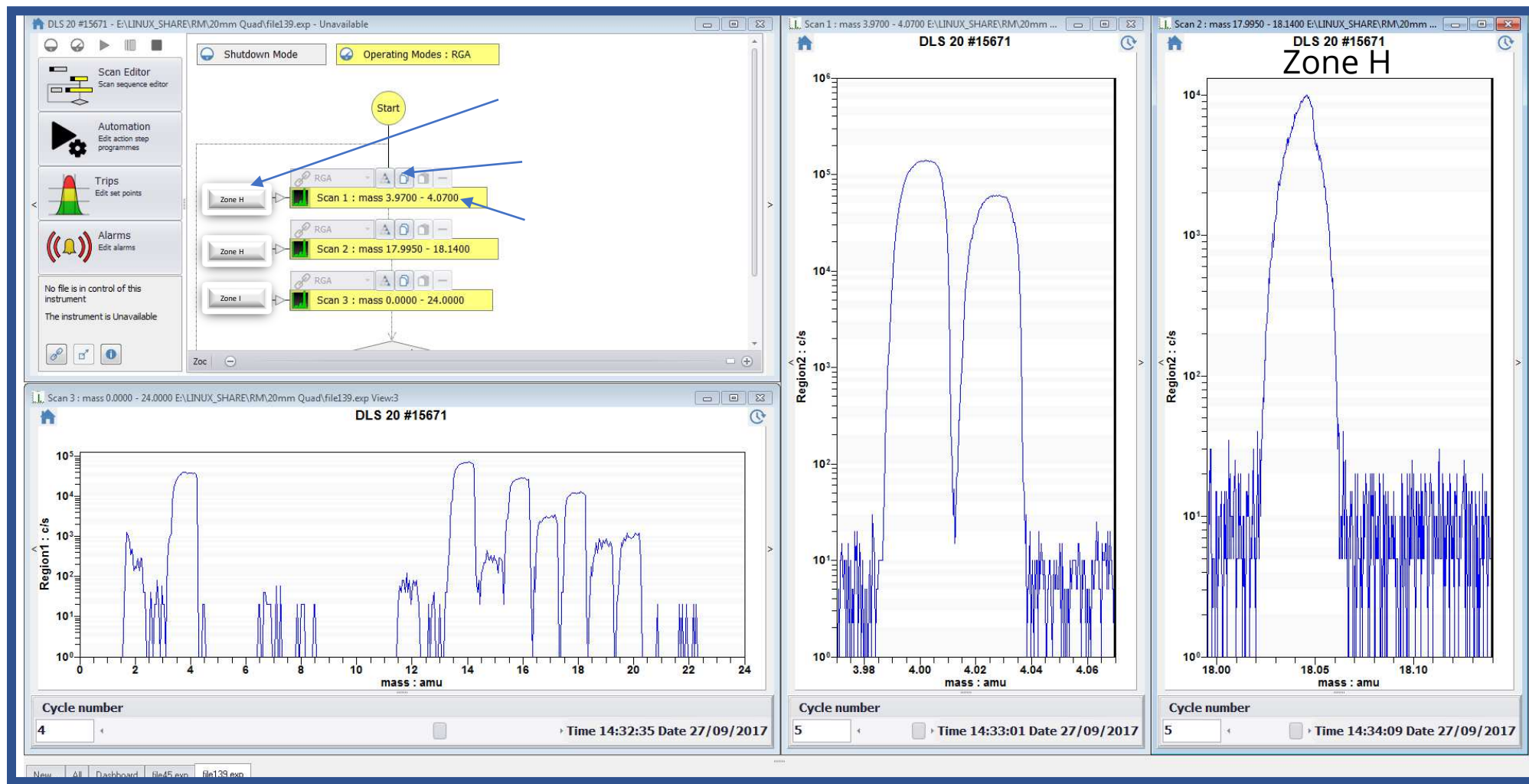


Hidden DLS-20 QMS

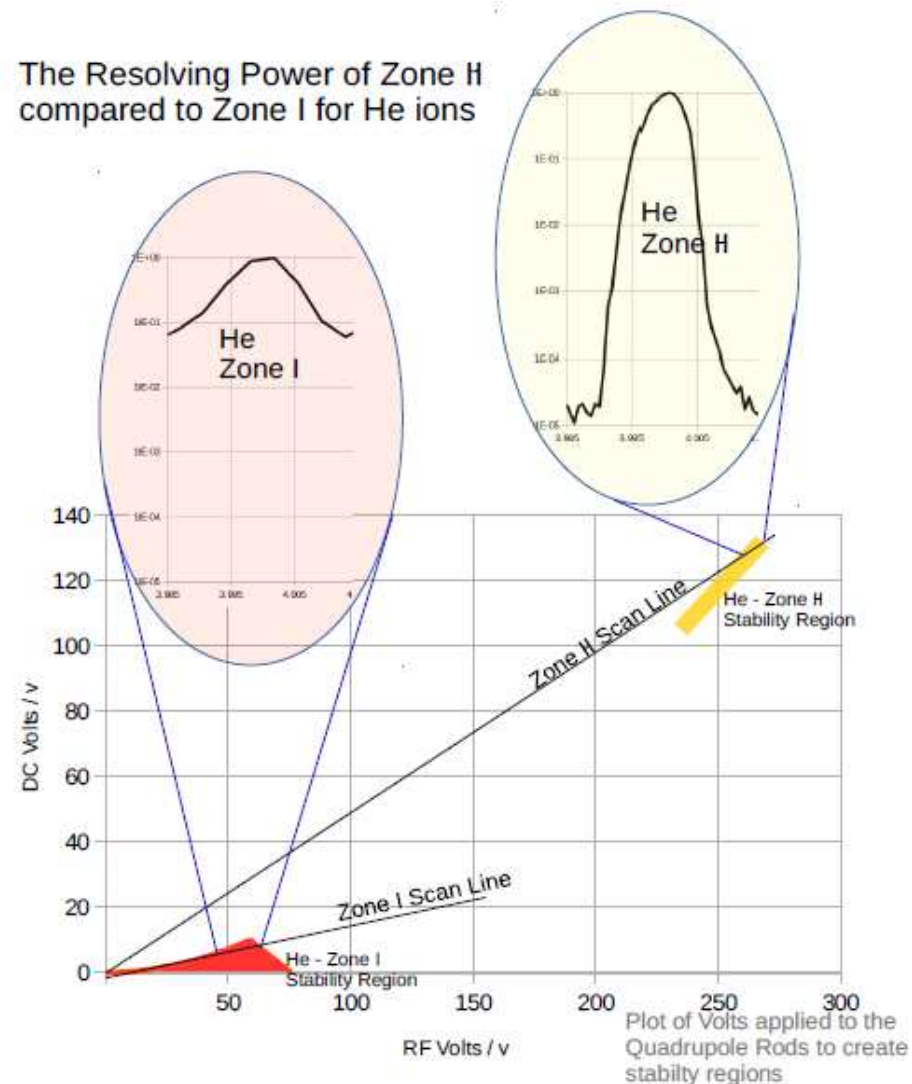
Zone H yields Ultra High Resolution
Quadrupole Mass Spectrometer
Specifically for the Analysis of
Hydrogen, Hydrogen Isotopes and Light gases

- 1. Hiden's
- 2. software
- 3. enables
- Zone 1 and
- H scans -
- even
- within the
- same
- event
- sequence!



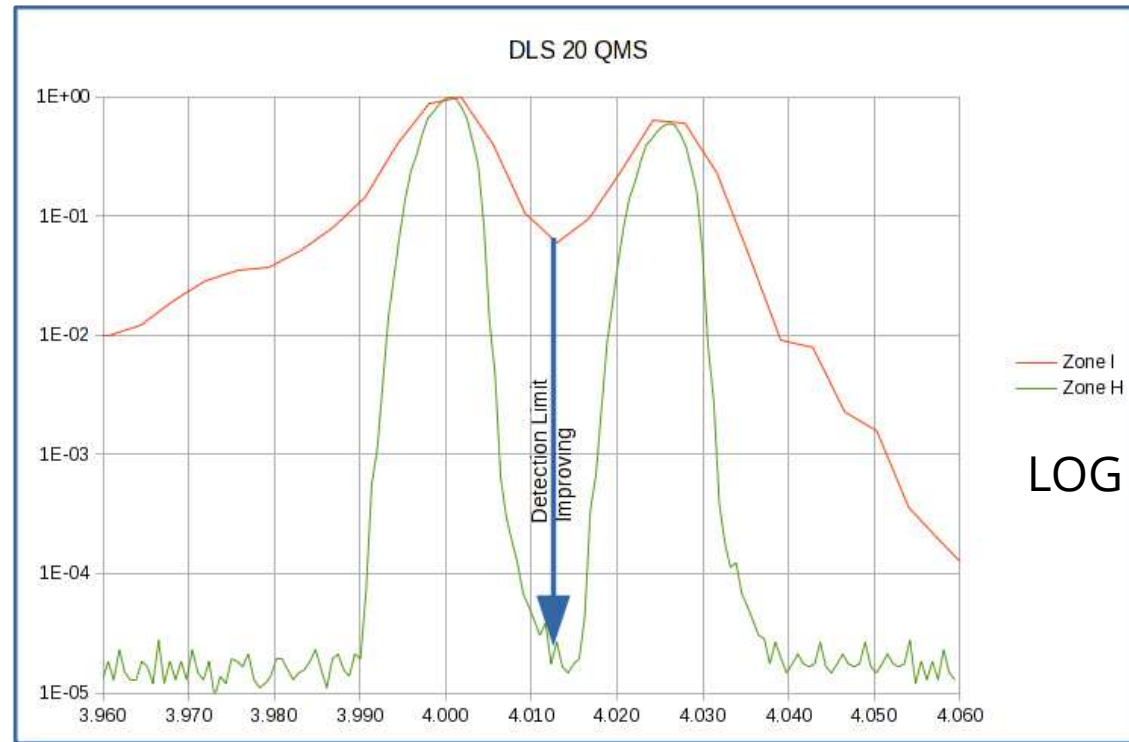
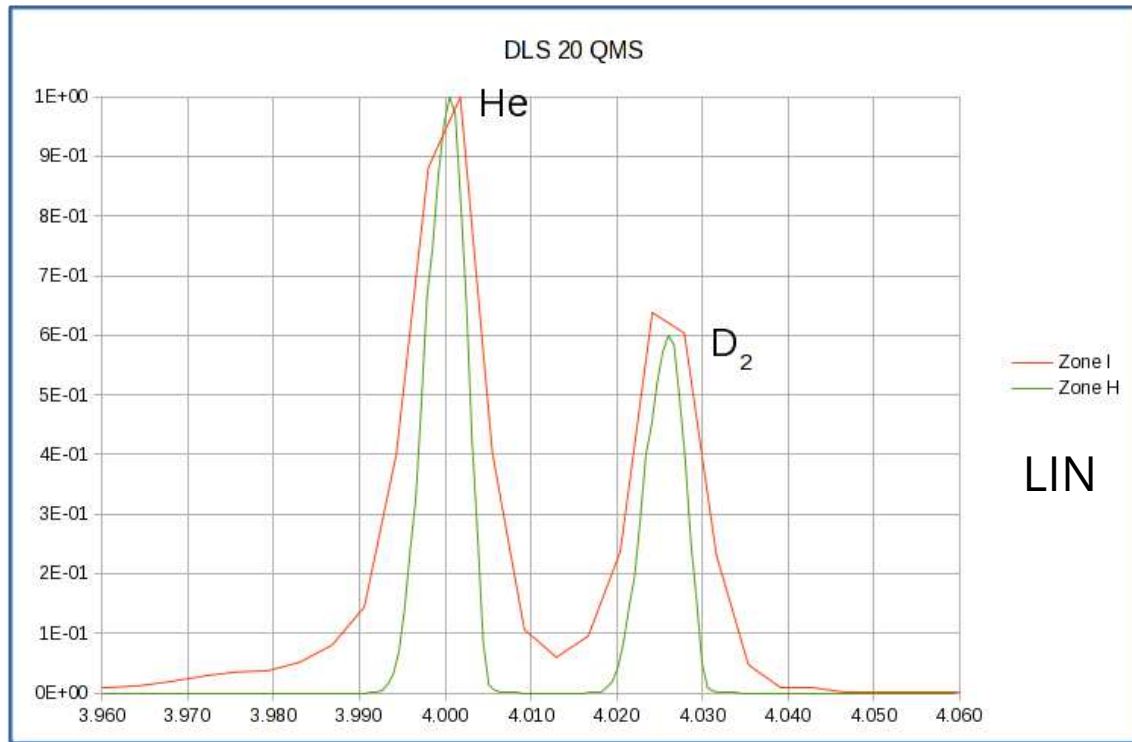
Only the Resolving Power of Zone H gives ultimate detection limit for He in D₂

Quadrupoles operate with RF and DC Voltages applied to their rods which then carry ions to the detector
Certain voltage combinations can create 'stability regions' that transmit only ions of a particular m/z
Scanning the Quad's Voltages across the tips of these regions will carry only that ion to the detector
The Zone I region is most often used. However, a second region, Zone H, offers much greater Resolving Power – which helps separate adjacent masses
But only Quadrupole Electronics with both high power and stability can operate in this Zone
Hiden's High Power Electronics is now offered with selectable Zone H capability for masses up to 20 amu and Zone I for masses up to 200 amu – in a single package

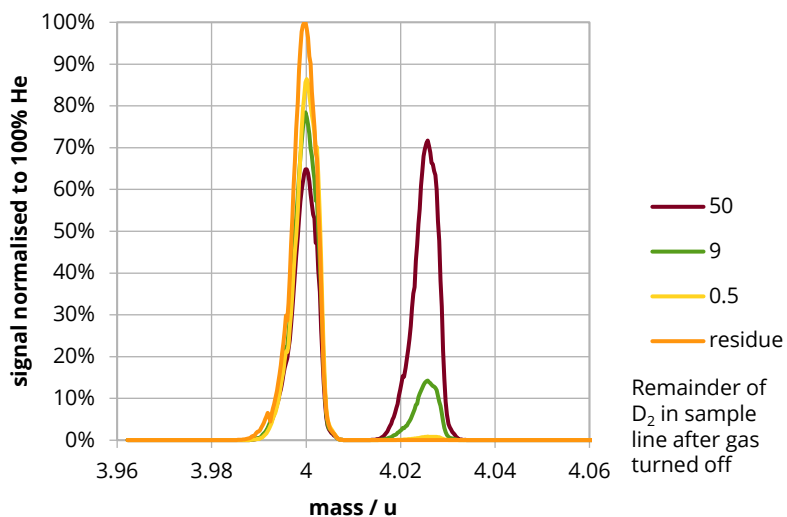


Mass	Component	Exact Mass Value (u)		Mass	Component	Exact Mass Value (u)
1	H ⁺	1.0078252		4	⁴ He ⁺ HT ⁴ D ₂ ⁺ H ₂ D ⁺	4.002600 4.023875 4.028204 4.029650
2	D ⁺ H ₂ ⁺	2.014102 2.0151018		5	DT ⁺ H ₂ T ⁺ D ₂ H ⁺ HeH ⁺	5.03005 5.03170 5.035825 5.01045
3	³ He ⁺ T ⁺ HD ⁺ H ₃ ⁺	3.016030 3.016050 3.021825 3.023475		6	T ⁺ D ₂ ⁺ ¹² C ⁺⁺ HeD ⁺	6.032 6.042 5.999 6.0168

Detection Limits for He in D₂ depend on the Resolving Power of the Quadrupole. The benefits of operation in Zone II are clearly demonstrated – detection limit enhanced by almost four orders of magnitude!

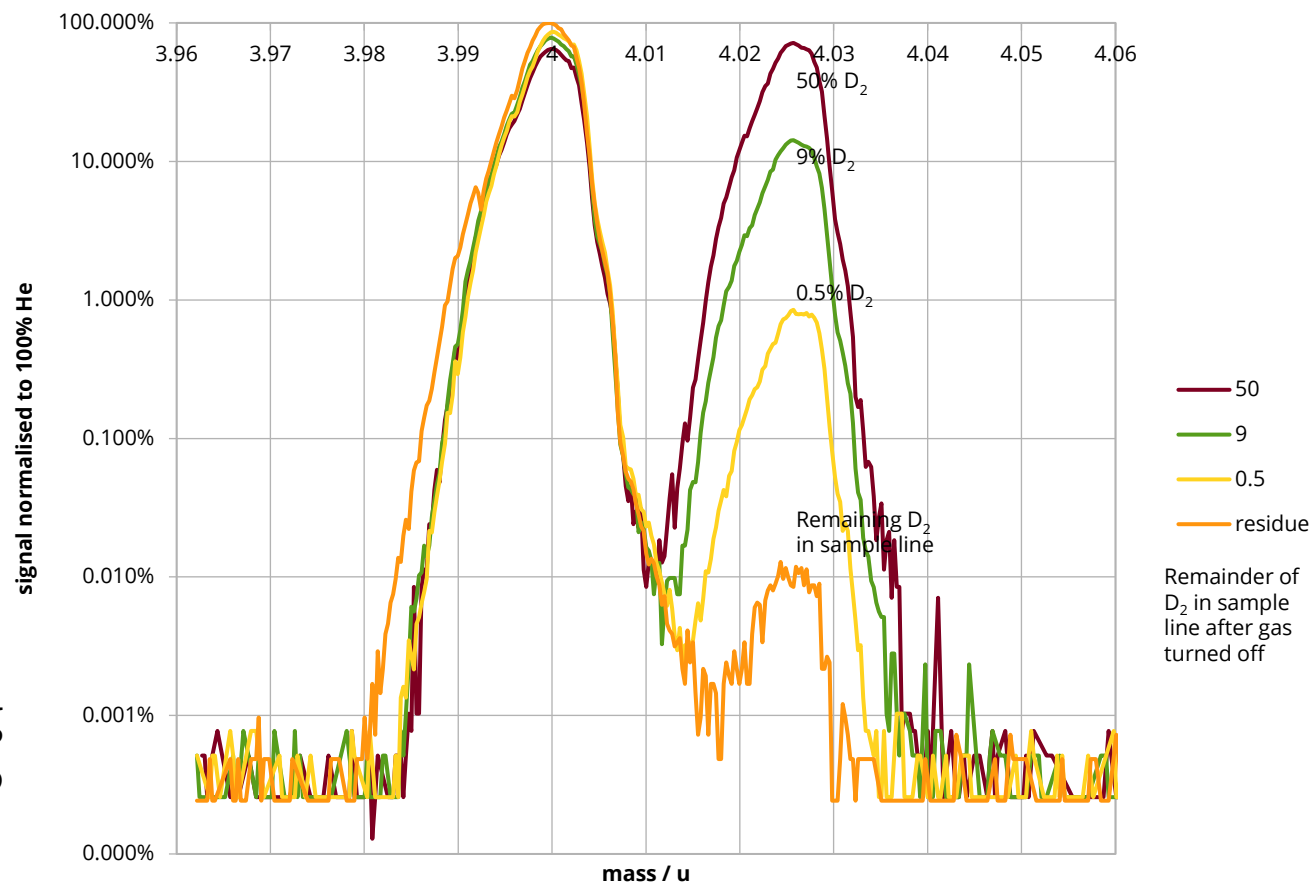


He D₂ Gas Mix, plotted with %D₂. Zone II Operation.

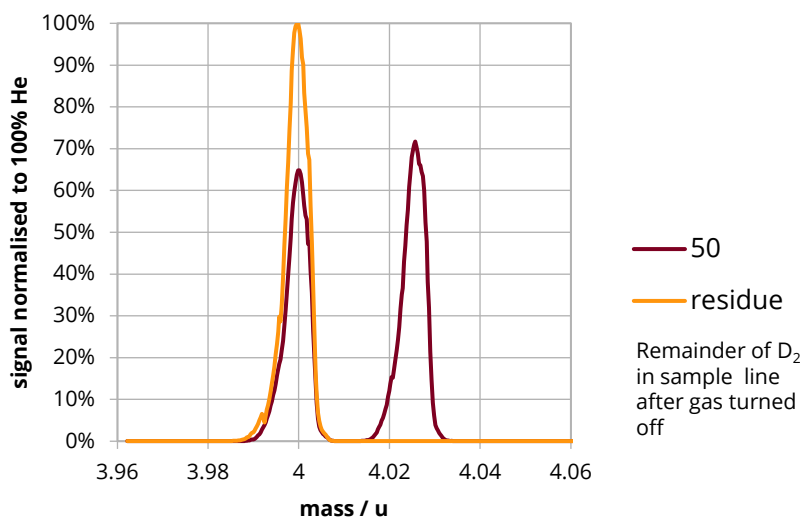


Detection of D₂ in He. Response with varying gas mixes of He and D₂, 50/50, 91/9, 99.5/0.5 and approx 99.99/0.01%

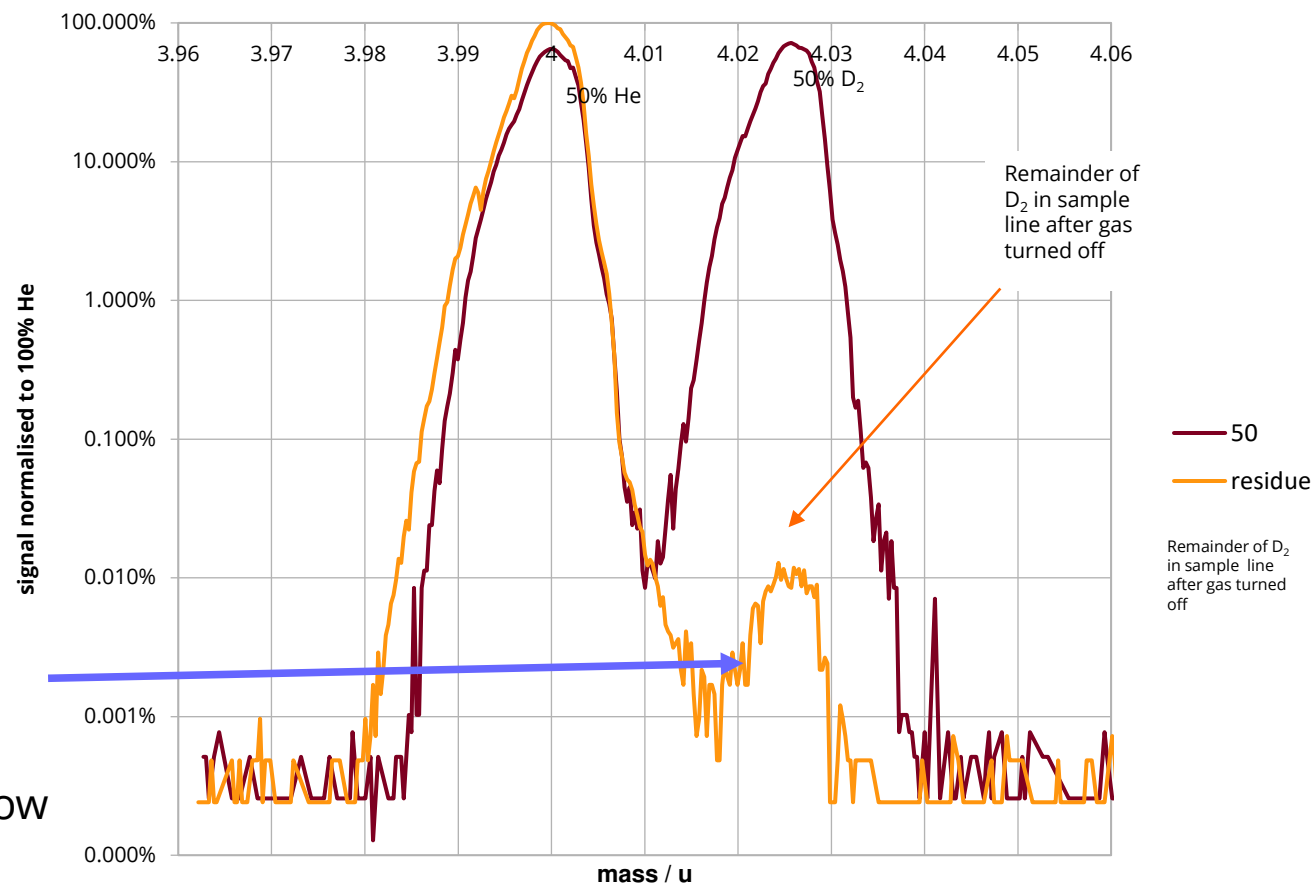
He D₂ Gas Mix, plotted with %D₂. Zone II Operation.



He D₂ Gas Mix, plotted with %D₂. Zone H Operation.



He D₂ Gas Mix, plotted with %D₂. Zone H Operation.



Detection of D₂ in He. Detection limit approaching 10 ppm, which is of the order 99.999% He / 0.001% D₂

Note that in Zone H detection limit is **not degraded** by the Low Mass Side Tailing Effect encountered in Zone I – this means a better detection limit for He in D₂!

Zone H