44.000	21	47.100	20
37.900	0	41.000	38	44.100	26	47.200	22
38.000	1	41.100	29	44.200	30	47.300	14
38.100	0	41.200	29	44.300	21	47.400	19
38.200	0	41.300	34	44.400	29	47.500	25
38.300	0	41.400	36	44.500	29	47.600	22
38.400	1	41.500	26	44.600	24	47.700	19
38.500	0	41.600	30	44.700	35	47.800	17
38.600	0	41.700	27	44.800	20	47.900	18
38.700	0	41.800	34	44.900	33	48.000	23
38.800	1	41.900	30	45.000	30	48.100	19
38.900	0	42.000	26	45.100	19	48.200	20
39.000	3	42.100	32	45.200	20	48.300	12
39.100	3	42.200	23	45.300	31	48.400	15
39.200	2	42.300	26	45.400	22	48.500	10
39.300	2	42.400	32	45.500	19	48.600	20
39.400	1	42.500	23	45.600	26	48.700	18
39.500	0	42.600	24	45.700	15	48.800	36
39.600	3	42.700	32	45.800	22	48.900	22
39.700	5	42.800	30	45.900	23	49.000	15
39.800	1	42.900	32	46.000	16	49.100	24
39.900	0	43.000	28	46.100	30	49.200	16

49.300	22	52.400	2	55.500	18	58.600	22
49.400	23	52.500	1	55.600	10	58.700	19
49.500	21	52.600	2	55.700	14	58.800	20
49.600	26	52.700	0	55.800	9	58.900	26
49.700	21	52.800	0	55.900	9	59.000	26
49.800	20	52.900	5	56.000	14	59.100	28
49.900	13	53.000	0	56.100	15	59.200	22
50.000	28	53.100	2	56.200	18	59.300	24
50.100	32	53.200	0	56.300	16	59.400	25
50.200	16	53.300	3	56.400	16	59.500	26
50.300	21	53.400	2	56.500	27	59.600	25
50.400	23	53.500	4	56.600	27	59.700	18
50.500	22	53.600	0	56.700	23	59.800	17
50.600	14	53.700	3	56.800	19	59.900	21
50.700	15	53.800	1	56.900	29	60.000	14
50.800	23	53.900	1	57.000	25	60.100	13
50.900	29	54.000	4	57.100	32	60.200	11
51.000	17	54.100	4	57.200	25	60.300	17
51.100	19	54.200	2	57.300	26	60.400	6
51.200	20	54.300	0	57.400	34	60.500	15
51.300	26	54.400	3	57.500	15	60.600	21
51.400	28	54.500	3	57.600	18	60.700	18
51.500	20	54.600	7	57.700	23	60.800	12
51.600	19	54.700	7	57.800	12	60.900	30
51.700	10	54.800	3	57.900	23	61.000	12
51.800	1	54.900	1	58.000	18	61.100	10
51.900	0	55.000	3	58.100	18	61.200	25
52.000	0	55.100	7	58.200	21	61.300	23
52.100	1	55.200	4	58.300	19	61.400	16
52.200	1	55.300	5	58.400	19	61.500	23
52.300	6	55.400	7	58.500	25	61.600	27

61.700	25	64.800	78	67.900	97	71.000	73
61.800	36	64.900	87	68.000	84	71.100	79
61.900	26	65.000	75	68.100	72	71.200	87
62.000	38	65.100	83	68.200	110	71.300	68
62.100	33	65.200	95	68.300	110	71.400	71
62.200	51	65.300	114	68.400	93	71.500	72
62.300	60	65.400	133	68.500	127	71.600	67
62.400	53	65.500	112	68.600	103	71.700	71
62.500	57	65.600	124	68.700	114	71.800	77
62.600	80	65.700	138	68.800	110	71.900	57
62.700	71	65.800	86	68.900	103	72.000	66
62.800	85	65.900	97	69.000	79	72.100	82
62.900	95	66.000	92	69.100	88	72.200	79
63.000	109	66.100	91	69.200	109	72.300	68
63.100	109	66.200	103	69.300	71	72.400	75
63.200	88	66.300	79	69.400	97	72.500	70
63.300	110	66.400	101	69.500	64	72.600	80
63.400	107	66.500	123	69.600	69	72.700	88
63.500	108	66.600	121	69.700	73	72.800	83
63.600	72	66.700	106	69.800	78	72.900	114
63.700	104	66.800	123	69.900	70	73.000	117
63.800	97	66.900	105	70.000	81	73.100	127
63.900	95	67.000	121	70.100	84	73.200	145
64.000	100	67.100	104	70.200	92	73.300	156
64.100	117	67.200	90	70.300	88	73.400	147
64.200	102	67.300	86	70.400	77	73.500	154
64.300	114	67.400	94	70.500	79	73.600	144
64.400	85	67.500	79	70.600	86	73.700	190
64.500	79	67.600	95	70.700	75	73.800	183
64.600	62	67.700	84	70.800	82	73.900	165
64.700	90	67.800	82	70.900	68	74.000	129

74.100	89	77.200	212	80.300	346	83.400	348
74.200	98	77.300	205	80.400	357	83.500	317
74.300	100	77.400	220	80.500	333	83.600	341
74.400	115	77.500	221	80.600	359	83.700	328
74.500	119	77.600	202	80.700	373	83.800	352
74.600	119	77.700	225	80.800	330	83.900	339
74.700	115	77.800	161	80.900	326	84.000	323
74.800	118	77.900	275	81.000	320	84.100	349
74.900	122	78.000	298	81.100	340	84.200	309
75.000	125	78.100	313	81.200	337	84.300	335
75.100	124	78.200	260	81.300	316	84.400	340
75.200	135	78.300	269	81.400	341	84.500	317
75.300	102	78.400	258	81.500	358	84.600	327
75.400	144	78.500	281	81.600	343	84.700	327
75.500	105	78.600	306	81.700	344	84.800	361
75.600	103	78.700	294	81.800	355	84.900	312
75.700	121	78.800	310	81.900	348	85.000	330
75.800	108	78.900	350	82.000	329	85.100	327
75.900	89	79.000	341	82.100	355	85.200	315
76.000	108	79.100	340	82.200	361	85.300	329
76.100	132	79.200	347	82.300	311	85.400	326
76.200	127	79.300	343	82.400	316	85.500	332
76.300	148	79.400	364	82.500	334	85.600	326
76.400	165	79.500	332	82.600	313	85.700	296
76.500	151	79.600	328	82.700	297	85.800	313
76.600	170	79.700	356	82.800	337	85.900	321
76.700	174	79.800	368	82.900	305	86.000	301
76.800	221	79.900	395	83.000	331	86.100	300
76.900	194	80.000	385	83.100	294	86.200	281
77.000	200	80.100	336	83.200	337	86.300	289
77.100	193	80.200	353	83.300	325	86.400	320

86.500	284	89.600	233	92.700	263	95.800	250
86.600	310	89.700	215	92.800	272	95.900	270
86.700	313	89.800	218	92.900	272	96.000	253
86.800	323	89.900	201	93.000	241	96.100	266
86.900	331	90.000	242	93.100	285	96.200	266
87.000	313	90.100	239	93.200	226	96.300	275
87.100	291	90.200	302	93.300	232	96.400	309
87.200	265	90.300	322	93.400	217	96.500	298
87.300	287	90.400	256	93.500	218	96.600	293
87.400	322	90.500	241	93.600	252	96.700	299
87.500	289	90.600	232	93.700	265	96.800	293
87.600	293	90.700	281	93.800	311	96.900	224
87.700	293	90.800	303	93.900	301	97.000	231
87.800	320	90.900	309	94.000	300	97.100	230
87.900	311	91.000	256	94.100	288	97.200	247
88.000	309	91.100	285	94.200	304	97.300	248
88.100	321	91.200	262	94.300	328	97.400	245
88.200	297	91.300	240	94.400	304	97.500	230
88.300	266	91.400	251	94.500	315	97.600	234
88.400	282	91.500	268	94.600	325	97.700	249
88.500	265	91.600	292	94.700	310	97.800	229
88.600	300	91.700	277	94.800	308	97.900	208
88.700	256	91.800	307	94.900	314	98.000	208
88.800	262	91.900	302	95.000	314	98.100	231
88.900	254	92.000	274	95.100	303	98.200	206
89.000	271	92.100	273	95.200	314	98.300	221
89.100	236	92.200	268	95.300	335	98.400	240
89.200	238	92.300	261	95.400	280	98.500	248
89.300	238	92.400	268	95.500	300	98.600	240
89.400	197	92.500	270	95.600	293	98.700	231
89.500	237	92.600	290	95.700	266	98.800	249

98.900	244	102.000	201	105.100	200	108.200	442
99.000	267	102.100	230	105.200	196	108.300	420
99.100	243	102.200	230	105.300	212	108.400	444
99.200	259	102.300	216	105.400	199	108.500	438
99.300	273	102.400	215	105.500	206	108.600	427
99.400	259	102.500	220	105.600	211	108.700	459
99.500	242	102.600	219	105.700	205	108.800	476
99.600	249	102.700	200	105.800	197	108.900	460
99.700	249	102.800	205	105.900	217	109.000	485
99.800	264	102.900	200	106.000	197	109.100	462
99.900	255	103.000	186	106.100	193	109.200	476
100.000	251	103.100	194	106.200	201	109.300	465
100.100	228	103.200	205	106.300	199	109.400	471
100.200	240	103.300	206	106.400	205	109.500	450
100.300	246	103.400	206	106.500	220	109.600	430
100.400	222	103.500	184	106.600	239	109.700	461
100.500	254	103.600	197	106.700	255	109.800	443
100.600	252	103.700	177	106.800	249	109.900	417
100.700	252	103.800	211	106.900	262	110.000	359
100.800	227	103.900	198	107.000	260	110.100	401
100.900	220	104.000	202	107.100	267	110.200	401
101.000	213	104.100	192	107.200	238	110.300	435
101.100	219	104.200	189	107.300	263	110.400	426
101.200	226	104.300	215	107.400	243	110.500	446
101.300	202	104.400	227	107.500	217	110.600	443
101.400	220	104.500	217	107.600	378	110.700	426
101.500	206	104.600	218	107.700	454	110.800	440
101.600	238	104.700	220	107.800	457	110.900	436
101.700	213	104.800	232	107.900	425	111.000	446
101.800	200	104.900	193	108.000	435	111.100	437
101.900	195	105.000	222	108.100	482	111.200	456

111.300	460	114.400	423	117.500	403	120.600	364
111.400	454	114.500	436	117.600	383	120.700	359
111.500	445	114.600	449	117.700	412	120.800	347
111.600	437	114.700	432	117.800	391	120.900	409
111.700	426	114.800	408	117.900	377	121.000	415
111.800	415	114.900	406	118.000	362	121.100	416
111.900	436	115.000	386	118.100	369	121.200	417
112.000	420	115.100	413	118.200	386	121.300	433
112.100	435	115.200	431	118.300	386	121.400	429
112.200	390	115.300	438	118.400	400	121.500	443
112.300	397	115.400	408	118.500	408	121.600	425
112.400	422	115.500	391	118.600	407	121.700	410
112.500	413	115.600	379	118.700	413	121.800	363
112.600	444	115.700	382	118.800	408	121.900	351
112.700	412	115.800	378	118.900	396	122.000	348
112.800	417	115.900	373	119.000	397	122.100	359
112.900	429	116.000	368	119.100	407	122.200	357
113.000	426	116.100	379	119.200	396	122.300	342
113.100	401	116.200	379	119.300	414	122.400	354
113.200	396	116.300	367	119.400	424	122.500	357
113.300	429	116.400	383	119.500	420	122.600	332
113.400	446	116.500	393	119.600	415	122.700	348
113.500	414	116.600	371	119.700	399	122.800	335
113.600	401	116.700	400	119.800	368	122.900	339
113.700	401	116.800	371	119.900	368	123.000	358
113.800	423	116.900	412	120.000	345	123.100	351
113.900	421	117.000	392	120.100	344	123.200	360
114.000	412	117.100	400	120.200	366	123.300	364
114.100	389	117.200	396	120.300	350	123.400	393
114.200	416	117.300	399	120.400	361	123.500	386
114.300	426	117.400	402	120.500	373	123.600	398

123.700	391	126.800	375	129.900	370	133.000	380
123.800	380	126.900	356	130.000	384	133.100	394
123.900	373	127.000	339	130.100	353	133.200	367
124.000	386	127.100	352	130.200	364	133.300	378
124.100	373	127.200	340	130.300	356	133.400	390
124.200	354	127.300	348	130.400	343	133.500	383
124.300	379	127.400	326	130.500	329	133.600	358
124.400	359	127.500	369	130.600	368	133.700	361
124.500	383	127.600	372	130.700	351	133.800	328
124.600	383	127.700	369	130.800	349	133.900	342
124.700	372	127.800	348	130.900	344	134.000	344
124.800	393	127.900	359	131.000	340	134.100	361
124.900	392	128.000	352	131.100	350	134.200	362
125.000	388	128.100	344	131.200	366	134.300	342
125.100	400	128.200	344	131.300	365	134.400	364
125.200	390	128.300	369	131.400	380	134.500	341
125.300	386	128.400	368	131.500	382	134.600	377
125.400	394	128.500	359	131.600	385	134.700	362
125.500	401	128.600	350	131.700	382	134.800	360
125.600	418	128.700	360	131.800	403	134.900	364
125.700	388	128.800	348	131.900	390	135.000	355
125.800	374	128.900	368	132.000	399	135.100	349
125.900	360	129.000	368	132.100	374	135.200	361
126.000	311	129.100	368	132.200	380	135.300	351
126.100	305	129.200	352	132.300	398	135.400	341
126.200	300	129.300	344	132.400	415	135.500	355
126.300	356	129.400	359	132.500	388	135.600	338
126.400	368	129.500	337	132.600	393	135.700	346
126.500	388	129.600	343	132.700	376	135.800	360
126.600	368	129.700	364	132.800	394	135.900	352
126.700	376	129.800	351	132.900	392	136.000	338

136.100	363	139.200	384	142.300	347	145.400	344
136.200	345	139.300	381	142.400	333	145.500	351
136.300	327	139.400	374	142.500	346	145.600	349
136.400	327	139.500	360	142.600	361	145.700	352
136.500	303	139.600	365	142.700	351	145.800	365
136.600	302	139.700	349	142.800	364	145.900	358
136.700	300	139.800	356	142.900	377	146.000	364
136.800	296	139.900	360	143.000	349	146.100	336
136.900	335	140.000	364	143.100	338	146.200	365
137.000	300	140.100	353	143.200	354	146.300	365
137.100	312	140.200	360	143.300	345	146.400	357
137.200	303	140.300	354	143.400	370	146.500	321
137.300	325	140.400	329	143.500	369	146.600	355
137.400	294	140.500	327	143.600	343	146.700	363
137.500	329	140.600	305	143.700	358	146.800	70
137.600	293	140.700	340	143.800	356	146.900	0
137.700	285	140.800	307	143.900	366	147.000	0
137.800	320	140.900	314	144.000	361	147.100	0
137.900	315	141.000	308	144.100	345	147.200	0
138.000	369	141.100	300	144.200	350	147.300	0
138.100	362	141.200	322	144.300	360	147.400	0
138.200	350	141.300	349	144.400	345	147.500	0
138.300	370	141.400	353	144.500	346	147.600	0
138.400	363	141.500	372	144.600	355	147.700	0
138.500	360	141.600	309	144.700	349	147.800	0
138.600	362	141.700	313	144.800	338	147.900	0
138.700	367	141.800	322	144.900	339	148.000	0
138.800	345	141.900	343	145.000	325	148.100	0
138.900	343	142.000	354	145.100	337	148.200	0
139.000	376	142.100	365	145.200	367	148.300	0
139.100	363	142.200	325	145.300	347	148.400	0

148.500 1

148.600 0

148.700 0

148.800 0

148.900 0

149.000 0

149.100 0

149.200 0

149.300 0

149.400 0

149.500 0

149.600 0

149.700 0

149.800 0

149.900 0

150.000 0

Run-2 30-40 mTorr: Where first value is time in seconds and second value is counts per sample

0.100	0	3.100	0	6.100	0	9.100	0
0.200	0	3.200	0	6.200	0	9.200	0
0.300	0	3.300	0	6.300	0	9.300	0
0.400	0	3.400	0	6.400	0	9.400	0
0.500	0	3.500	1	6.500	0	9.500	0
0.600	0	3.600	0	6.600	0	9.600	0
0.700	0	3.700	0	6.700	0	9.700	0
0.800	0	3.800	0	6.800	0	9.800	0
0.900	0	3.900	0	6.900	0	9.900	0
1.000	0	4.000	0	7.000	0	10.000	0
1.100	0	4.100	0	7.100	0	10.100	0
1.200	0	4.200	0	7.200	0	10.200	0
1.300	0	4.300	0	7.300	0	10.300	0
1.400	0	4.400	0	7.400	0	10.400	0
1.500	0	4.500	0	7.500	0	10.500	0
1.600	0	4.600	0	7.600	0	10.600	0
1.700	0	4.700	0	7.700	0	10.700	0
1.800	0	4.800	0	7.800	1	10.800	0
1.900	0	4.900	0	7.900	0	10.900	0
2.000	0	5.000	0	8.000	0	11.000	0
2.100	0	5.100	0	8.100	0	11.100	0
2.200	0	5.200	0	8.200	0	11.200	0
2.300	0	5.300	0	8.300	0	11.300	0
2.400	0	5.400	0	8.400	0	11.400	0
2.500	0	5.500	0	8.500	0	11.500	0
2.600	0	5.600	0	8.600	0	11.600	0
2.700	0	5.700	0	8.700	0	11.700	0
2.800	0	5.800	0	8.800	0	11.800	0
2.900	0	5.900	0	8.900	0	11.900	0
3.000	0	6.000	0	9.000	0	12.000	0

12.100	0	15.200	0	18.300	0	21.400	1
12.200	1	15.300	0	18.400	0	21.500	1
12.300	0	15.400	0	18.500	0	21.600	0
12.400	0	15.500	0	18.600	0	21.700	2
12.500	0	15.600	0	18.700	0	21.800	1
12.600	0	15.700	0	18.800	0	21.900	1
12.700	0	15.800	0	18.900	0	22.000	2
12.800	0	15.900	0	19.000	1	22.100	1
12.900	0	16.000	0	19.100	0	22.200	0
13.000	0	16.100	0	19.200	0	22.300	1
13.100	0	16.200	0	19.300	0	22.400	1
13.200	0	16.300	0	19.400	0	22.500	1
13.300	0	16.400	0	19.500	2	22.600	4
13.400	0	16.500	0	19.600	0	22.700	1
13.500	0	16.600	0	19.700	0	22.800	0
13.600	1	16.700	0	19.800	0	22.900	0
13.700	0	16.800	0	19.900	0	23.000	1
13.800	0	16.900	0	20.000	0	23.100	0
13.900	0	17.000	0	20.100	0	23.200	0
14.000	0	17.100	0	20.200	0	23.300	1
14.100	0	17.200	0	20.300	0	23.400	0
14.200	0	17.300	0	20.400	0	23.500	2
14.300	0	17.400	0	20.500	0	23.600	0
14.400	0	17.500	0	20.600	0	23.700	1
14.500	0	17.600	0	20.700	0	23.800	0
14.600	0	17.700	0	20.800	0	23.900	0
14.700	0	17.800	0	20.900	1	24.000	1
14.800	0	17.900	0	21.000	1	24.100	0
14.900	0	18.000	0	21.100	0	24.200	2
15.000	0	18.100	0	21.200	0	24.300	1
15.100	1	18.200	0	21.300	2	24.400	2

24.500	2	27.600	2	30.700	1	33.800	1
24.600	2	27.700	2	30.800	1	33.900	1
24.700	0	27.800	2	30.900	2	34.000	1
24.800	2	27.900	2	31.000	4	34.100	2
24.900	0	28.000	0	31.100	1	34.200	1
25.000	3	28.100	3	31.200	2	34.300	1
25.100	3	28.200	1	31.300	0	34.400	1
25.200	0	28.300	2	31.400	1	34.500	6
25.300	0	28.400	1	31.500	0	34.600	1
25.400	2	28.500	1	31.600	2	34.700	2
25.500	0	28.600	1	31.700	2	34.800	3
25.600	1	28.700	3	31.800	2	34.900	2
25.700	0	28.800	0	31.900	2	35.000	3
25.800	3	28.900	1	32.000	2	35.100	2
25.900	2	29.000	2	32.100	0	35.200	4
26.000	0	29.100	0	32.200	2	35.300	2
26.100	1	29.200	3	32.300	1	35.400	2
26.200	1	29.300	0	32.400	2	35.500	4
26.300	0	29.400	1	32.500	2	35.600	1
26.400	2	29.500	2	32.600	2	35.700	2
26.500	0	29.600	0	32.700	1	35.800	3
26.600	2	29.700	1	32.800	3	35.900	2
26.700	1	29.800	1	32.900	0	36.000	3
26.800	1	29.900	3	33.000	2	36.100	0
26.900	0	30.000	1	33.100	2	36.200	2
27.000	1	30.100	4	33.200	3	36.300	3
27.100	1	30.200	1	33.300	1	36.400	1
27.200	0	30.300	1	33.400	1	36.500	4
27.300	1	30.400	0	33.500	0	36.600	1
27.400	2	30.500	0	33.600	1	36.700	2
27.500	2	30.600	5	33.700	0	36.800	2

36.900	4	40.000	4	43.100	4	46.200	3
37.000	4	40.100	1	43.200	2	46.300	5
37.100	2	40.200	3	43.300	2	46.400	1
37.200	4	40.300	4	43.400	4	46.500	1
37.300	2	40.400	0	43.500	0	46.600	4
37.400	5	40.500	3	43.600	2	46.700	1
37.500	0	40.600	1	43.700	3	46.800	6
37.600	2	40.700	1	43.800	1	46.900	1
37.700	2	40.800	3	43.900	2	47.000	3
37.800	3	40.900	3	44.000	2	47.100	3
37.900	2	41.000	1	44.100	4	47.200	2
38.000	0	41.100	2	44.200	3	47.300	3
38.100	6	41.200	2	44.300	5	47.400	5
38.200	1	41.300	3	44.400	3	47.500	4
38.300	1	41.400	0	44.500	3	47.600	3
38.400	2	41.500	1	44.600	5	47.700	6
38.500	1	41.600	1	44.700	3	47.800	5
38.600	3	41.700	1	44.800	5	47.900	3
38.700	3	41.800	2	44.900	3	48.000	5
38.800	1	41.900	1	45.000	5	48.100	2
38.900	2	42.000	3	45.100	3	48.200	2
39.000	4	42.100	1	45.200	3	48.300	3
39.100	1	42.200	3	45.300	4	48.400	2
39.200	3	42.300	3	45.400	3	48.500	5
39.300	0	42.400	4	45.500	4	48.600	6
39.400	3	42.500	7	45.600	1	48.700	4
39.500	3	42.600	0	45.700	4	48.800	2
39.600	3	42.700	2	45.800	0	48.900	3
39.700	0	42.800	2	45.900	2	49.000	4
39.800	2	42.900	0	46.000	5	49.100	6
39.900	2	43.000	3	46.100	4	49.200	5

49.300	4	52.400	25	55.500	11	58.600	22
49.400	4	52.500	13	55.600	14	58.700	21
49.500	6	52.600	19	55.700	18	58.800	17
49.600	4	52.700	17	55.800	16	58.900	17
49.700	2	52.800	14	55.900	22	59.000	14
49.800	5	52.900	15	56.000	27	59.100	21
49.900	7	53.000	18	56.100	22	59.200	25
50.000	7	53.100	18	56.200	23	59.300	21
50.100	7	53.200	21	56.300	17	59.400	16
50.200	4	53.300	9	56.400	18	59.500	25
50.300	10	53.400	16	56.500	25	59.600	24
50.400	4	53.500	17	56.600	22	59.700	24
50.500	5	53.600	17	56.700	17	59.800	22
50.600	10	53.700	22	56.800	17	59.900	22
50.700	6	53.800	19	56.900	15	60.000	22
50.800	11	53.900	12	57.000	20	60.100	22
50.900	13	54.000	17	57.100	22	60.200	28
51.000	13	54.100	20	57.200	24	60.300	21
51.100	16	54.200	18	57.300	17	60.400	19
51.200	19	54.300	23	57.400	21	60.500	22
51.300	12	54.400	25	57.500	27	60.600	17
51.400	10	54.500	22	57.600	23	60.700	26
51.500	15	54.600	21	57.700	20	60.800	26
51.600	24	54.700	12	57.800	12	60.900	20
51.700	22	54.800	18	57.900	18	61.000	24
51.800	16	54.900	15	58.000	21	61.100	22
51.900	23	55.000	14	58.100	24	61.200	18
52.000	17	55.100	18	58.200	19	61.300	23
52.100	15	55.200	23	58.300	21	61.400	23
52.200	11	55.300	26	58.400	20	61.500	16
52.300	20	55.400	17	58.500	14	61.600	29

61.700	23	64.800	25	67.900	17	71.000	22
61.800	18	64.900	25	68.000	23	71.100	31
61.900	11	65.000	17	68.100	25	71.200	27
62.000	21	65.100	27	68.200	18	71.300	17
62.100	19	65.200	26	68.300	21	71.400	27
62.200	21	65.300	30	68.400	21	71.500	23
62.300	19	65.400	24	68.500	26	71.600	18
62.400	21	65.500	26	68.600	21	71.700	14
62.500	14	65.600	20	68.700	26	71.800	22
62.600	32	65.700	24	68.800	18	71.900	21
62.700	15	65.800	26	68.900	16	72.000	19
62.800	23	65.900	27	69.000	25	72.100	21
62.900	26	66.000	22	69.100	19	72.200	22
63.000	25	66.100	29	69.200	19	72.300	27
63.100	15	66.200	22	69.300	23	72.400	28
63.200	25	66.300	17	69.400	17	72.500	22
63.300	22	66.400	23	69.500	20	72.600	26
63.400	14	66.500	17	69.600	19	72.700	25
63.500	21	66.600	21	69.700	29	72.800	24
63.600	19	66.700	13	69.800	27	72.900	22
63.700	26	66.800	21	69.900	16	73.000	35
63.800	25	66.900	23	70.000	28	73.100	26
63.900	17	67.000	28	70.100	28	73.200	23
64.000	17	67.100	13	70.200	25	73.300	20
64.100	19	67.200	20	70.300	26	73.400	22
64.200	16	67.300	24	70.400	17	73.500	25
64.300	16	67.400	18	70.500	20	73.600	21
64.400	21	67.500	25	70.600	18	73.700	23
64.500	18	67.600	25	70.700	18	73.800	23
64.600	16	67.700	20	70.800	13	73.900	33
64.700	23	67.800	22	70.900	14	74.000	25

74.100	19	77.200	24	80.300	23	83.400	35
74.200	23	77.300	23	80.400	29	83.500	29
74.300	23	77.400	22	80.500	31	83.600	25
74.400	16	77.500	26	80.600	33	83.700	31
74.500	20	77.600	23	80.700	28	83.800	27
74.600	20	77.700	31	80.800	15	83.900	32
74.700	27	77.800	27	80.900	21	84.000	29
74.800	31	77.900	29	81.000	25	84.100	26
74.900	20	78.000	30	81.100	32	84.200	22
75.000	21	78.100	34	81.200	29	84.300	25
75.100	28	78.200	30	81.300	29	84.400	32
75.200	33	78.300	22	81.400	18	84.500	24
75.300	28	78.400	25	81.500	23	84.600	20
75.400	25	78.500	26	81.600	26	84.700	33
75.500	22	78.600	24	81.700	33	84.800	15
75.600	18	78.700	25	81.800	27	84.900	29
75.700	21	78.800	22	81.900	31	85.000	34
75.800	21	78.900	34	82.000	29	85.100	30
75.900	24	79.000	27	82.100	31	85.200	24
76.000	23	79.100	29	82.200	22	85.300	22
76.100	25	79.200	24	82.300	19	85.400	31
76.200	30	79.300	21	82.400	21	85.500	35
76.300	28	79.400	33	82.500	35	85.600	24
76.400	22	79.500	23	82.600	25	85.700	31
76.500	27	79.600	22	82.700	35	85.800	25
76.600	26	79.700	35	82.800	26	85.900	31
76.700	30	79.800	19	82.900	24	86.000	27
76.800	21	79.900	30	83.000	26	86.100	34
76.900	22	80.000	21	83.100	33	86.200	25
77.000	32	80.100	21	83.200	31	86.300	30
77.100	29	80.200	24	83.300	33	86.400	26

86.500	23	89.600	29	92.700	24	95.800	27
86.600	21	89.700	18	92.800	23	95.900	31
86.700	29	89.800	30	92.900	34	96.000	33
86.800	26	89.900	36	93.000	38	96.100	30
86.900	22	90.000	28	93.100	24	96.200	31
87.000	24	90.100	20	93.200	25	96.300	33
87.100	30	90.200	20	93.300	25	96.400	28
87.200	30	90.300	30	93.400	20	96.500	30
87.300	20	90.400	26	93.500	31	96.600	29
87.400	21	90.500	35	93.600	32	96.700	23
87.500	19	90.600	25	93.700	24	96.800	29
87.600	28	90.700	25	93.800	30	96.900	31
87.700	29	90.800	26	93.900	27	97.000	32
87.800	15	90.900	27	94.000	21	97.100	30
87.900	28	91.000	22	94.100	27	97.200	23
88.000	23	91.100	21	94.200	23	97.300	32
88.100	29	91.200	23	94.300	28	97.400	27
88.200	36	91.300	24	94.400	33	97.500	29
88.300	24	91.400	35	94.500	32	97.600	35
88.400	32	91.500	21	94.600	29	97.700	31
88.500	20	91.600	25	94.700	24	97.800	31
88.600	34	91.700	21	94.800	28	97.900	28
88.700	23	91.800	29	94.900	27	98.000	25
88.800	20	91.900	27	95.000	23	98.100	32
88.900	23	92.000	33	95.100	28	98.200	24
89.000	28	92.100	30	95.200	25	98.300	33
89.100	28	92.200	32	95.300	24	98.400	30
89.200	23	92.300	30	95.400	28	98.500	35
89.300	30	92.400	30	95.500	23	98.600	31
89.400	25	92.500	27	95.600	24	98.700	28
89.500	25	92.600	31	95.700	21	98.800	31

98.900	28	102.000	34	105.100	34	108.200	36
99.000	34	102.100	29	105.200	38	108.300	40
99.100	33	102.200	32	105.300	27	108.400	39
99.200	33	102.300	31	105.400	34	108.500	29
99.300	31	102.400	27	105.500	42	108.600	49
99.400	31	102.500	30	105.600	33	108.700	35
99.500	31	102.600	28	105.700	37	108.800	34
99.600	39	102.700	35	105.800	34	108.900	46
99.700	25	102.800	27	105.900	38	109.000	37
99.800	26	102.900	48	106.000	36	109.100	47
99.900	26	103.000	33	106.100	35	109.200	42
100.000	32	103.100	34	106.200	36	109.300	31
100.100	29	103.200	24	106.300	38	109.400	39
100.200	27	103.300	29	106.400	40	109.500	30
100.300	24	103.400	26	106.500	34	109.600	34
100.400	29	103.500	35	106.600	37	109.700	41
100.500	41	103.600	35	106.700	36	109.800	42
100.600	25	103.700	37	106.800	44	109.900	36
100.700	27	103.800	23	106.900	48	110.000	35
100.800	31	103.900	31	107.000	41	110.100	41
100.900	28	104.000	31	107.100	29	110.200	43
101.000	38	104.100	27	107.200	37	110.300	51
101.100	29	104.200	42	107.300	30	110.400	37
101.200	30	104.300	30	107.400	41	110.500	32
101.300	26	104.400	39	107.500	47	110.600	40
101.400	28	104.500	45	107.600	39	110.700	40
101.500	29	104.600	46	107.700	47	110.800	34
101.600	31	104.700	21	107.800	37	110.900	44
101.700	31	104.800	32	107.900	45	111.000	37
101.800	39	104.900	40	108.000	42	111.100	32
101.900	33	105.000	32	108.100	37	111.200	47

111.300	38	114.400	39	117.500	44	120.600	44
111.400	35	114.500	41	117.600	44	120.700	41
111.500	36	114.600	46	117.700	28	120.800	50
111.600	40	114.700	46	117.800	41	120.900	39
111.700	47	114.800	43	117.900	39	121.000	38
111.800	34	114.900	42	118.000	38	121.100	46
111.900	37	115.000	50	118.100	36	121.200	38
112.000	42	115.100	42	118.200	47	121.300	45
112.100	34	115.200	42	118.300	34	121.400	38
112.200	47	115.300	48	118.400	39	121.500	34
112.300	49	115.400	36	118.500	34	121.600	51
112.400	33	115.500	50	118.600	37	121.700	48
112.500	35	115.600	53	118.700	45	121.800	39
112.600	34	115.700	45	118.800	31	121.900	44
112.700	42	115.800	49	118.900	35	122.000	44
112.800	33	115.900	41	119.000	34	122.100	36
112.900	45	116.000	46	119.100	43	122.200	34
113.000	34	116.100	44	119.200	41	122.300	48
113.100	39	116.200	33	119.300	44	122.400	29
113.200	43	116.300	50	119.400	41	122.500	41
113.300	37	116.400	39	119.500	39	122.600	42
113.400	38	116.500	32	119.600	46	122.700	47
113.500	37	116.600	42	119.700	45	122.800	43
113.600	42	116.700	50	119.800	32	122.900	33
113.700	30	116.800	51	119.900	43	123.000	52
113.800	42	116.900	37	120.000	40	123.100	51
113.900	44	117.000	48	120.100	40	123.200	35
114.000	36	117.100	51	120.200	45	123.300	43
114.100	45	117.200	50	120.300	42	123.400	30
114.200	34	117.300	42	120.400	46	123.500	35
114.300	36	117.400	42	120.500	49	123.600	45

123.700	42	126.800	45	129.900	34	133.000	41
123.800	47	126.900	45	130.000	42	133.100	46
123.900	47	127.000	38	130.100	35	133.200	41
124.000	40	127.100	53	130.200	48	133.300	41
124.100	38	127.200	40	130.300	48	133.400	42
124.200	49	127.300	46	130.400	41	133.500	48
124.300	29	127.400	43	130.500	41	133.600	47
124.400	47	127.500	55	130.600	41	133.700	42
124.500	46	127.600	42	130.700	43	133.800	54
124.600	43	127.700	48	130.800	53	133.900	40
124.700	39	127.800	40	130.900	47	134.000	33
124.800	45	127.900	47	131.000	44	134.100	47
124.900	49	128.000	39	131.100	45	134.200	46
125.000	33	128.100	41	131.200	50	134.300	42
125.100	35	128.200	42	131.300	44	134.400	45
125.200	50	128.300	54	131.400	47	134.500	46
125.300	44	128.400	53	131.500	43	134.600	58
125.400	41	128.500	37	131.600	45	134.700	59
125.500	51	128.600	37	131.700	39	134.800	55
125.600	44	128.700	34	131.800	47	134.900	38
125.700	44	128.800	38	131.900	51	135.000	51
125.800	36	128.900	36	132.000	42	135.100	40
125.900	41	129.000	40	132.100	42	135.200	51
126.000	56	129.100	55	132.200	53	135.300	37
126.100	35	129.200	51	132.300	43	135.400	41
126.200	51	129.300	50	132.400	40	135.500	48
126.300	38	129.400	31	132.500	49	135.600	48
126.400	45	129.500	40	132.600	49	135.700	42
126.500	45	129.600	34	132.700	40	135.800	52
126.600	48	129.700	42	132.800	41	135.900	41
126.700	35	129.800	41	132.900	36	136.000	37

136.100	41	139.200	58	142.300	44	145.400	51
136.200	48	139.300	46	142.400	45	145.500	62
136.300	41	139.400	45	142.500	46	145.600	43
136.400	49	139.500	53	142.600	41	145.700	57
136.500	42	139.600	44	142.700	48	145.800	48
136.600	54	139.700	41	142.800	51	145.900	57
136.700	50	139.800	38	142.900	58	146.000	64
136.800	53	139.900	50	143.000	61	146.100	54
136.900	53	140.000	45	143.100	54	146.200	54
137.000	32	140.100	44	143.200	52	146.300	51
137.100	42	140.200	37	143.300	56	146.400	42
137.200	44	140.300	51	143.400	39	146.500	53
137.300	33	140.400	49	143.500	41	146.600	58
137.400	48	140.500	54	143.600	57	146.700	51
137.500	45	140.600	47	143.700	59	146.800	55
137.600	43	140.700	44	143.800	56	146.900	52
137.700	47	140.800	44	143.900	48	147.000	52
137.800	43	140.900	50	144.000	45	147.100	52
137.900	42	141.000	46	144.100	42	147.200	43
138.000	37	141.100	48	144.200	54	147.300	52
138.100	44	141.200	53	144.300	44	147.400	51
138.200	46	141.300	40	144.400	58	147.500	52
138.300	41	141.400	44	144.500	54	147.600	55
138.400	44	141.500	49	144.600	50	147.700	52
138.500	43	141.600	42	144.700	42	147.800	55
138.600	46	141.700	45	144.800	51	147.900	60
138.700	52	141.800	48	144.900	51	148.000	58
138.800	53	141.900	43	145.000	54	148.100	57
138.900	53	142.000	51	145.100	59	148.200	54
139.000	43	142.100	51	145.200	42	148.300	50
139.100	42	142.200	42	145.300	48	148.400	51

148.500	46	148.900	56	149.300	49	149.700	53
148.600	44	149.000	57	149.400	52	149.800	52
148.700	50	149.100	58	149.500	49	149.900	54
148.800	45	149.200	47	149.600	49	150.000	64

Run-3 50-60 mTorr: Where first value is time in seconds and second value is counts per sample

0.100	0	2.500	0	4.900	0	7.300	0
0.200	0	2.600	0	5.000	0	7.400	0
0.300	0	2.700	0	5.100	0	7.500	0
0.400	0	2.800	0	5.200	0	7.600	0
0.500	0	2.900	0	5.300	0	7.700	0
0.600	0	3.000	0	5.400	0	7.800	0
0.700	0	3.100	0	5.500	0	7.900	0
0.800	0	3.200	0	5.600	0	8.000	0
0.900	0	3.300	0	5.700	0	8.100	0
1.000	0	3.400	0	5.800	0	8.200	0
1.100	0	3.500	0	5.900	0	8.300	0
1.200	0	3.600	0	6.000	0	8.400	1
1.300	0	3.700	0	6.100	0	8.500	0
1.400	0	3.800	0	6.200	0	8.600	0
1.500	0	3.900	0	6.300	0	8.700	0
1.600	0	4.000	0	6.400	0	8.800	0
1.700	0	4.100	0	6.500	0	8.900	0
1.800	0	4.200	0	6.600	0	9.000	0
1.900	0	4.300	0	6.700	0	9.100	0
2.000	0	4.400	0	6.800	0	9.200	0
2.100	0	4.500	0	6.900	0	9.300	0
2.200	0	4.600	0	7.000	0	9.400	0
2.300	0	4.700	0	7.100	0	9.500	0
2.400	0	4.800	0	7.200	0	9.600	0

9.700	0	12.800	5	15.900	15	19.000	34
9.800	1	12.900	3	16.000	13	19.100	32
9.900	0	13.000	3	16.100	9	19.200	39
10.000	0	13.100	4	16.200	14	19.300	39
10.100	0	13.200	5	16.300	16	19.400	36
10.200	0	13.300	7	16.400	20	19.500	35
10.300	0	13.400	2	16.500	21	19.600	24
10.400	0	13.500	5	16.600	16	19.700	29
10.500	0	13.600	3	16.700	22	19.800	32
10.600	0	13.700	2	16.800	25	19.900	23
10.700	0	13.800	2	16.900	32	20.000	37
10.800	0	13.900	5	17.000	29	20.100	29
10.900	0	14.000	4	17.100	24	20.200	29
11.000	0	14.100	3	17.200	28	20.300	38
11.100	0	14.200	3	17.300	29	20.400	24
11.200	0	14.300	8	17.400	33	20.500	22
11.300	0	14.400	5	17.500	22	20.600	30
11.400	1	14.500	8	17.600	24	20.700	28
11.500	1	14.600	6	17.700	35	20.800	20
11.600	0	14.700	9	17.800	30	20.900	23
11.700	1	14.800	7	17.900	27	21.000	32
11.800	0	14.900	11	18.000	24	21.100	22
11.900	1	15.000	9	18.100	35	21.200	34
12.000	0	15.100	18	18.200	31	21.300	21
12.100	0	15.200	8	18.300	31	21.400	20
12.200	0	15.300	10	18.400	28	21.500	18
12.300	0	15.400	12	18.500	38	21.600	19
12.400	3	15.500	8	18.600	23	21.700	15
12.500	2	15.600	11	18.700	33	21.800	21
12.600	0	15.700	12	18.800	36	21.900	22
12.700	3	15.800	17	18.900	33	22.000	21

22.100	29	25.200	50	28.300	55	31.400	33
22.200	28	25.300	40	28.400	36	31.500	30
22.300	35	25.400	48	28.500	37	31.600	38
22.400	24	25.500	33	28.600	34	31.700	34
22.500	30	25.600	20	28.700	32	31.800	32
22.600	32	25.700	13	28.800	22	31.900	31
22.700	26	25.800	23	28.900	28	32.000	32
22.800	38	25.900	24	29.000	28	32.100	37
22.900	26	26.000	28	29.100	30	32.200	27
23.000	32	26.100	29	29.200	30	32.300	34
23.100	38	26.200	30	29.300	31	32.400	16
23.200	41	26.300	22	29.400	34	32.500	33
23.300	39	26.400	35	29.500	26	32.600	24
23.400	42	26.500	23	29.600	32	32.700	23
23.500	42	26.600	19	29.700	29	32.800	28
23.600	34	26.700	30	29.800	31	32.900	28
23.700	33	26.800	34	29.900	31	33.000	30
23.800	47	26.900	25	30.000	28	33.100	27
23.900	41	27.000	25	30.100	30	33.200	36
24.000	44	27.100	33	30.200	34	33.300	25
24.100	33	27.200	31	30.300	30	33.400	30
24.200	40	27.300	31	30.400	30	33.500	30
24.300	27	27.400	36	30.500	31	33.600	42
24.400	41	27.500	26	30.600	28	33.700	40
24.500	38	27.600	28	30.700	33	33.800	35
24.600	33	27.700	32	30.800	31	33.900	32
24.700	46	27.800	28	30.900	36	34.000	37
24.800	43	27.900	29	31.000	32	34.100	24
24.900	45	28.000	29	31.100	30	34.200	26
25.000	42	28.100	31	31.200	30	34.300	38
25.100	45	28.200	34	31.300	29	34.400	27

34.500	39	37.600	31	40.700	37	43.800	18
34.600	22	37.700	25	40.800	33	43.900	22
34.700	31	37.800	33	40.900	30	44.000	24
34.800	31	37.900	35	41.000	28	44.100	30
34.900	23	38.000	30	41.100	34	44.200	16
35.000	30	38.100	35	41.200	28	44.300	31
35.100	31	38.200	34	41.300	32	44.400	28
35.200	35	38.300	38	41.400	24	44.500	38
35.300	23	38.400	36	41.500	29	44.600	27
35.400	34	38.500	35	41.600	38	44.700	22
35.500	23	38.600	32	41.700	40	44.800	16
35.600	46	38.700	40	41.800	42	44.900	11
35.700	28	38.800	38	41.900	31	45.000	19
35.800	36	38.900	43	42.000	24	45.100	26
35.900	37	39.000	36	42.100	21	45.200	21
36.000	34	39.100	32	42.200	27	45.300	27
36.100	49	39.200	22	42.300	27	45.400	19
36.200	26	39.300	30	42.400	34	45.500	24
36.300	28	39.400	42	42.500	27	45.600	18
36.400	21	39.500	28	42.600	26	45.700	19
36.500	29	39.600	37	42.700	27	45.800	20
36.600	35	39.700	31	42.800	31	45.900	22
36.700	37	39.800	32	42.900	30	46.000	23
36.800	47	39.900	42	43.000	28	46.100	20
36.900	50	40.000	31	43.100	23	46.200	27
37.000	47	40.100	36	43.200	26	46.300	27
37.100	40	40.200	29	43.300	31	46.400	17
37.200	35	40.300	29	43.400	32	46.500	29
37.300	40	40.400	34	43.500	36	46.600	22
37.400	33	40.500	18	43.600	32	46.700	23
37.500	40	40.600	38	43.700	23	46.800	22

46.900	13	50.000	14	53.100	17	56.200	16
47.000	21	50.100	10	53.200	14	56.300	18
47.100	21	50.200	15	53.300	17	56.400	24
47.200	24	50.300	16	53.400	13	56.500	11
47.300	31	50.400	10	53.500	13	56.600	5
47.400	26	50.500	16	53.600	9	56.700	7
47.500	26	50.600	19	53.700	13	56.800	11
47.600	24	50.700	16	53.800	12	56.900	15
47.700	22	50.800	10	53.900	8	57.000	6
47.800	19	50.900	15	54.000	13	57.100	14
47.900	27	51.000	14	54.100	12	57.200	10
48.000	31	51.100	16	54.200	8	57.300	13
48.100	30	51.200	25	54.300	15	57.400	11
48.200	27	51.300	12	54.400	15	57.500	10
48.300	19	51.400	13	54.500	15	57.600	7
48.400	26	51.500	11	54.600	16	57.700	6
48.500	27	51.600	20	54.700	11	57.800	11
48.600	22	51.700	17	54.800	28	57.900	7
48.700	17	51.800	20	54.900	26	58.000	13
48.800	18	51.900	14	55.000	16	58.100	14
48.900	22	52.000	15	55.100	19	58.200	6
49.000	19	52.100	13	55.200	17	58.300	9
49.100	16	52.200	17	55.300	20	58.400	18
49.200	19	52.300	12	55.400	17	58.500	9
49.300	23	52.400	16	55.500	7	58.600	13
49.400	19	52.500	15	55.600	24	58.700	9
49.500	15	52.600	17	55.700	12	58.800	9
49.600	14	52.700	12	55.800	22	58.900	4
49.700	16	52.800	15	55.900	16	59.000	7
49.800	14	52.900	18	56.000	13	59.100	8
49.900	19	53.000	10	56.100	13	59.200	11

59.300	12	62.400	10	65.500	14	68.600	15
59.400	11	62.500	13	65.600	13	68.700	12
59.500	12	62.600	9	65.700	14	68.800	9
59.600	7	62.700	13	65.800	14	68.900	13
59.700	11	62.800	8	65.900	11	69.000	16
59.800	8	62.900	10	66.000	19	69.100	19
59.900	13	63.000	9	66.100	15	69.200	14
60.000	14	63.100	16	66.200	9	69.300	19
60.100	15	63.200	11	66.300	16	69.400	10
60.200	11	63.300	6	66.400	19	69.500	8
60.300	11	63.400	10	66.500	12	69.600	10
60.400	16	63.500	11	66.600	16	69.700	11
60.500	11	63.600	10	66.700	20	69.800	16
60.600	8	63.700	7	66.800	17	69.900	14
60.700	12	63.800	9	66.900	9	70.000	12
60.800	10	63.900	10	67.000	16	70.100	21
60.900	10	64.000	19	67.100	13	70.200	8
61.000	4	64.100	19	67.200	13	70.300	16
61.100	8	64.200	15	67.300	17	70.400	8
61.200	12	64.300	23	67.400	13	70.500	15
61.300	10	64.400	17	67.500	19	70.600	12
61.400	11	64.500	10	67.600	14	70.700	12
61.500	7	64.600	9	67.700	9	70.800	13
61.600	7	64.700	17	67.800	9	70.900	13
61.700	12	64.800	13	67.900	13	71.000	19
61.800	16	64.900	11	68.000	17	71.100	18
61.900	15	65.000	12	68.100	9	71.200	20
62.000	7	65.100	11	68.200	17	71.300	20
62.100	12	65.200	12	68.300	16	71.400	12
62.200	8	65.300	13	68.400	14	71.500	21
62.300	17	65.400	22	68.500	17	71.600	19

71.700	17	74.800	15	77.900	12	81.000	16
71.800	10	74.900	15	78.000	15	81.100	14
71.900	10	75.000	18	78.100	16	81.200	12
72.000	13	75.100	16	78.200	12	81.300	16
72.100	14	75.200	13	78.300	11	81.400	14
72.200	18	75.300	11	78.400	12	81.500	21
72.300	9	75.400	11	78.500	15	81.600	22
72.400	15	75.500	16	78.600	12	81.700	15
72.500	15	75.600	16	78.700	11	81.800	12
72.600	15	75.700	13	78.800	6	81.900	14
72.700	8	75.800	10	78.900	11	82.000	15
72.800	12	75.900	15	79.000	13	82.100	14
72.900	20	76.000	12	79.100	11	82.200	16
73.000	10	76.100	14	79.200	8	82.300	13
73.100	12	76.200	13	79.300	14	82.400	5
73.200	16	76.300	14	79.400	11	82.500	7
73.300	11	76.400	11	79.500	14	82.600	16
73.400	21	76.500	14	79.600	17	82.700	18
73.500	13	76.600	13	79.700	23	82.800	18
73.600	9	76.700	11	79.800	12	82.900	10
73.700	12	76.800	8	79.900	17	83.000	17
73.800	11	76.900	9	80.000	14	83.100	14
73.900	15	77.000	9	80.100	13	83.200	15
74.000	17	77.100	11	80.200	12	83.300	18
74.100	16	77.200	15	80.300	10	83.400	15
74.200	14	77.300	17	80.400	19	83.500	16
74.300	12	77.400	10	80.500	23	83.600	9
74.400	8	77.500	14	80.600	17	83.700	15
74.500	14	77.600	11	80.700	11	83.800	8
74.600	18	77.700	11	80.800	11	83.900	5
74.700	11	77.800	6	80.900	24	84.000	16

84.100	6	87.200	9	90.300	17	93.400	11
84.200	10	87.300	16	90.400	10	93.500	12
84.300	11	87.400	14	90.500	11	93.600	9
84.400	14	87.500	18	90.600	12	93.700	5
84.500	7	87.600	11	90.700	12	93.800	8
84.600	9	87.700	12	90.800	8	93.900	8
84.700	5	87.800	11	90.900	12	94.000	10
84.800	12	87.900	12	91.000	7	94.100	9
84.900	8	88.000	13	91.100	14	94.200	9
85.000	7	88.100	16	91.200	12	94.300	17
85.100	5	88.200	14	91.300	10	94.400	15
85.200	12	88.300	10	91.400	12	94.500	12
85.300	13	88.400	19	91.500	11	94.600	17
85.400	17	88.500	19	91.600	20	94.700	13
85.500	13	88.600	12	91.700	18	94.800	15
85.600	11	88.700	13	91.800	14	94.900	10
85.700	17	88.800	14	91.900	11	95.000	14
85.800	6	88.900	10	92.000	9	95.100	14
85.900	9	89.000	4	92.100	16	95.200	11
86.000	9	89.100	12	92.200	8	95.300	9
86.100	8	89.200	10	92.300	11	95.400	10
86.200	13	89.300	11	92.400	16	95.500	6
86.300	14	89.400	9	92.500	7	95.600	17
86.400	11	89.500	9	92.600	8	95.700	12
86.500	12	89.600	8	92.700	14	95.800	26
86.600	17	89.700	18	92.800	8	95.900	8
86.700	10	89.800	12	92.900	13	96.000	12
86.800	9	89.900	15	93.000	7	96.100	10
86.900	12	90.000	12	93.100	16	96.200	16
87.000	11	90.100	12	93.200	7	96.300	11
87.100	12	90.200	10	93.300	16	96.400	14

96.500	11	99.600	4	102.700	11	105.800	10
96.600	4	99.700	17	102.800	13	105.900	6
96.700	17	99.800	10	102.900	10	106.000	11
96.800	10	99.900	12	103.000	9	106.100	12
96.900	10	100.000	9	103.100	14	106.200	12
97.000	7	100.100	9	103.200	13	106.300	5
97.100	7	100.200	9	103.300	7	106.400	17
97.200	17	100.300	12	103.400	14	106.500	12
97.300	13	100.400	6	103.500	10	106.600	9
97.400	12	100.500	9	103.600	6	106.700	9
97.500	7	100.600	6	103.700	12	106.800	15
97.600	5	100.700	15	103.800	9	106.900	9
97.700	16	100.800	8	103.900	11	107.000	9
97.800	15	100.900	15	104.000	9	107.100	8
97.900	10	101.000	9	104.100	11	107.200	6
98.000	8	101.100	12	104.200	7	107.300	4
98.100	7	101.200	10	104.300	14	107.400	9
98.200	6	101.300	15	104.400	10	107.500	7
98.300	12	101.400	8	104.500	9	107.600	4
98.400	10	101.500	7	104.600	11	107.700	16
98.500	13	101.600	11	104.700	7	107.800	11
98.600	15	101.700	16	104.800	10	107.900	8
98.700	12	101.800	15	104.900	5	108.000	9
98.800	11	101.900	9	105.000	8	108.100	10
98.900	5	102.000	17	105.100	7	108.200	12
99.000	16	102.100	11	105.200	8	108.300	11
99.100	7	102.200	12	105.300	8	108.400	14
99.200	12	102.300	12	105.400	12	108.500	14
99.300	9	102.400	8	105.500	10	108.600	11
99.400	8	102.500	12	105.600	15	108.700	10
99.500	13	102.600	12	105.700	9	108.800	9

108.900	7	112.000	10	115.100	8	118.200	7
109.000	10	112.100	13	115.200	14	118.300	7
109.100	10	112.200	8	115.300	11	118.400	13
109.200	5	112.300	11	115.400	12	118.500	10
109.300	13	112.400	8	115.500	12	118.600	11
109.400	6	112.500	8	115.600	15	118.700	16
109.500	6	112.600	11	115.700	9	118.800	6
109.600	9	112.700	10	115.800	5	118.900	11
109.700	11	112.800	11	115.900	10	119.000	14
109.800	11	112.900	11	116.000	6	119.100	4
109.900	12	113.000	5	116.100	11	119.200	11
110.000	8	113.100	8	116.200	8	119.300	6
110.100	11	113.200	17	116.300	9	119.400	13
110.200	8	113.300	16	116.400	11	119.500	11
110.300	6	113.400	9	116.500	14	119.600	3
110.400	9	113.500	11	116.600	11	119.700	13
110.500	11	113.600	14	116.700	9	119.800	9
110.600	5	113.700	11	116.800	14	119.900	8
110.700	10	113.800	13	116.900	7	120.000	7
110.800	9	113.900	9	117.000	8	120.100	16
110.900	13	114.000	20	117.100	9	120.200	12
111.000	11	114.100	14	117.200	11	120.300	11
111.100	7	114.200	11	117.300	12	120.400	10
111.200	12	114.300	14	117.400	12	120.500	10
111.300	9	114.400	11	117.500	8	120.600	10
111.400	12	114.500	12	117.600	17	120.700	9
111.500	11	114.600	14	117.700	9	120.800	20
111.600	7	114.700	5	117.800	12	120.900	14
111.700	8	114.800	14	117.900	8	121.000	16
111.800	7	114.900	10	118.000	13	121.100	16
111.900	16	115.000	7	118.100	18	121.200	27

121.300	24	124.400	12	127.500	7	130.600	8
121.400	14	124.500	4	127.600	13	130.700	7
121.500	14	124.600	15	127.700	9	130.800	10
121.600	10	124.700	9	127.800	16	130.900	10
121.700	20	124.800	15	127.900	7	131.000	10
121.800	17	124.900	9	128.000	7	131.100	8
121.900	23	125.000	6	128.100	6	131.200	7
122.000	18	125.100	16	128.200	11	131.300	8
122.100	18	125.200	12	128.300	9	131.400	9
122.200	8	125.300	9	128.400	6	131.500	6
122.300	9	125.400	8	128.500	7	131.600	8
122.400	9	125.500	8	128.600	8	131.700	7
122.500	10	125.600	5	128.700	8	131.800	8
122.600	8	125.700	10	128.800	4	131.900	10
122.700	8	125.800	9	128.900	4	132.000	11
122.800	9	125.900	4	129.000	16	132.100	10
122.900	3	126.000	11	129.100	4	132.200	6
123.000	7	126.100	15	129.200	8	132.300	8
123.100	4	126.200	12	129.300	5	132.400	6
123.200	9	126.300	12	129.400	9	132.500	13
123.300	9	126.400	13	129.500	9	132.600	10
123.400	8	126.500	13	129.600	5	132.700	6
123.500	10	126.600	9	129.700	8	132.800	7
123.600	10	126.700	15	129.800	11	132.900	7
123.700	9	126.800	17	129.900	10	133.000	7
123.800	8	126.900	14	130.000	5	133.100	7
123.900	6	127.000	8	130.100	11	133.200	12
124.000	13	127.100	11	130.200	8	133.300	7
124.100	7	127.200	8	130.300	4	133.400	4
124.200	12	127.300	10	130.400	12	133.500	6
124.300	9	127.400	16	130.500	10	133.600	7

133.700	4	136.800	4	139.900	9	143.000	5
133.800	11	136.900	7	140.000	6	143.100	11
133.900	10	137.000	8	140.100	5	143.200	6
134.000	8	137.100	8	140.200	6	143.300	8
134.100	5	137.200	7	140.300	7	143.400	11
134.200	12	137.300	6	140.400	3	143.500	6
134.300	14	137.400	8	140.500	10	143.600	6
134.400	7	137.500	7	140.600	8	143.700	10
134.500	9	137.600	6	140.700	10	143.800	9
134.600	5	137.700	10	140.800	6	143.900	5
134.700	8	137.800	8	140.900	7	144.000	7
134.800	8	137.900	14	141.000	12	144.100	12
134.900	6	138.000	12	141.100	9	144.200	12
135.000	8	138.100	8	141.200	12	144.300	5
135.100	10	138.200	10	141.300	11	144.400	8
135.200	16	138.300	4	141.400	16	144.500	8
135.300	8	138.400	9	141.500	9	144.600	7
135.400	9	138.500	9	141.600	8	144.700	10
135.500	9	138.600	13	141.700	6	144.800	7
135.600	10	138.700	15	141.800	10	144.900	4
135.700	13	138.800	6	141.900	5	145.000	8
135.800	10	138.900	6	142.000	6	145.100	4
135.900	9	139.000	7	142.100	13	145.200	4
136.000	14	139.100	3	142.200	7	145.300	5
136.100	10	139.200	9	142.300	10	145.400	11
136.200	13	139.300	7	142.400	3	145.500	8
136.300	10	139.400	11	142.500	7	145.600	10
136.400	14	139.500	3	142.600	5	145.700	8
136.500	10	139.600	13	142.700	6	145.800	5
136.600	9	139.700	5	142.800	4	145.900	8
136.700	7	139.800	8	142.900	4	146.000	9

146.100	8	147.100	9	148.100	5	149.100	7
146.200	8	147.200	8	148.200	5	149.200	6
146.300	7	147.300	8	148.300	7	149.300	5
146.400	5	147.400	7	148.400	6	149.400	8
146.500	5	147.500	9	148.500	7	149.500	5
146.600	13	147.600	6	148.600	6	149.600	6
146.700	4	147.700	3	148.700	10	149.700	12
146.800	6	147.800	6	148.800	8	149.800	6
146.900	4	147.900	6	148.900	8	149.900	7
147.000	6	148.000	5	149.000	7	150.000	3

Run-4 70-80 mTorr: Where first value is time in seconds and second value is counts per sample

0.100	0	3.200	0	6.300	0	9.400	0
0.200	0	3.300	0	6.400	0	9.500	0
0.300	0	3.400	0	6.500	0	9.600	0
0.400	0	3.500	0	6.600	0	9.700	0
0.500	0	3.600	0	6.700	0	9.800	0
0.600	0	3.700	0	6.800	0	9.900	0
0.700	0	3.800	1	6.900	0	10.000	0
0.800	0	3.900	0	7.000	0	10.100	0
0.900	0	4.000	0	7.100	0	10.200	0
1.000	0	4.100	0	7.200	0	10.300	0
1.100	0	4.200	0	7.300	0	10.400	0
1.200	0	4.300	0	7.400	0	10.500	0
1.300	0	4.400	0	7.500	0	10.600	1
1.400	0	4.500	0	7.600	0	10.700	0
1.500	0	4.600	0	7.700	0	10.800	0
1.600	0	4.700	0	7.800	0	10.900	0
1.700	0	4.800	0	7.900	0	11.000	0
1.800	0	4.900	0	8.000	0	11.100	0
1.900	0	5.000	0	8.100	0	11.200	0
2.000	0	5.100	0	8.200	0	11.300	0
2.100	0	5.200	0	8.300	0	11.400	0
2.200	0	5.300	0	8.400	0	11.500	0
2.300	0	5.400	0	8.500	0	11.600	0
2.400	0	5.500	0	8.600	0	11.700	0
2.500	0	5.600	0	8.700	0	11.800	0
2.600	0	5.700	0	8.800	0	11.900	0
2.700	0	5.800	0	8.900	0	12.000	0
2.800	0	5.900	0	9.000	0	12.100	0
2.900	0	6.000	0	9.100	0	12.200	0
3.000	0	6.100	0	9.200	0	12.300	0
3.100	0	6.200	0	9.300	0	12.400	0

12.500	0	15.600	0	18.700	0	21.800	0
12.600	0	15.700	0	18.800	0	21.900	0
12.700	0	15.800	0	18.900	0	22.000	0
12.800	0	15.900	0	19.000	0	22.100	0
12.900	0	16.000	0	19.100	0	22.200	0
13.000	0	16.100	0	19.200	0	22.300	0
13.100	0	16.200	0	19.300	0	22.400	0
13.200	0	16.300	0	19.400	0	22.500	0
13.300	0	16.400	0	19.500	0	22.600	0
13.400	0	16.500	0	19.600	0	22.700	0
13.500	0	16.600	0	19.700	0	22.800	0
13.600	0	16.700	0	19.800	0	22.900	0
13.700	0	16.800	0	19.900	0	23.000	0
13.800	0	16.900	0	20.000	0	23.100	0
13.900	0	17.000	0	20.100	0	23.200	0
14.000	0	17.100	0	20.200	0	23.300	0
14.100	0	17.200	0	20.300	0	23.400	0
14.200	0	17.300	0	20.400	0	23.500	0
14.300	0	17.400	0	20.500	0	23.600	0
14.400	0	17.500	0	20.600	0	23.700	0
14.500	0	17.600	0	20.700	0	23.800	0
14.600	0	17.700	0	20.800	0	23.900	0
14.700	0	17.800	0	20.900	0	24.000	0
14.800	0	17.900	0	21.000	0	24.100	0
14.900	0	18.000	0	21.100	0	24.200	0
15.000	0	18.100	0	21.200	0	24.300	0
15.100	0	18.200	0	21.300	0	24.400	0
15.200	0	18.300	0	21.400	0	24.500	0
15.300	0	18.400	0	21.500	0	24.600	0
15.400	0	18.500	0	21.600	0	24.700	0
15.500	0	18.600	0	21.700	0	24.800	0

24.900	0	28.000	0	31.100	0	34.200	0
25.000	0	28.100	0	31.200	0	34.300	0
25.100	0	28.200	0	31.300	0	34.400	0
25.200	0	28.300	0	31.400	0	34.500	0
25.300	0	28.400	0	31.500	0	34.600	0
25.400	0	28.500	0	31.600	0	34.700	0
25.500	0	28.600	0	31.700	0	34.800	0
25.600	0	28.700	0	31.800	0	34.900	0
25.700	0	28.800	0	31.900	0	35.000	0
25.800	0	28.900	0	32.000	0	35.100	0
25.900	0	29.000	0	32.100	0	35.200	0
26.000	0	29.100	0	32.200	0	35.300	0
26.100	0	29.200	0	32.300	0	35.400	0
26.200	0	29.300	0	32.400	0	35.500	0
26.300	0	29.400	0	32.500	0	35.600	0
26.400	0	29.500	0	32.600	0	35.700	0
26.500	0	29.600	0	32.700	0	35.800	0
26.600	0	29.700	0	32.800	0	35.900	0
26.700	0	29.800	0	32.900	0	36.000	0
26.800	0	29.900	0	33.000	0	36.100	0
26.900	0	30.000	0	33.100	0	36.200	0
27.000	0	30.100	0	33.200	0	36.300	0
27.100	0	30.200	0	33.300	0	36.400	0
27.200	0	30.300	0	33.400	0	36.500	0
27.300	0	30.400	0	33.500	0	36.600	0
27.400	0	30.500	0	33.600	0	36.700	0
27.500	0	30.600	0	33.700	0	36.800	0
27.600	0	30.700	0	33.800	0	36.900	0
27.700	0	30.800	0	33.900	0	37.000	0
27.800	0	30.900	0	34.000	0	37.100	0
27.900	0	31.000	0	34.100	0	37.200	0

37.300	0	40.400	0	43.500	0	46.600	0
37.400	0	40.500	0	43.600	0	46.700	0
37.500	0	40.600	0	43.700	0	46.800	0
37.600	0	40.700	0	43.800	0	46.900	0
37.700	0	40.800	0	43.900	0	47.000	0
37.800	0	40.900	0	44.000	0	47.100	0
37.900	0	41.000	0	44.100	0	47.200	0
38.000	0	41.100	0	44.200	1	47.300	0
38.100	0	41.200	0	44.300	0	47.400	0
38.200	0	41.300	0	44.400	0	47.500	0
38.300	0	41.400	0	44.500	0	47.600	0
38.400	0	41.500	1	44.600	0	47.700	0
38.500	0	41.600	0	44.700	0	47.800	0
38.600	0	41.700	0	44.800	0	47.900	0
38.700	0	41.800	0	44.900	0	48.000	0
38.800	0	41.900	0	45.000	0	48.100	0
38.900	0	42.000	0	45.100	0	48.200	0
39.000	0	42.100	0	45.200	0	48.300	0
39.100	0	42.200	0	45.300	0	48.400	0
39.200	0	42.300	0	45.400	0	48.500	0
39.300	0	42.400	0	45.500	0	48.600	0
39.400	0	42.500	0	45.600	0	48.700	0
39.500	0	42.600	0	45.700	0	48.800	0
39.600	0	42.700	0	45.800	0	48.900	0
39.700	0	42.800	0	45.900	0	49.000	0
39.800	0	42.900	1	46.000	0	49.100	0
39.900	0	43.000	0	46.100	0	49.200	0
40.000	0	43.100	0	46.200	0	49.300	0
40.100	0	43.200	0	46.300	0	49.400	0
40.200	0	43.300	0	46.400	0	49.500	0
40.300	0	43.400	0	46.500	0	49.600	0

49.700	0	52.800	0	55.900	0	59.000	0
49.800	0	52.900	0	56.000	0	59.100	0
49.900	0	53.000	0	56.100	0	59.200	0
50.000	0	53.100	0	56.200	0	59.300	0
50.100	0	53.200	0	56.300	0	59.400	0
50.200	0	53.300	0	56.400	0	59.500	0
50.300	0	53.400	0	56.500	0	59.600	0
50.400	0	53.500	0	56.600	0	59.700	0
50.500	0	53.600	0	56.700	0	59.800	0
50.600	0	53.700	0	56.800	0	59.900	0
50.700	0	53.800	0	56.900	0	60.000	0
50.800	0	53.900	0	57.000	0	60.100	0
50.900	0	54.000	0	57.100	0	60.200	0
51.000	0	54.100	0	57.200	0	60.300	0
51.100	0	54.200	0	57.300	0	60.400	0
51.200	0	54.300	0	57.400	0	60.500	0
51.300	0	54.400	0	57.500	0	60.600	0
51.400	0	54.500	0	57.600	0	60.700	0
51.500	0	54.600	0	57.700	0	60.800	0
51.600	0	54.700	0	57.800	0	60.900	0
51.700	0	54.800	0	57.900	0	61.000	0
51.800	0	54.900	0	58.000	0	61.100	0
51.900	0	55.000	0	58.100	0	61.200	0
52.000	0	55.100	0	58.200	0	61.300	0
52.100	0	55.200	0	58.300	0	61.400	0
52.200	0	55.300	0	58.400	0	61.500	0
52.300	0	55.400	0	58.500	0	61.600	0
52.400	0	55.500	2	58.600	0	61.700	0
52.500	0	55.600	0	58.700	0	61.800	0
52.600	0	55.700	0	58.800	0	61.900	0
52.700	0	55.800	0	58.900	0	62.000	0

62.100	0	65.200	0	68.300	0	71.400	0
62.200	0	65.300	0	68.400	0	71.500	0
62.300	0	65.400	0	68.500	0	71.600	0
62.400	0	65.500	0	68.600	0	71.700	0
62.500	0	65.600	0	68.700	0	71.800	0
62.600	0	65.700	0	68.800	0	71.900	0
62.700	0	65.800	0	68.900	0	72.000	0
62.800	1	65.900	0	69.000	0	72.100	0
62.900	0	66.000	0	69.100	0	72.200	0
63.000	0	66.100	0	69.200	0	72.300	0
63.100	0	66.200	0	69.300	0	72.400	0
63.200	0	66.300	0	69.400	0	72.500	0
63.300	0	66.400	0	69.500	0	72.600	0
63.400	0	66.500	0	69.600	0	72.700	0
63.500	0	66.600	0	69.700	0	72.800	0
63.600	0	66.700	0	69.800	0	72.900	0
63.700	0	66.800	0	69.900	0	73.000	0
63.800	0	66.900	0	70.000	0	73.100	0
63.900	0	67.000	0	70.100	0	73.200	0
64.000	0	67.100	0	70.200	0	73.300	0
64.100	0	67.200	0	70.300	0	73.400	0
64.200	1	67.300	0	70.400	0	73.500	0
64.300	1	67.400	0	70.500	0	73.600	0
64.400	0	67.500	0	70.600	0	73.700	0
64.500	0	67.600	0	70.700	0	73.800	0
64.600	0	67.700	0	70.800	0	73.900	0
64.700	0	67.800	0	70.900	0	74.000	0
64.800	0	67.900	0	71.000	0	74.100	0
64.900	0	68.000	0	71.100	0	74.200	0
65.000	0	68.100	0	71.200	0	74.300	0
65.100	0	68.200	0	71.300	0	74.400	0

74.500	0	77.600	0	80.700	0	83.800	0
74.600	0	77.700	1	80.800	0	83.900	0
74.700	0	77.800	0	80.900	0	84.000	0
74.800	0	77.900	0	81.000	0	84.100	0
74.900	0	78.000	0	81.100	0	84.200	0
75.000	0	78.100	0	81.200	0	84.300	0
75.100	0	78.200	0	81.300	0	84.400	0
75.200	0	78.300	0	81.400	1	84.500	0
75.300	0	78.400	0	81.500	0	84.600	0
75.400	0	78.500	0	81.600	0	84.700	0
75.500	0	78.600	0	81.700	0	84.800	0
75.600	0	78.700	0	81.800	0	84.900	0
75.700	0	78.800	1	81.900	0	85.000	0
75.800	0	78.900	0	82.000	0	85.100	0
75.900	0	79.000	0	82.100	0	85.200	0
76.000	0	79.100	0	82.200	0	85.300	0
76.100	0	79.200	0	82.300	0	85.400	0
76.200	0	79.300	0	82.400	0	85.500	0
76.300	0	79.400	0	82.500	0	85.600	0
76.400	0	79.500	0	82.600	0	85.700	0
76.500	0	79.600	0	82.700	0	85.800	0
76.600	0	79.700	0	82.800	0	85.900	0
76.700	0	79.800	0	82.900	0	86.000	0
76.800	0	79.900	0	83.000	0	86.100	11
76.900	0	80.000	0	83.100	0	86.200	0
77.000	0	80.100	0	83.200	0	86.300	0
77.100	1	80.200	0	83.300	0	86.400	1
77.200	1	80.300	0	83.400	0	86.500	0
77.300	0	80.400	0	83.500	0	86.600	0
77.400	0	80.500	1	83.600	0	86.700	0
77.500	1	80.600	0	83.700	0	86.800	0

86.900	1	90.000	0	93.100	0	96.200	0
87.000	0	90.100	0	93.200	0	96.300	0
87.100	0	90.200	0	93.300	0	96.400	0
87.200	1	90.300	0	93.400	0	96.500	0
87.300	1	90.400	0	93.500	0	96.600	0
87.400	0	90.500	0	93.600	0	96.700	0
87.500	0	90.600	0	93.700	0	96.800	0
87.600	0	90.700	0	93.800	1	96.900	0
87.700	0	90.800	1	93.900	0	97.000	0
87.800	0	90.900	0	94.000	1	97.100	0
87.900	0	91.000	0	94.100	0	97.200	0
88.000	0	91.100	0	94.200	0	97.300	0
88.100	1	91.200	0	94.300	0	97.400	0
88.200	1	91.300	0	94.400	0	97.500	0
88.300	0	91.400	0	94.500	0	97.600	0
88.400	0	91.500	0	94.600	0	97.700	1
88.500	0	91.600	0	94.700	1	97.800	0
88.600	0	91.700	0	94.800	0	97.900	0
88.700	0	91.800	0	94.900	0	98.000	0
88.800	0	91.900	0	95.000	0	98.100	0
88.900	0	92.000	0	95.100	0	98.200	0
89.000	0	92.100	0	95.200	0	98.300	0
89.100	0	92.200	0	95.300	0	98.400	0
89.200	0	92.300	0	95.400	0	98.500	0
89.300	0	92.400	0	95.500	0	98.600	1
89.400	0	92.500	0	95.600	1	98.700	0
89.500	0	92.600	0	95.700	0	98.800	0
89.600	0	92.700	0	95.800	1	98.900	0
89.700	2	92.800	0	95.900	0	99.000	0
89.800	0	92.900	0	96.000	2	99.100	0
89.900	0	93.000	0	96.100	0	99.200	1

99.300	0	102.400	0	105.500	0	108.600	0
99.400	1	102.500	0	105.600	0	108.700	0
99.500	0	102.600	1	105.700	0	108.800	0
99.600	0	102.700	0	105.800	1	108.900	0
99.700	0	102.800	0	105.900	0	109.000	1
99.800	0	102.900	0	106.000	0	109.100	0
99.900	0	103.000	0	106.100	0	109.200	0
100.000	1	103.100	1	106.200	0	109.300	1
100.100	0	103.200	1	106.300	0	109.400	0
100.200	0	103.300	1	106.400	0	109.500	0
100.300	0	103.400	0	106.500	0	109.600	1
100.400	0	103.500	0	106.600	0	109.700	1
100.500	0	103.600	1	106.700	0	109.800	0
100.600	0	103.700	0	106.800	2	109.900	1
100.700	1	103.800	0	106.900	0	110.000	0
100.800	0	103.900	0	107.000	0	110.100	0
100.900	0	104.000	0	107.100	0	110.200	0
101.000	0	104.100	1	107.200	0	110.300	1
101.100	0	104.200	0	107.300	0	110.400	0
101.200	1	104.300	0	107.400	0	110.500	1
101.300	0	104.400	0	107.500	1	110.600	2
101.400	0	104.500	0	107.600	0	110.700	0
101.500	0	104.600	1	107.700	0	110.800	0
101.600	1	104.700	0	107.800	0	110.900	1
101.700	0	104.800	1	107.900	0	111.000	0
101.800	0	104.900	0	108.000	0	111.100	2
101.900	0	105.000	0	108.100	0	111.200	0
102.000	0	105.100	0	108.200	2	111.300	0
102.100	0	105.200	0	108.300	1	111.400	0
102.200	0	105.300	0	108.400	0	111.500	0
102.300	0	105.400	0	108.500	0	111.600	0

111.700	0	114.800	1	117.900	1	121.000	0
111.800	1	114.900	0	118.000	1	121.100	0
111.900	0	115.000	0	118.100	2	121.200	1
112.000	0	115.100	0	118.200	1	121.300	0
112.100	0	115.200	1	118.300	1	121.400	0
112.200	0	115.300	0	118.400	0	121.500	0
112.300	0	115.400	0	118.500	1	121.600	0
112.400	0	115.500	1	118.600	1	121.700	1
112.500	0	115.600	1	118.700	0	121.800	1
112.600	0	115.700	1	118.800	1	121.900	0
112.700	0	115.800	1	118.900	1	122.000	1
112.800	2	115.900	1	119.000	1	122.100	2
112.900	0	116.000	0	119.100	0	122.200	2
113.000	0	116.100	1	119.200	0	122.300	1
113.100	0	116.200	1	119.300	1	122.400	0
113.200	1	116.300	1	119.400	0	122.500	0
113.300	1	116.400	2	119.500	0	122.600	1
113.400	0	116.500	0	119.600	0	122.700	1
113.500	1	116.600	2	119.700	1	122.800	0
113.600	0	116.700	0	119.800	0	122.900	2
113.700	0	116.800	1	119.900	0	123.000	0
113.800	0	116.900	0	120.000	0	123.100	3
113.900	1	117.000	0	120.100	1	123.200	2
114.000	0	117.100	2	120.200	1	123.300	1
114.100	0	117.200	1	120.300	3	123.400	0
114.200	0	117.300	1	120.400	0	123.500	0
114.300	1	117.400	0	120.500	0	123.600	0
114.400	0	117.500	1	120.600	1	123.700	1
114.500	0	117.600	0	120.700	0	123.800	0
114.600	0	117.700	1	120.800	0	123.900	0
114.700	1	117.800	2	120.900	1	124.000	1

124.100	0	127.200	0	130.300	0	133.400	2
124.200	2	127.300	0	130.400	0	133.500	1
124.300	1	127.400	0	130.500	1	133.600	2
124.400	2	127.500	1	130.600	3	133.700	0
124.500	0	127.600	0	130.700	0	133.800	0
124.600	2	127.700	1	130.800	1	133.900	0
124.700	1	127.800	1	130.900	0	134.000	2
124.800	0	127.900	0	131.000	1	134.100	0
124.900	3	128.000	3	131.100	1	134.200	1
125.000	1	128.100	2	131.200	2	134.300	2
125.100	1	128.200	1	131.300	2	134.400	2
125.200	0	128.300	0	131.400	1	134.500	1
125.300	1	128.400	1	131.500	2	134.600	3
125.400	2	128.500	0	131.600	0	134.700	0
125.500	1	128.600	1	131.700	2	134.800	1
125.600	1	128.700	2	131.800	0	134.900	2
125.700	2	128.800	0	131.900	2	135.000	0
125.800	0	128.900	0	132.000	3	135.100	1
125.900	0	129.000	0	132.100	0	135.200	1
126.000	3	129.100	1	132.200	2	135.300	0
126.100	1	129.200	0	132.300	2	135.400	2
126.200	0	129.300	1	132.400	1	135.500	2
126.300	1	129.400	0	132.500	1	135.600	2
126.400	0	129.500	2	132.600	0	135.700	1
126.500	0	129.600	2	132.700	2	135.800	1
126.600	0	129.700	2	132.800	2	135.900	4
126.700	1	129.800	1	132.900	2	136.000	2
126.800	0	129.900	0	133.000	2	136.100	0
126.900	0	130.000	1	133.100	3	136.200	1
127.000	0	130.100	2	133.200	0	136.300	3
127.100	0	130.200	1	133.300	0	136.400	2

136.500	2	139.600	3	142.700	3	145.800	1
136.600	1	139.700	2	142.800	2	145.900	4
136.700	3	139.800	1	142.900	1	146.000	1
136.800	2	139.900	1	143.000	4	146.100	1
136.900	0	140.000	1	143.100	4	146.200	1
137.000	1	140.100	2	143.200	2	146.300	2
137.100	0	140.200	2	143.300	2	146.400	3
137.200	2	140.300	0	143.400	2	146.500	2
137.300	2	140.400	1	143.500	0	146.600	2
137.400	2	140.500	0	143.600	4	146.700	2
137.500	3	140.600	4	143.700	5	146.800	4
137.600	3	140.700	2	143.800	1	146.900	0
137.700	1	140.800	0	143.900	2	147.000	0
137.800	0	140.900	3	144.000	1	147.100	1
137.900	0	141.000	0	144.100	1	147.200	2
138.000	1	141.100	1	144.200	4	147.300	0
138.100	0	141.200	5	144.300	4	147.400	2
138.200	0	141.300	2	144.400	1	147.500	2
138.300	2	141.400	0	144.500	4	147.600	2
138.400	0	141.500	4	144.600	1	147.700	4
138.500	0	141.600	2	144.700	1	147.800	2
138.600	3	141.700	2	144.800	0	147.900	1
138.700	0	141.800	2	144.900	1	148.000	1
138.800	1	141.900	4	145.000	2	148.100	2
138.900	1	142.000	1	145.100	6	148.200	2
139.000	1	142.100	5	145.200	1	148.300	3
139.100	3	142.200	2	145.300	4	148.400	2
139.200	2	142.300	3	145.400	4	148.500	3
139.300	2	142.400	0	145.500	0	148.600	2
139.400	2	142.500	0	145.600	0	148.700	3
139.500	0	142.600	1	145.700	3	148.800	1

148.900	2	149.200	3	149.500	0	149.800	0
149.000	4	149.300	1	149.600	2	149.900	6
149.100	2	149.400	5	149.700	2	150.000	3