

MT Explorer 30 (MTE30) and Practical Aspects of MS Miniaturization

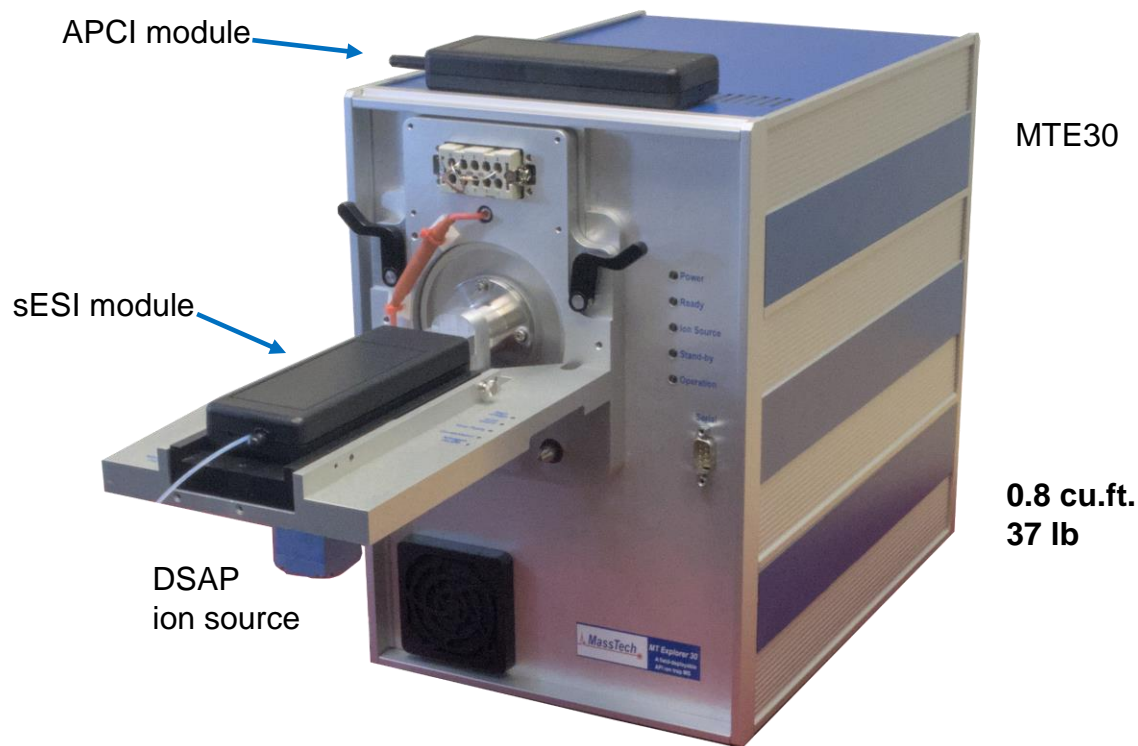
Vladimir M. Doroshenko



MassTech

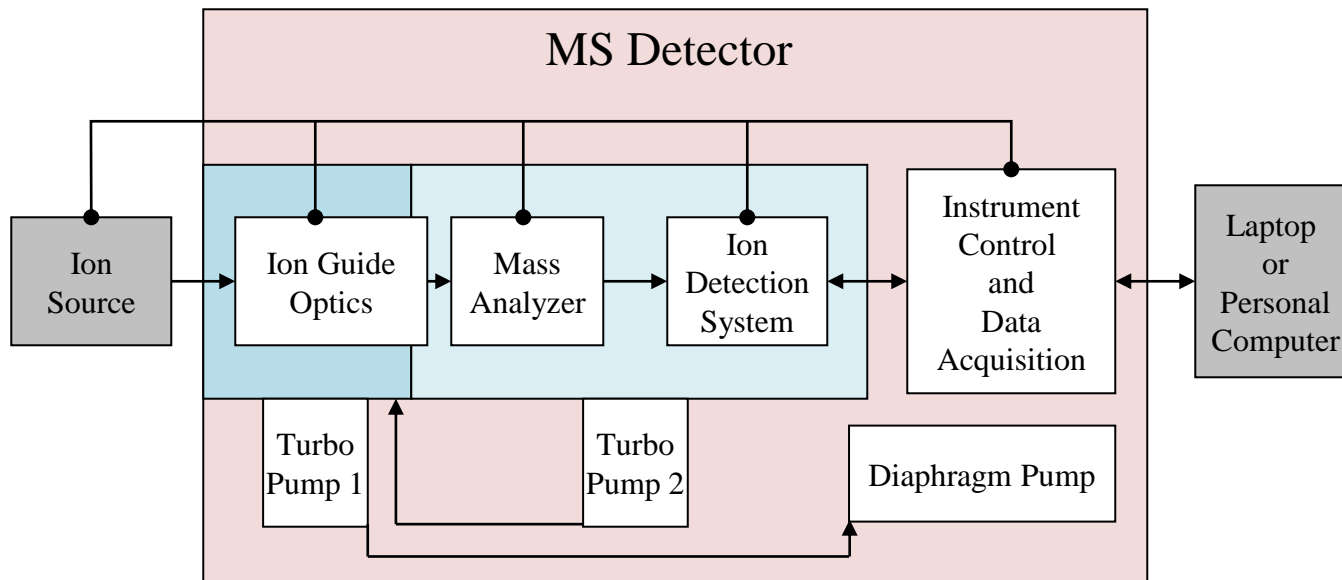
MassTech, Inc.
6992 Columbia Gateway Drive
Columbia, Maryland 21046
(443) 539-1757
www.apmaldi.com

MT Explorer 30 (MTE30) with DSAP ion source

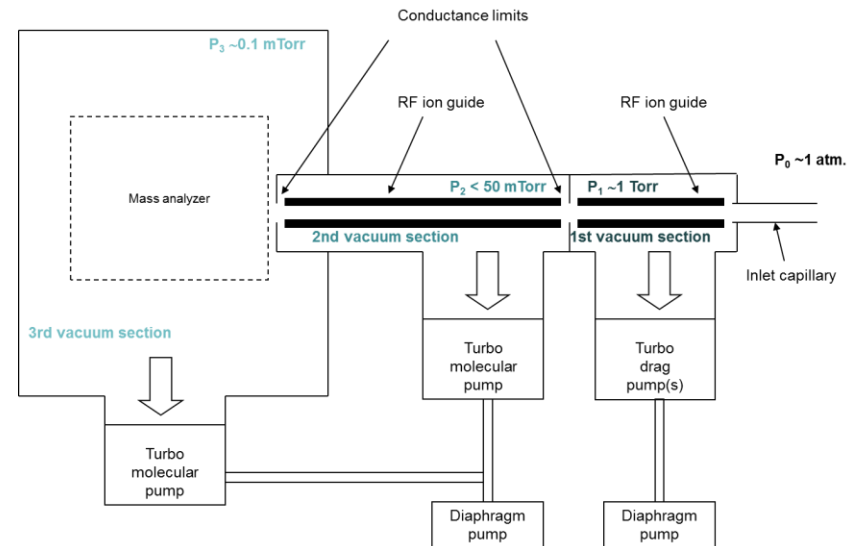
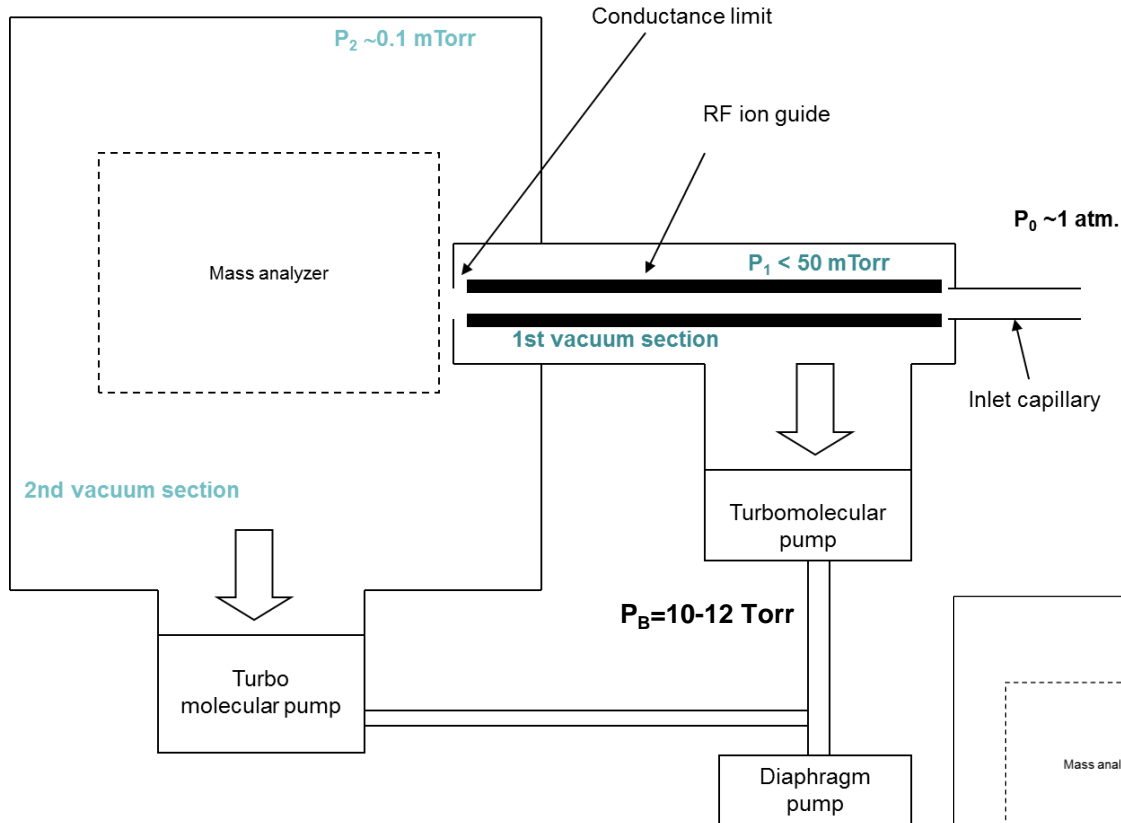


- **Field-deployable instrument (0.8 cu.ft, 37 lb.) for**
 - ✓ **small molecule analysis**
 - ✓ **biomolecule analysis**
- **Sensitivity comparable with that of commercial desktops**
- **Interfacing with all atmospheric pressure (AP) ionization techniques**
- **Providing software tools for custom application software development**

MTE30 Block Diagram



Two-chamber Vacuum System



Standard 3-chamber design

Two-chamber Vacuum System

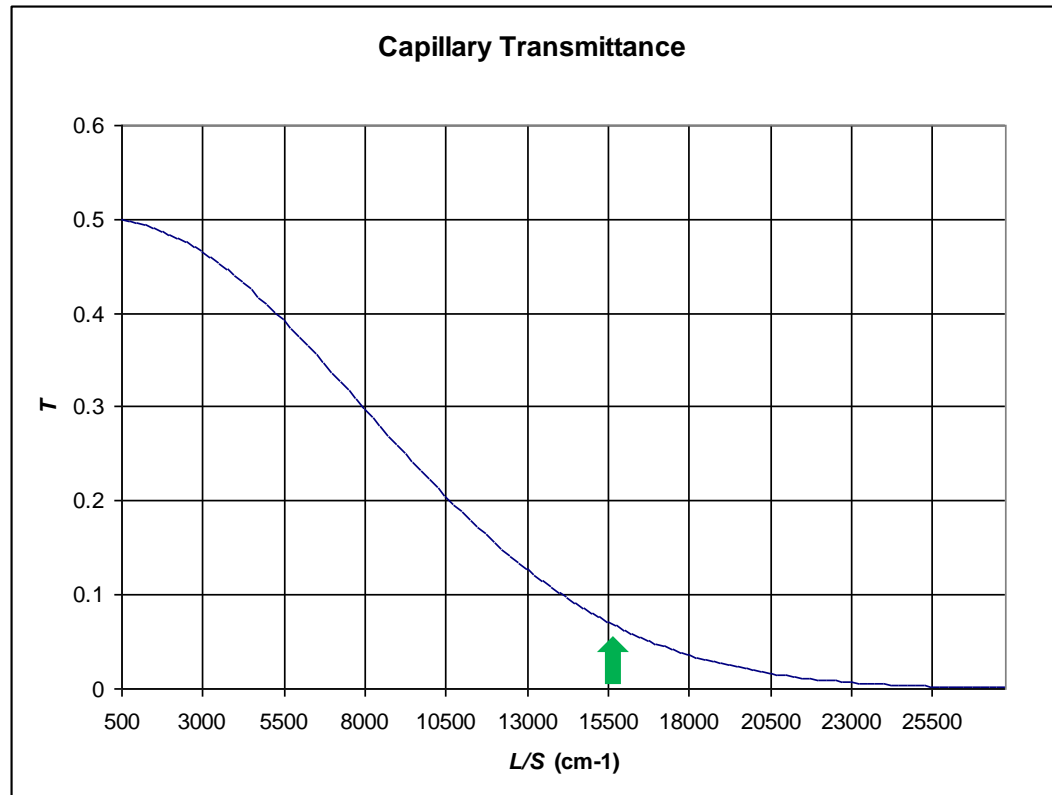
Ion transmission through a capillary¹:

$$T \approx 0.5 \exp \left[-\frac{18.16 DLP}{Q} \right]$$

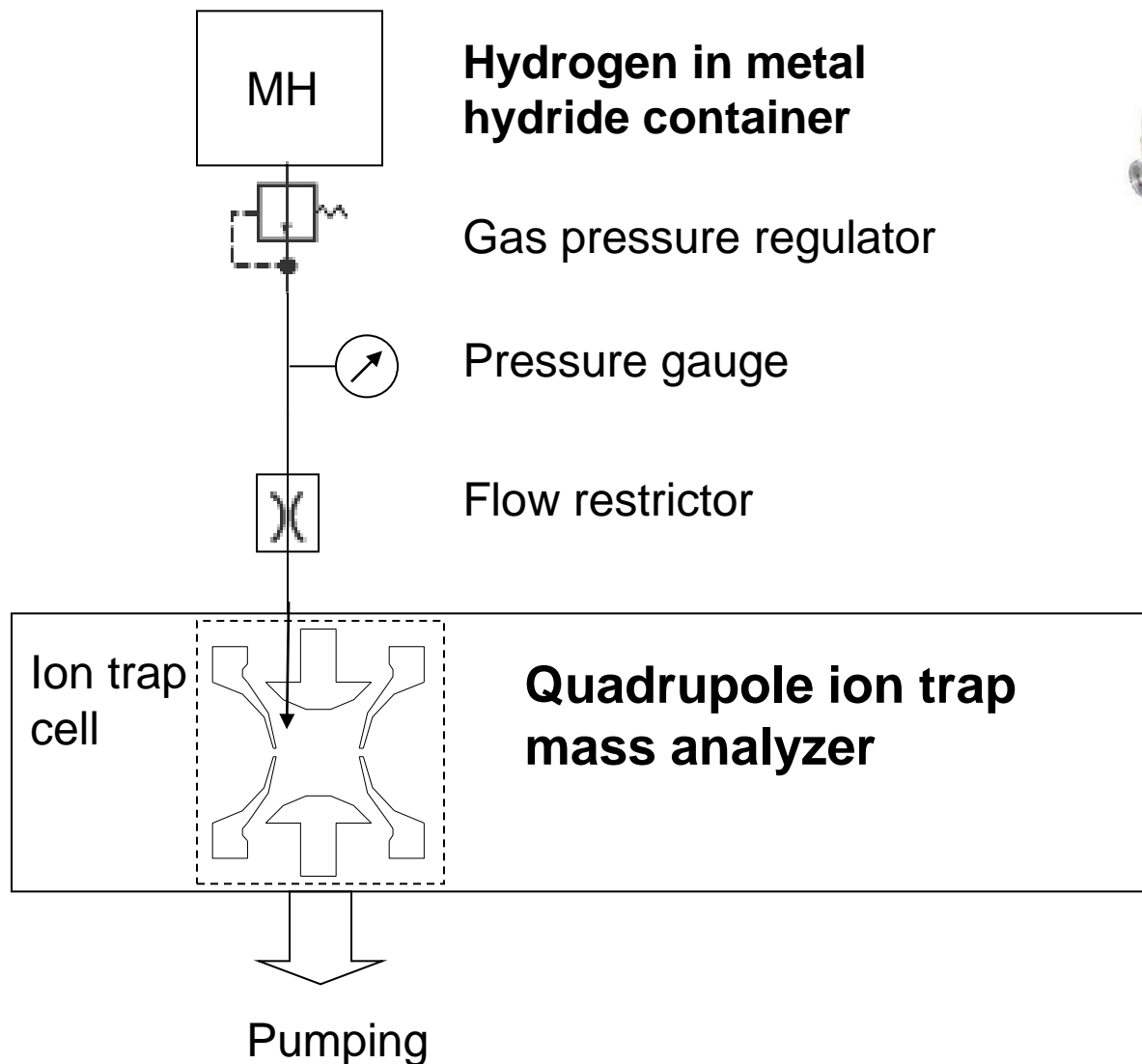
Gas flow load:

$$Q = \left(\frac{S^2}{8\pi\mu L} \right) P_{av} \Delta P$$

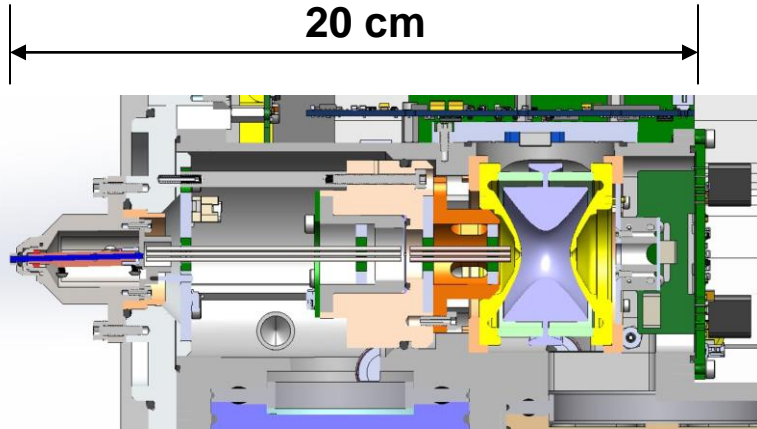
¹Lin, Sunner, J. Am. Soc. Mass Spectrom. 1994, vol. 5, pp. 873-885



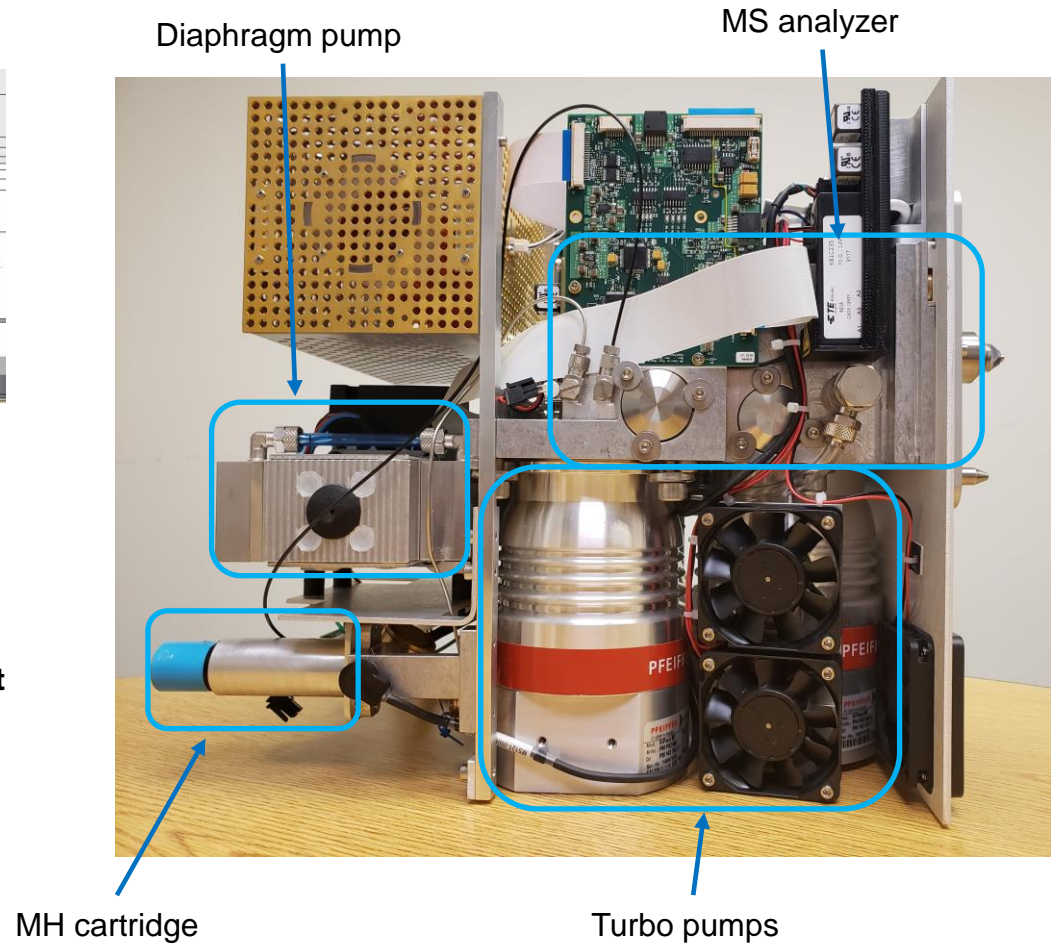
Hydrogen as a Buffer Gas



MTE30 Design Features



- A. Cone, heating elements and inlet capillary
- B. Inlet hexapole ion guide and conductance limit
- C. MS analyzer hexapole ion guide
- D. Ion trap mass analyzer
- E. Ion detector

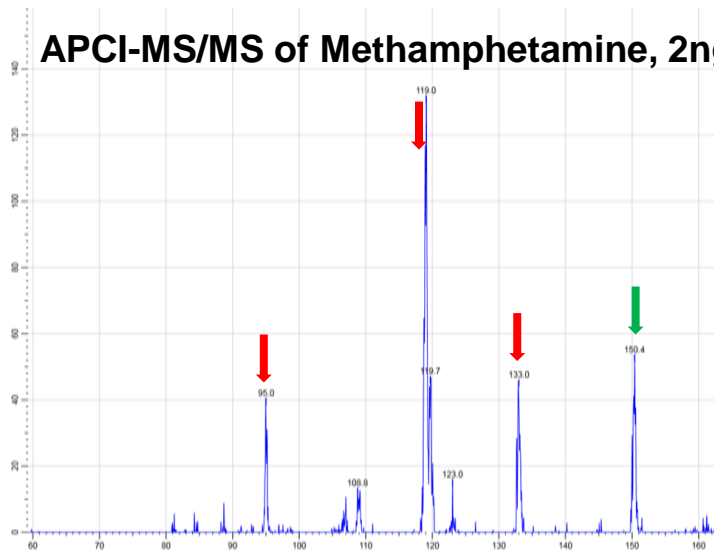


MTE30: Specifications



- Atmospheric pressure interface (API)
- MS and MS/MS modes of operation
- Mass range: 35-2,000 Da
- Mass accuracy 0.3 Da
- Weight 37 lb
- Dimensions 8"x12"x13"
- Power AC or battery (250W max)

APCI-MS/MS of Methamphetamine, 2ng



Negative ESI-MS of the calibration mixture

