Interlock Explanation

Software Interlock
   Master Interlock on pump controller
   Polls all pumps
   If any pump has an error, shuts down all pumps

Hardware Interlock
   Ionizer – if P5 falls below 90% of full rotational speed
   TPS - red LED on TPS, shuts off High Voltages

Vaporizer Interlock
   P4 and/or P6 fall below 90% of full rotational speed
   Heater LED and Heater Power LCD on EB shut off
   Shuts off power to Vaporizer
Filament Installation
Install filaments such that they are as parallel as possible to the ion cage. Be EXTRA careful when installing that nothing is shorting. The ceramic washer is critical, as it isolates the filament from ground.
Critical ceramic washers
Positioning of the Ceramic Washer on Filament Mounting Post

This side on filament block
## Pump operating currents and temps

<table>
<thead>
<tr>
<th></th>
<th>Gas Load Off (mA)</th>
<th>Gas Load On (mA)</th>
<th>Delta T* (Degrees C) (Closed/Open)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2</td>
<td>~ 450</td>
<td>~ 850</td>
<td>9/13.3</td>
</tr>
<tr>
<td>P3</td>
<td>~ 250</td>
<td>~ 300</td>
<td>9/9.3</td>
</tr>
<tr>
<td>P4</td>
<td>~ 200</td>
<td>~ 250</td>
<td>6/5.9</td>
</tr>
<tr>
<td>P5</td>
<td>&lt; 200</td>
<td>&lt; 200</td>
<td>6.2/6.5</td>
</tr>
<tr>
<td>P6</td>
<td>~ 200</td>
<td>~ 200</td>
<td>9.6/9.6</td>
</tr>
</tbody>
</table>

*Delta T = Pump Temp – Ambient Temp*
About Leaks

If the Airbeam (m/z 28,32,40) has a diff/closed ratio of < 2 you have a leak that you should address.
More About Leaks

One can further get a clue as to where the leak is by *carefully* looking at your *closed* and *difference* Airbeam.

If the leak is in the PToF region, the *difference* Airbeam will be attenuated and the *closed* AB will not be changed too much from normal.

If the leak is in the detection region, the *difference* AB will be about the same as normal, but the *closed* air signal will have an elevated background.
Particle Beam Alignment

NH₄NO₃ “spots” on cold vaporizer

As received

After alignment from 20140616