## Product

- **Compact vacuum cell**
- **UHV sealed package**
- **C-cut sapphire windows**
- **Ablation loaded ions**
- **Integrated ion pump**

## Product Description

ColdQuanta’s compact ion trap housings give you a self-contained, high-optical access UHV environment for ion trapping with long trap lifetimes. The trap surface is ion milled before assembly into a UHV-baked chamber to provide an ultra-clean ion trap surface. The C-cut sapphire window material ensures a low birefringence and high UV transparency. The housing was initially designed to house a Sandia HOA trap.

The photo above shows the ion trap vacuum system with the breakout board for easy application of trap voltages and the physics package for delivery of photoionization, cooling, and repump lasers.

## Product Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical Access</td>
<td>2 through axes 45°</td>
</tr>
<tr>
<td></td>
<td>2 single-sided direction</td>
</tr>
<tr>
<td></td>
<td>(see diagram on reverse)</td>
</tr>
<tr>
<td>Side Windows</td>
<td>0.12 NA</td>
</tr>
<tr>
<td>Top Window</td>
<td>0.7 NA</td>
</tr>
<tr>
<td>Single Sided Window</td>
<td>Opposite ablation target</td>
</tr>
<tr>
<td>Window Material</td>
<td>C-cut sapphire</td>
</tr>
<tr>
<td>Reflectance</td>
<td>8 % per surface without AR coating</td>
</tr>
<tr>
<td>Chip Connector</td>
<td>100 Pin CPGA</td>
</tr>
<tr>
<td>Dark Lifetime</td>
<td>25 min</td>
</tr>
<tr>
<td>Vacuum Pressure</td>
<td>2.5x10^{-11} Torr</td>
</tr>
<tr>
<td>Trap Type</td>
<td>HOA</td>
</tr>
<tr>
<td>Body Material</td>
<td>Titanium</td>
</tr>
<tr>
<td>Integrated Pump</td>
<td>Active and passive pumping</td>
</tr>
<tr>
<td>Vacuum volume</td>
<td>&lt; 3 cm³</td>
</tr>
</tbody>
</table>

## Related Products

- **4 K Cryogenic Ion Trap Housing**
- **Helical Resonator**
- **Helical Resonator Driver**
- **Ion Pump Driver**
- **Optics Package**
COMPACT ION TRAP SYSTEM

Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species</td>
<td>Ba (BaAl alloy)</td>
</tr>
<tr>
<td></td>
<td>Yb (Metal)</td>
</tr>
<tr>
<td></td>
<td>Inquire for other species</td>
</tr>
<tr>
<td>AR Coating</td>
<td>Inquire for options.</td>
</tr>
<tr>
<td></td>
<td>Coating designs optimized for Ba, Yb, and Ba-Yb co-trapping available</td>
</tr>
<tr>
<td>Bottom Window</td>
<td>High NA optical access from the trap bottom</td>
</tr>
<tr>
<td>Ion Pump Driver</td>
<td>Power the ion pump</td>
</tr>
<tr>
<td>Optics Package</td>
<td>Beam delivery optics</td>
</tr>
<tr>
<td>Helical Resonator</td>
<td>Application of trap RF voltage</td>
</tr>
<tr>
<td>Resonator Driver</td>
<td>Helical resonator driver</td>
</tr>
</tbody>
</table>

Mechanical Drawing

Relative positions are reconfigurable