Hiden DLS-20 QMS

Ultra High Resolution Quadrupole Mass Spectrometer Specifically for the Analysis of Hydrogen, Hydrogen Isotopes and Light gases.
The Hiden DLS-20 QMS is a quadrupole mass spectrometer specifically designed for the analysis of Hydrogen, Hydrogen Isotopes and light gases.

The DLS-20 QMS includes a new Hiden mass filter designed for ultra high resolution.

The new mass filter design is a micron precision assembly using the finest precision machined components.

The DLS-20 QMS has a pole diameter of 20mm.

A high stability, high frequency RF supply provides the power.
DLS-20 Mass Filter – 20mm pole diameter
DLS-20 QMS
20mm pole diameter quadrupole mass filter in comparison to, 9mm and 6mm filters
DLS-20 RF supply head in comparison to the RF supply head for the 6mm filter

Reactive Power Rating.

DLS-20 RF Head  = 10.8 kVA
6mm RF Head    = 0.21 kVA
DLS-20 option of Modular Source

Side Entry, Low Profile, Epic/PIC
DLS-20, showing Peak Shape Profile at Argon

DLS-20 QMS

Mass range: 50 AMU

Mounting flange:

DN 150 CF ~ 200mm OD
8inch Conflat type flange.
DLS-20, showing Resolving Power of $M/\Delta M$ of 2,000 at Argon
### Components within the Mass Range 1 – 6 m/e

<table>
<thead>
<tr>
<th>Mass</th>
<th>Component</th>
<th>Exact Mass Value (u)</th>
<th>Mass</th>
<th>Component</th>
<th>Exact Mass Value (u)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>H⁺</td>
<td>1.0078252</td>
<td>4</td>
<td>$^4$He⁺</td>
<td>4.002600</td>
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<td></td>
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<td></td>
<td></td>
<td>HT⁺</td>
<td>4.023875</td>
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<td></td>
<td></td>
<td>D₂⁺</td>
<td>4.028204</td>
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<td>H₂D⁺</td>
<td>4.029650</td>
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<td>D⁺</td>
<td>2.014102</td>
<td>5</td>
<td>DT⁺</td>
<td>5.03005</td>
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<td>H₂T⁺</td>
<td>5.03170</td>
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<td>D₂H⁺</td>
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<td>HeH⁺</td>
<td>5.01045</td>
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<tr>
<td>3</td>
<td>$^3$He⁺ T⁺ HD⁺</td>
<td>3.016030 3.016050 3.021825 3.023475</td>
<td>6</td>
<td>T⁺ D₂⁺ HeD⁺</td>
<td>6.032 6.042 5.999 6.0168</td>
</tr>
</tbody>
</table>
Scan of 1 – 10 sample is Deuterium in Hydrogen

De and H

Linear

Log
Scan of 1 – 10 sample is Deuterium in Hydrogen

Deuterium and Hydrogen

(cps vs mass / u)
Separation of $\text{He}^+$ and $\text{D}^+$ and resolution of $\text{H}^+$ at 0.005 amu FWHM
Separation of \( \text{He}^+ \) and \( \text{D}^+ \) and resolution of \( \text{H}^+ \) at 0.005amu FWHM

\[
\begin{align*}
\text{He}^+ & : 4.0026 \text{amu} \\
\text{D}_2^+ & : 4.0282 \text{amu} \\
\text{H}_2^+ & : 2.015 \text{amu}
\end{align*}
\]
Summary

20mm Rod Mass Filters offer significant advantages for the analysis of isotope ratio measurements:

- Flat top peaks at unit mass resolution
- Ultra High abundance sensitivity
- Resolution adjustable from unit mass to 0.005 AMU - FWHM

The combination of a 20mm pole diameter micron precision mass filter, and the high power, high frequency RF at low mass range, is ideal for analysis of He and H isotopes.
Quadrupole Mass Spectrometers for Advanced Science

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