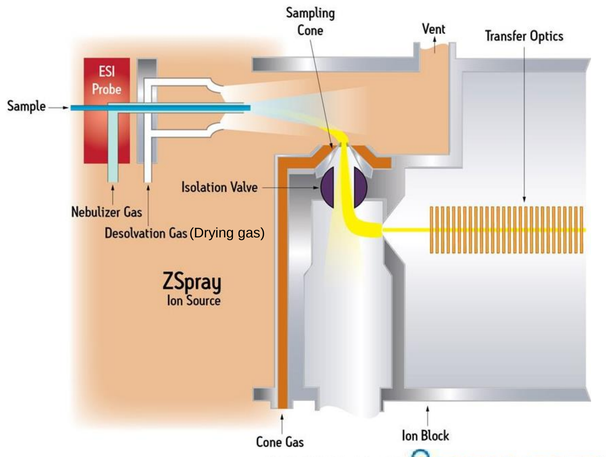
Waters Xevo G2-xs Quadrupole Time-of-Flight (Q-TOF MS)
University of Alabama Mass Spectrometry Facility



ESI Source

Capillary: 2-4 kV

Sample Cone: 25-100 V

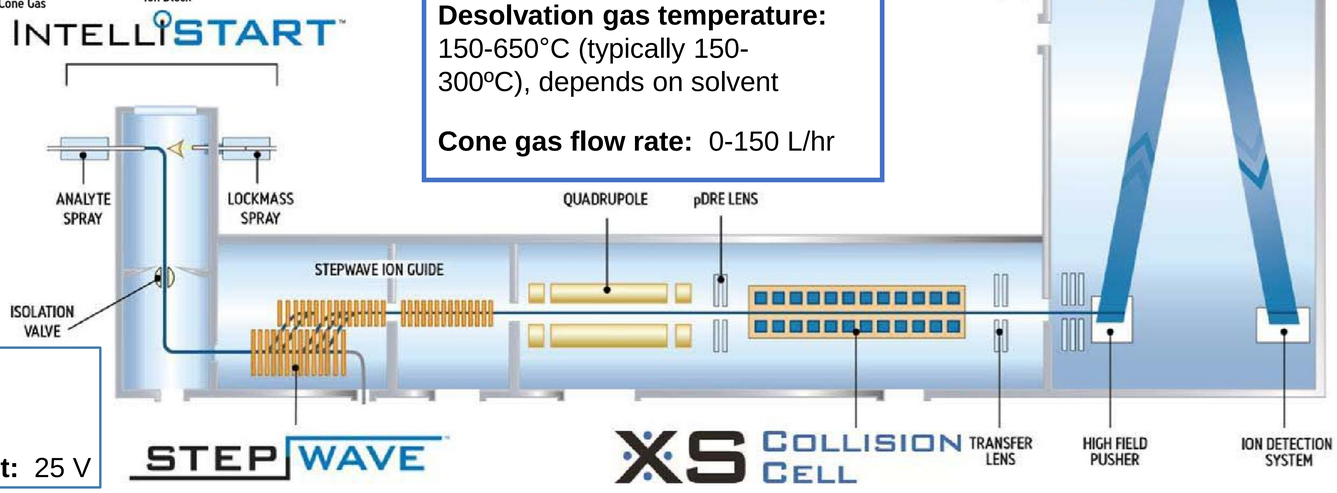
Source Offset: 25-100 V

Source temperature: for the source block, 60-120°C

Desolvation gas : 300-1000 L/hr

Desolvation gas temperature: 150-650°C (typically 150-300ºC), depends on solvent

Cone gas flow rate: 0-150 L/hr

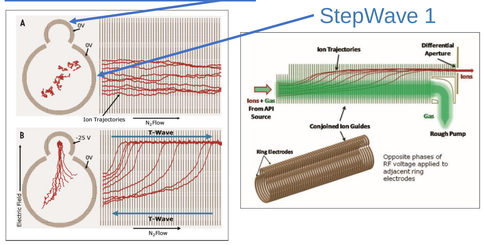


- **RF setting**
  StepWave: 300 V
  Ion guide: 350 V
- **StepWave 2 offset:** 25 V

StepWave

StepWave 2

StepWave 1



- Analytes enter the large diameter ion guide
- Ions enter the upper ion guide (by using differential voltage); neutrals and solvents are directed to the pump inlet

Quadrupole

Arbitrary value calculated from the RF/DC ratio

LM Resolution	4.7 (4k quad) 12 (32k quad)	Sets the width of the quad transmission window in Quad and TOF MS/MS modes.
HM Resolution	15	Sets the width of the quad transmission window in Quad and TOF MS/MS modes. Leave set to 15.
Pre-Filter	2	The DC voltage applied to the pre and post filters of the quad. Set to 2V (DO NOT TUNE).
Ion Energy	0.2	The offset voltage applied to the quadrupole.

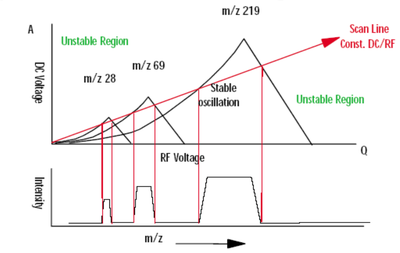
- Serves as ion guide in the single MS mode
- Served as mass filter in the tandem MS mode (precursor ion selection)

Collision cell

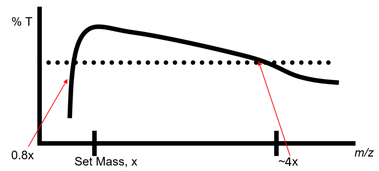
- Collision energy: 20-30 eV (collision energy is tuned by adjusting the voltage of focusing lenses, which accelerates ions into the collision cell)
- Collision gas: argon
- Pressure up to 10^{-4} torr in CID
- Collision RF values: RF offset is 150 for small molecules, and 400 for proteomics

Quadrupole theory

- 4 hyperbolic or cylindrical rods with the combination of dc (U) and rf voltages (V) applied on the rods
- Motion of ion in quadrupole fields:
  $a_x = 8zeU/mr^2\omega^2$
  $q_x = 4zeV/mr^2\omega^2$
- A constant a/q ratio will generate a scan line. Scanning this line (U, V varied) allows ions of differing m/z through the Q

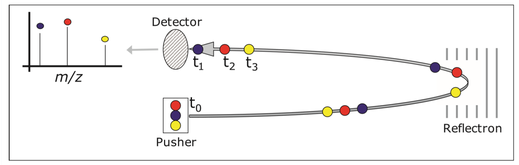


- Quad profiles



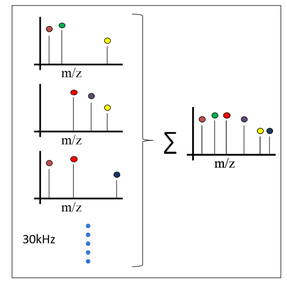
The Q will transmit over the region of ~4 times the set mass

oa-TOF



Ions are accelerated orthogonally (90º) by the pusher voltage

- Pusher: 1900 V
- Puller: 1400V
- Reflectron grid: 1700 V
- Reflectron: 1400V



- Data is acquired at speeds of up to 30,000 spectra per second
- Individual spectra are summed and a composite spectrum is recorded as raw data