

Kast Lab Seminar

Davin Carter

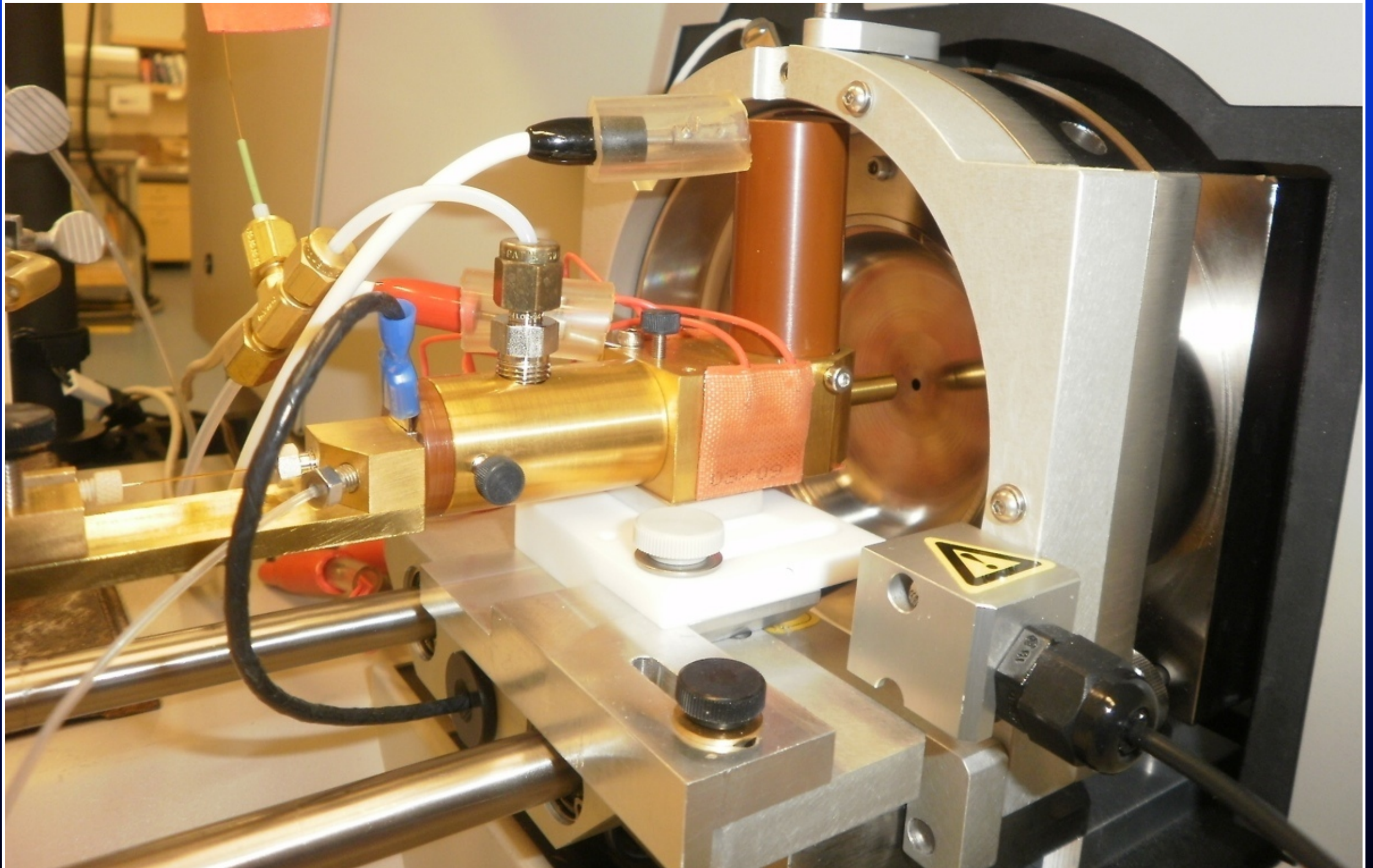
Faculty of Medicine
Biomedical Research Centre

June 17, 2011



a place of mind

**Atmospheric Pressure - Electron Capture Dissociation
Mass Spec Hardware design - like a plumber, only smaller**



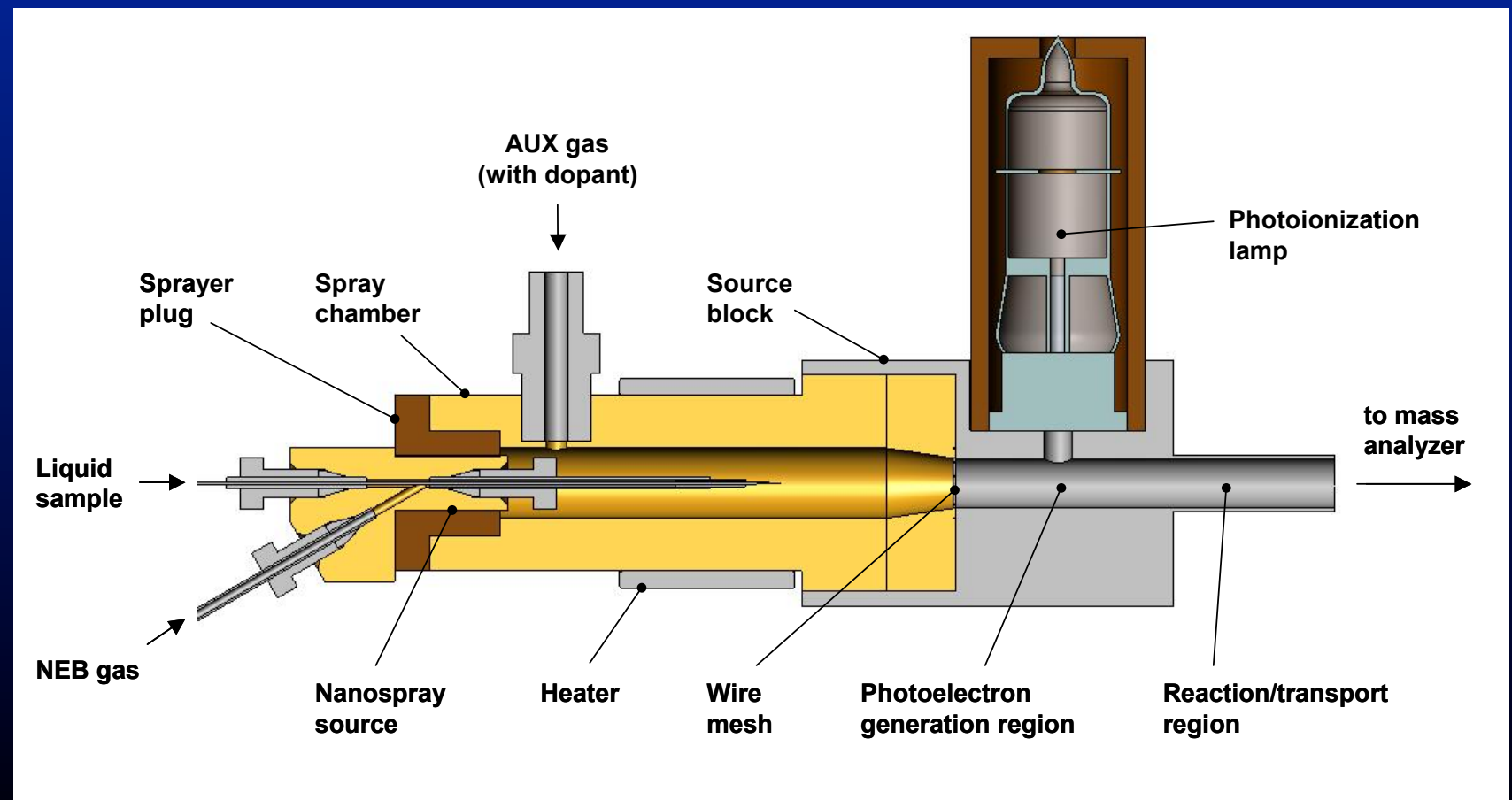
Atmospheric Pressure - Electron Capture Dissociation

Rationale

Add ECD capacity on our instrument

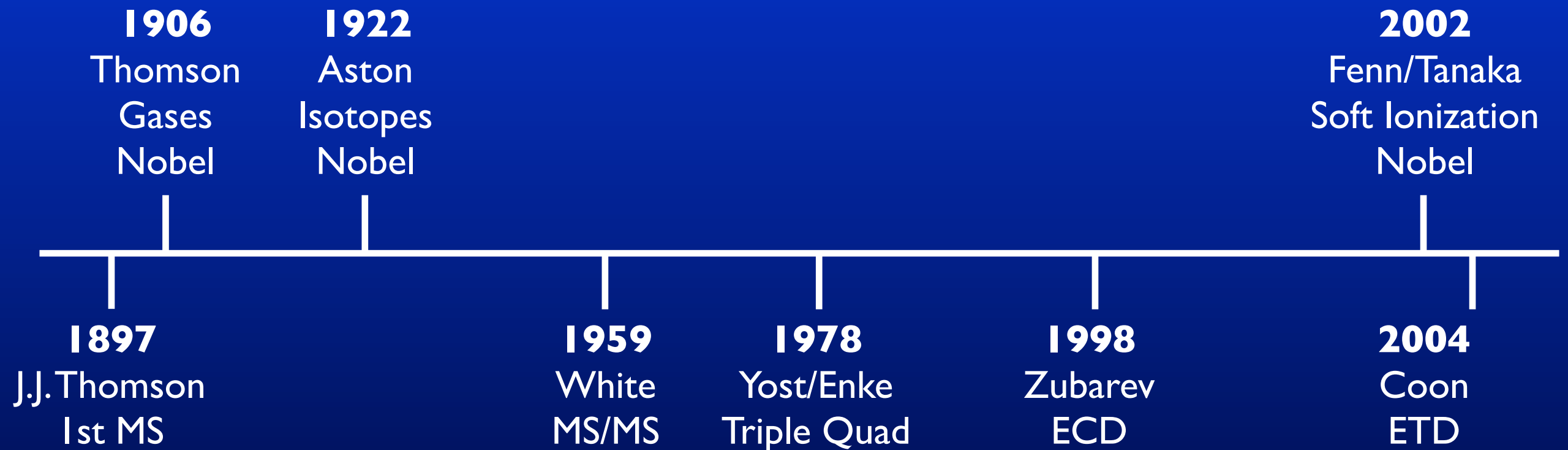
Million dollars buys a lot of research or a lot of grad students

Comments from ASMS



Mass Spectrometry

Best tool ever*

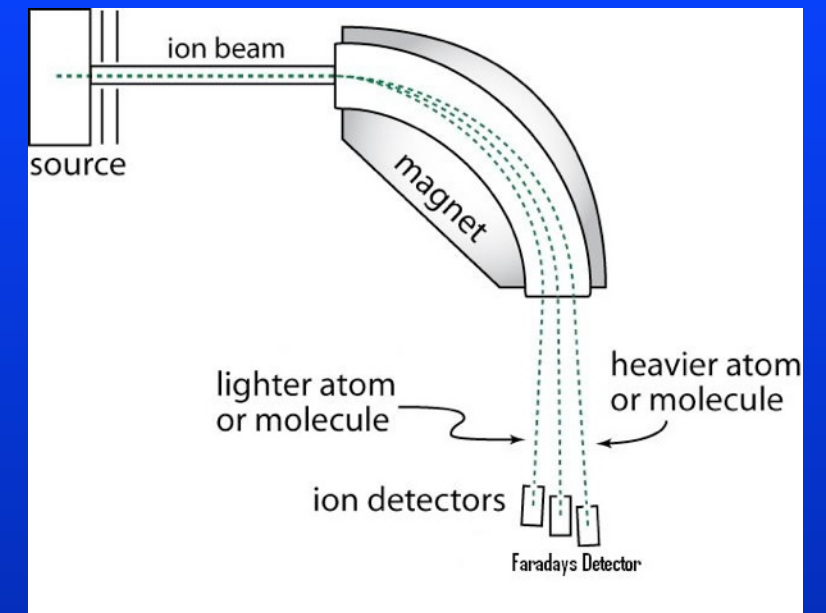


* 9 of 10 mass spectrometrists at ASMS

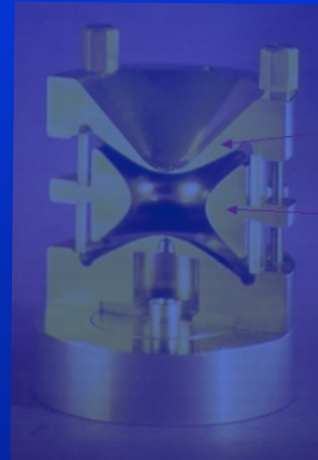
Mass Spectrometry

Different types

Magnetic Sector



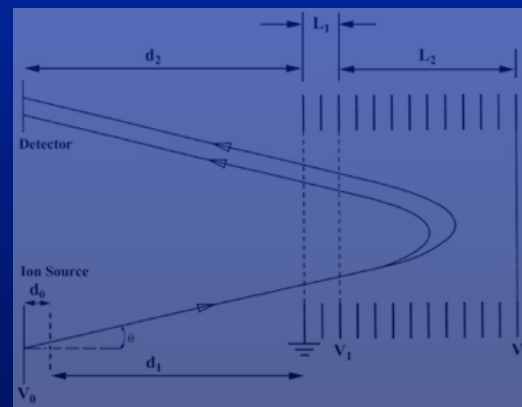
Ion Trap



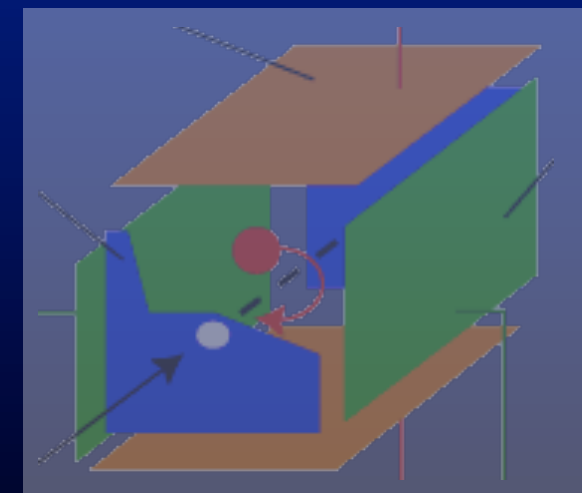
Quadrupole



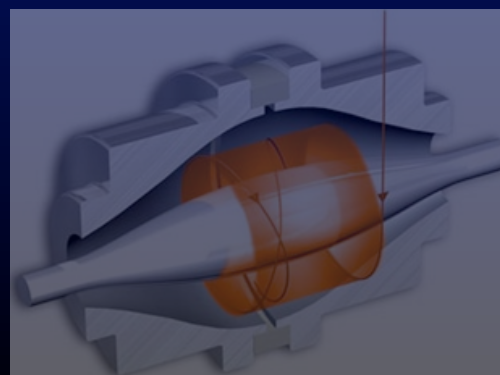
Time of Flight



Ion Cyclotron Resonance



Orbitrap



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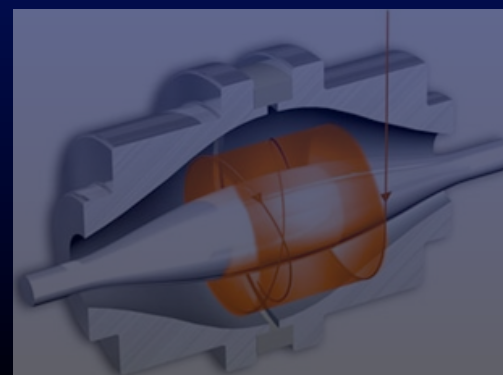
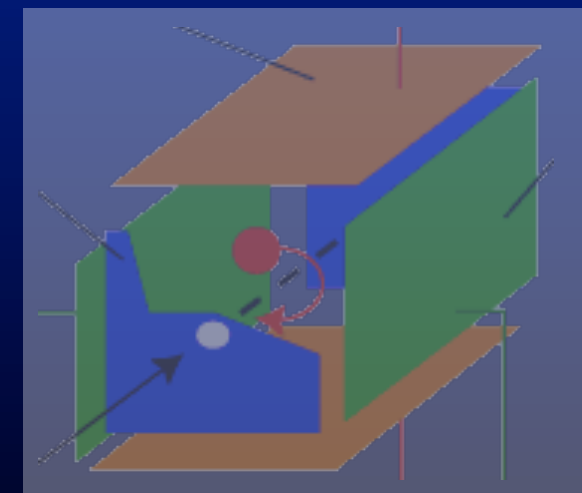
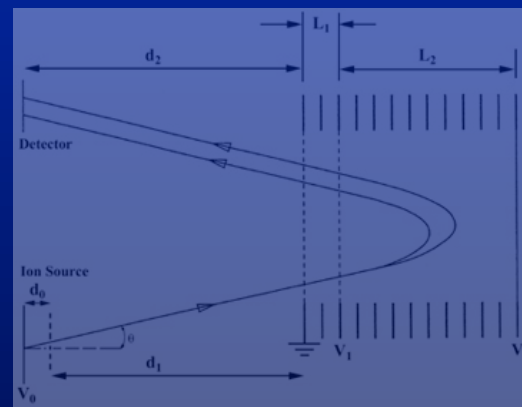
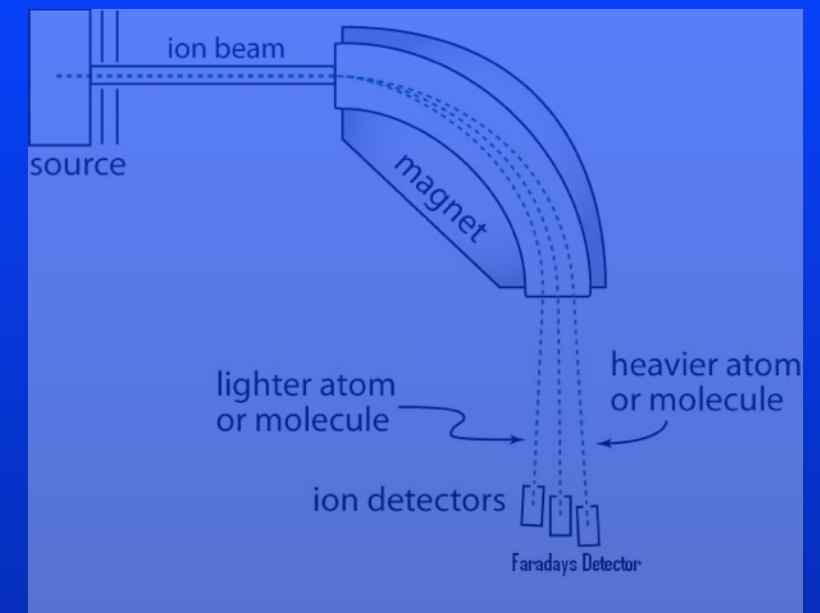
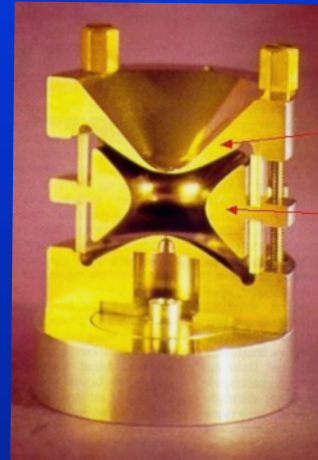
Ion Trap

Quadrupole

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Ion Cyclotron Resonance

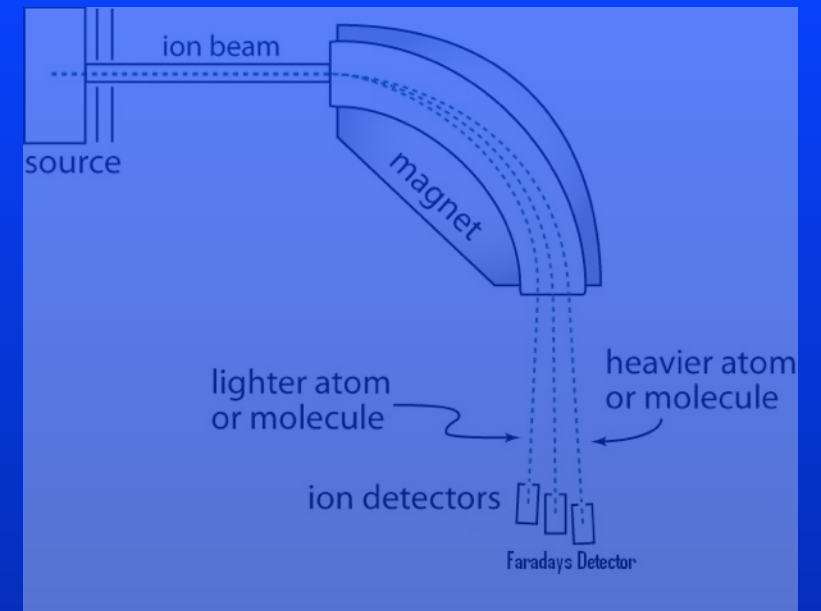
Orbitrap



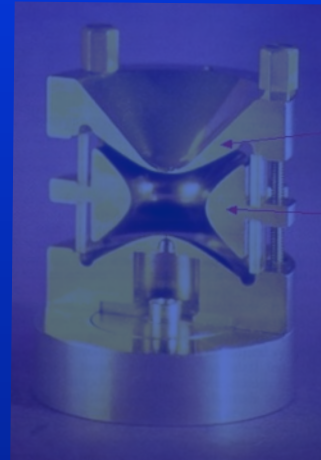
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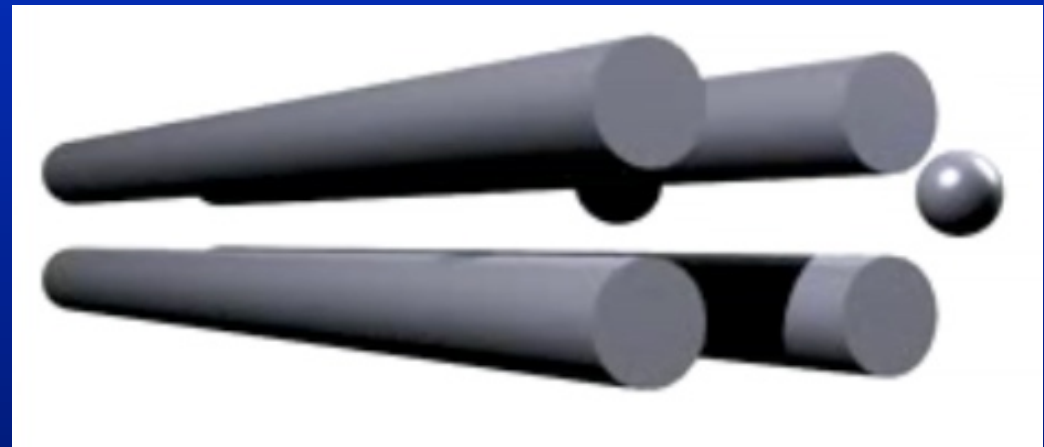
Magnetic Sector



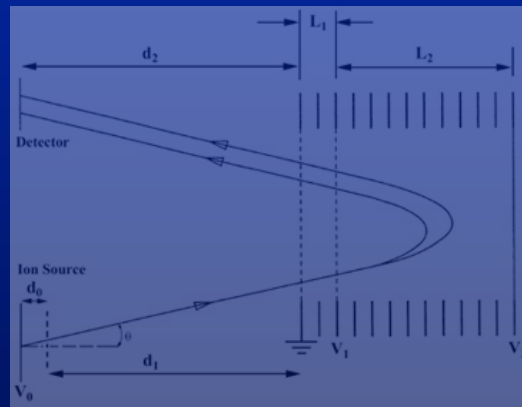
Ion Trap



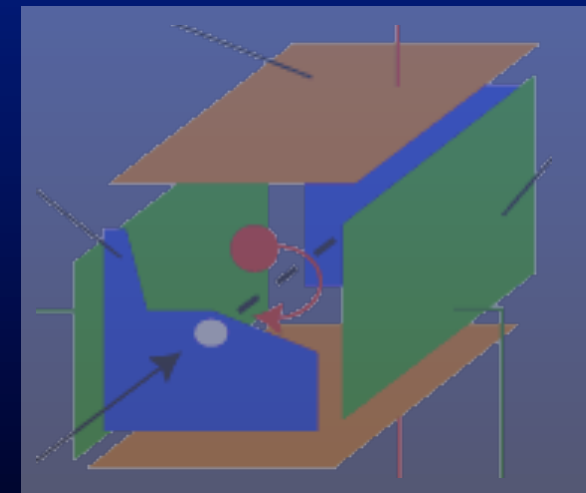
Quadrupole



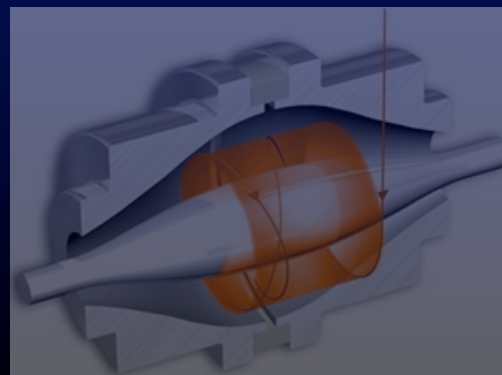
Time of Flight



Ion Cyclotron Resonance



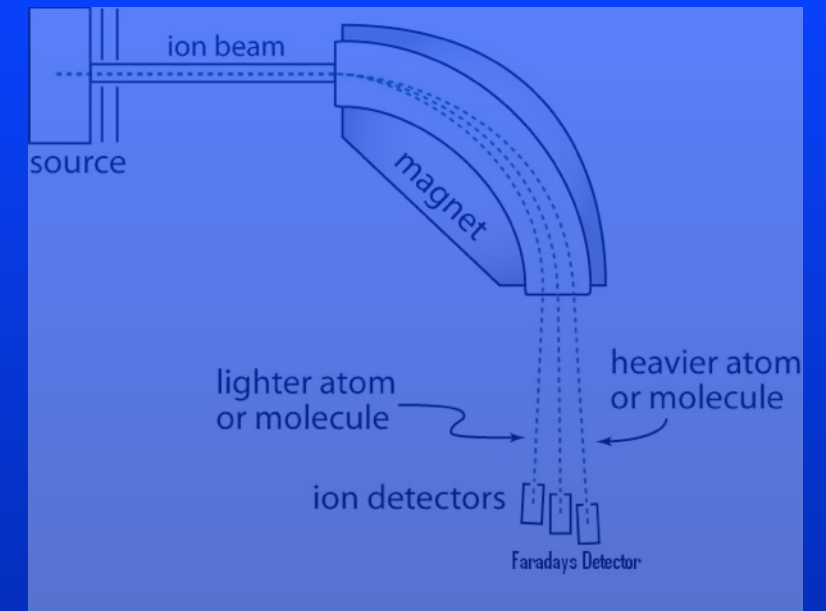
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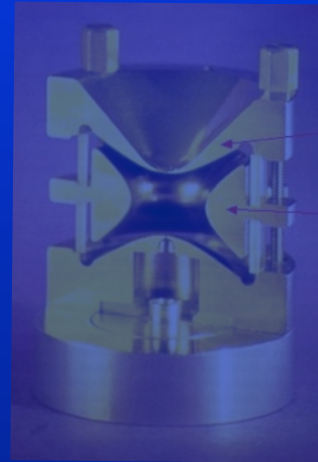
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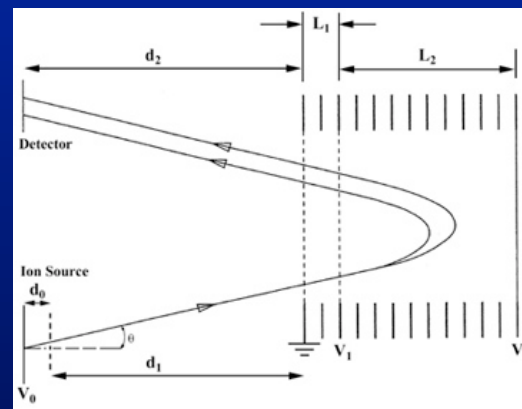
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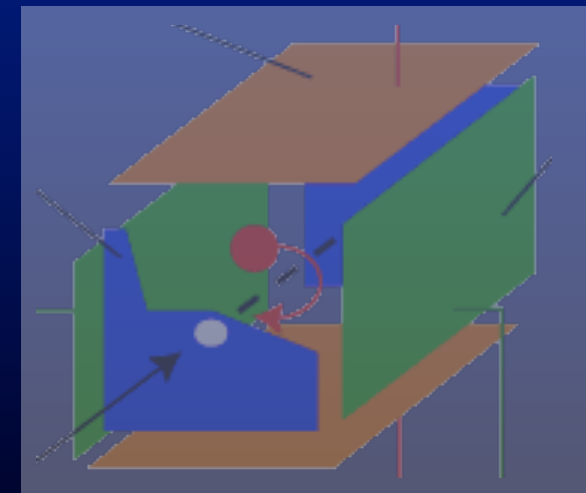
Quadrupole



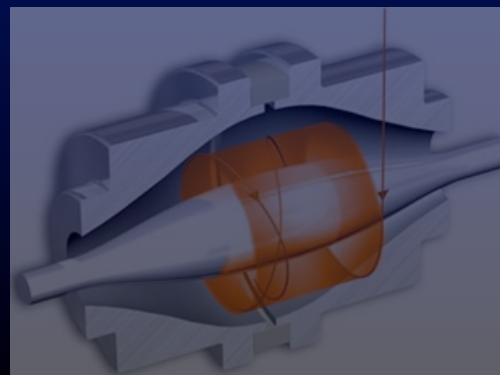
Time of Flight



Ion Cyclotron Resonance



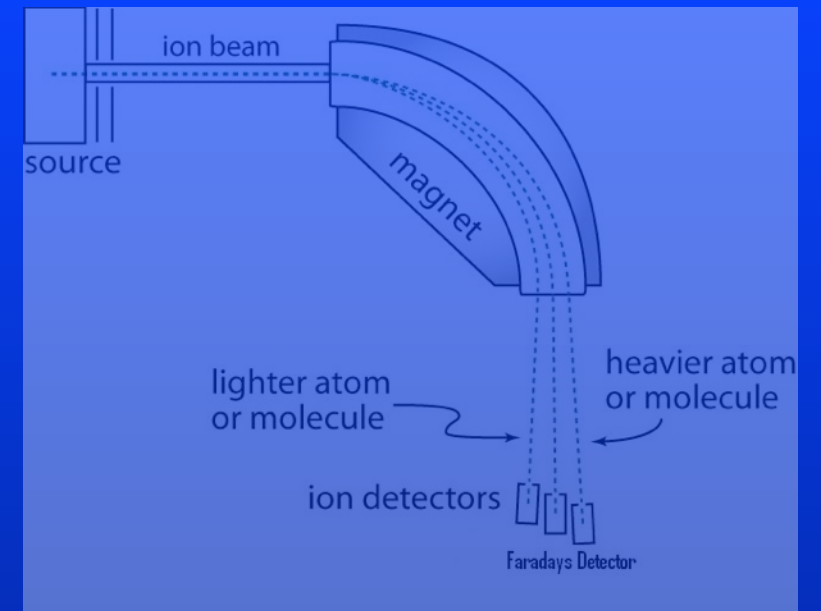
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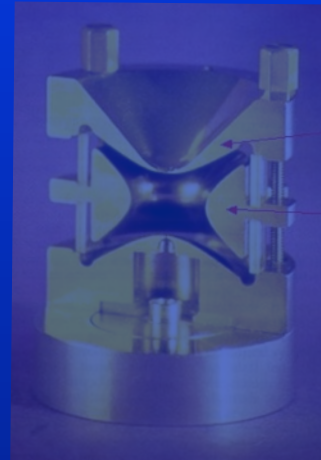
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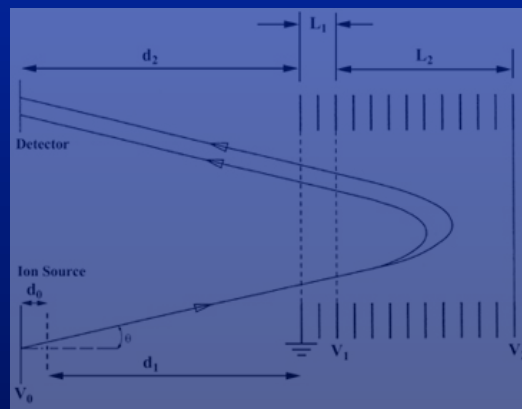
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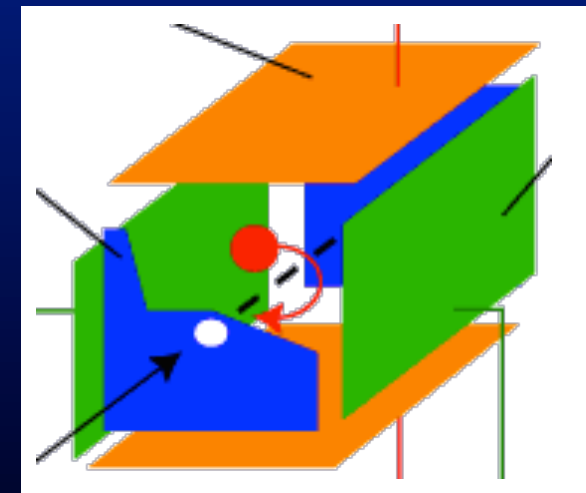
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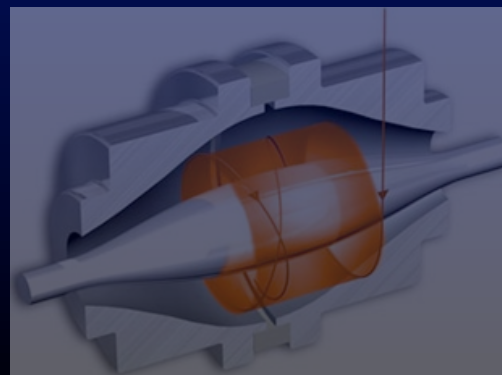
Time of Flight



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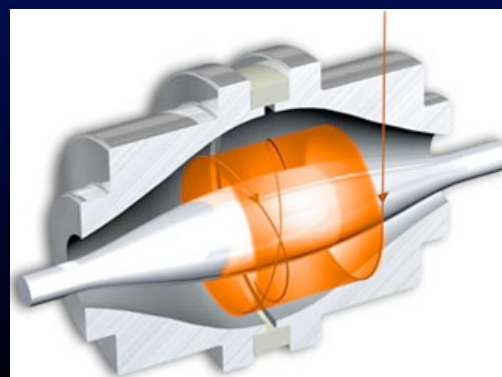
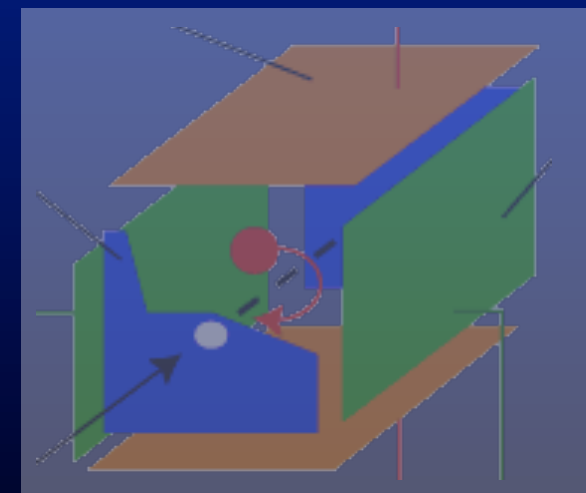
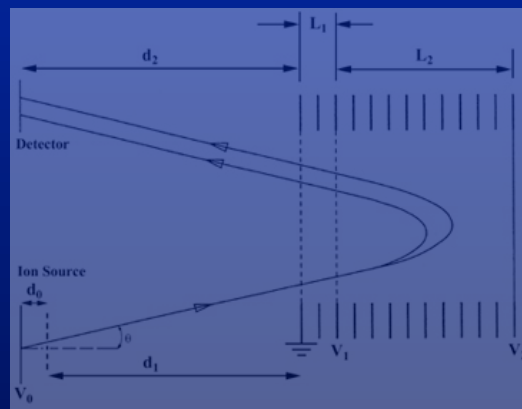
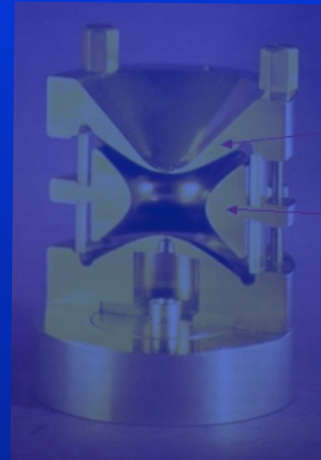
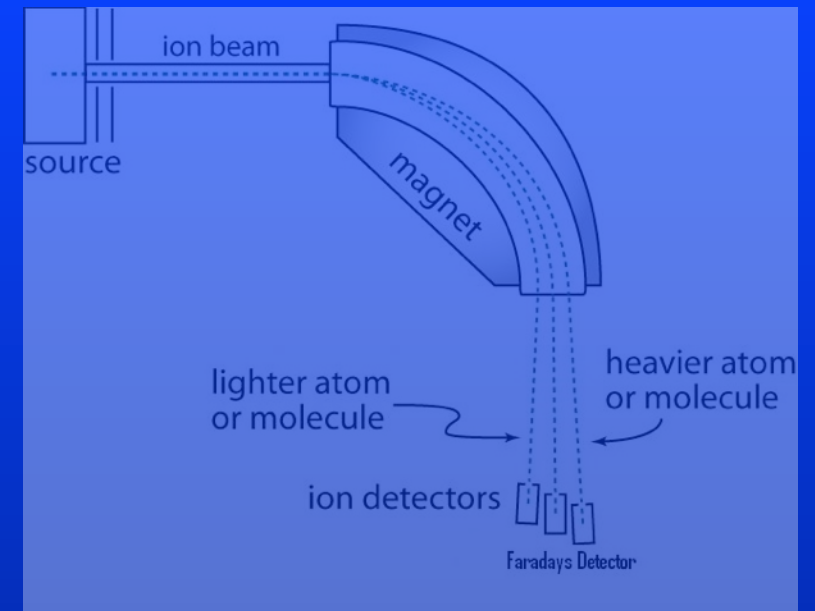
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Quadrupole

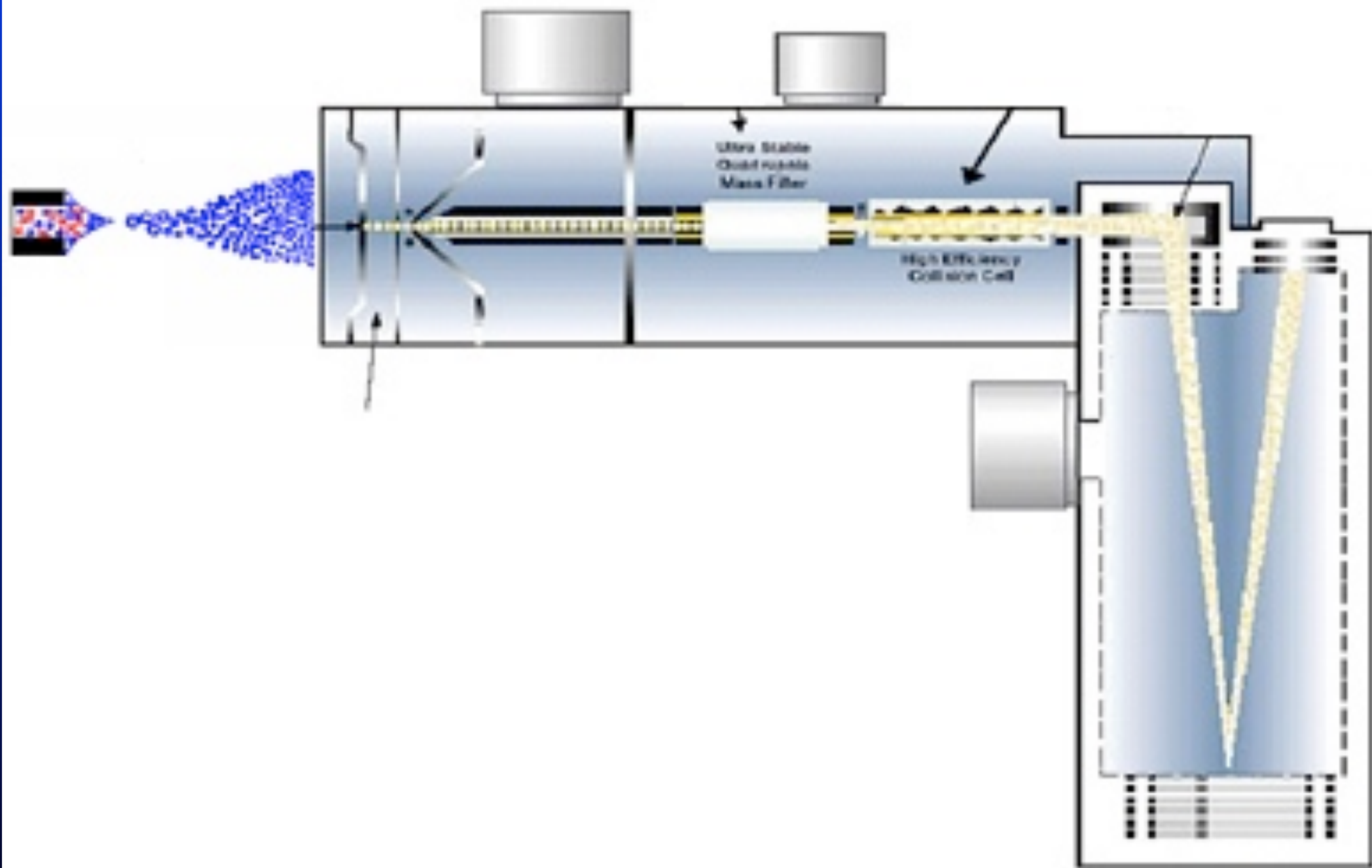
Time of Flight

Ion Cyclotron Resonance

Orbitrap



Our Q-Star Quadrupole Collision Induced Dissociation Time of Flight



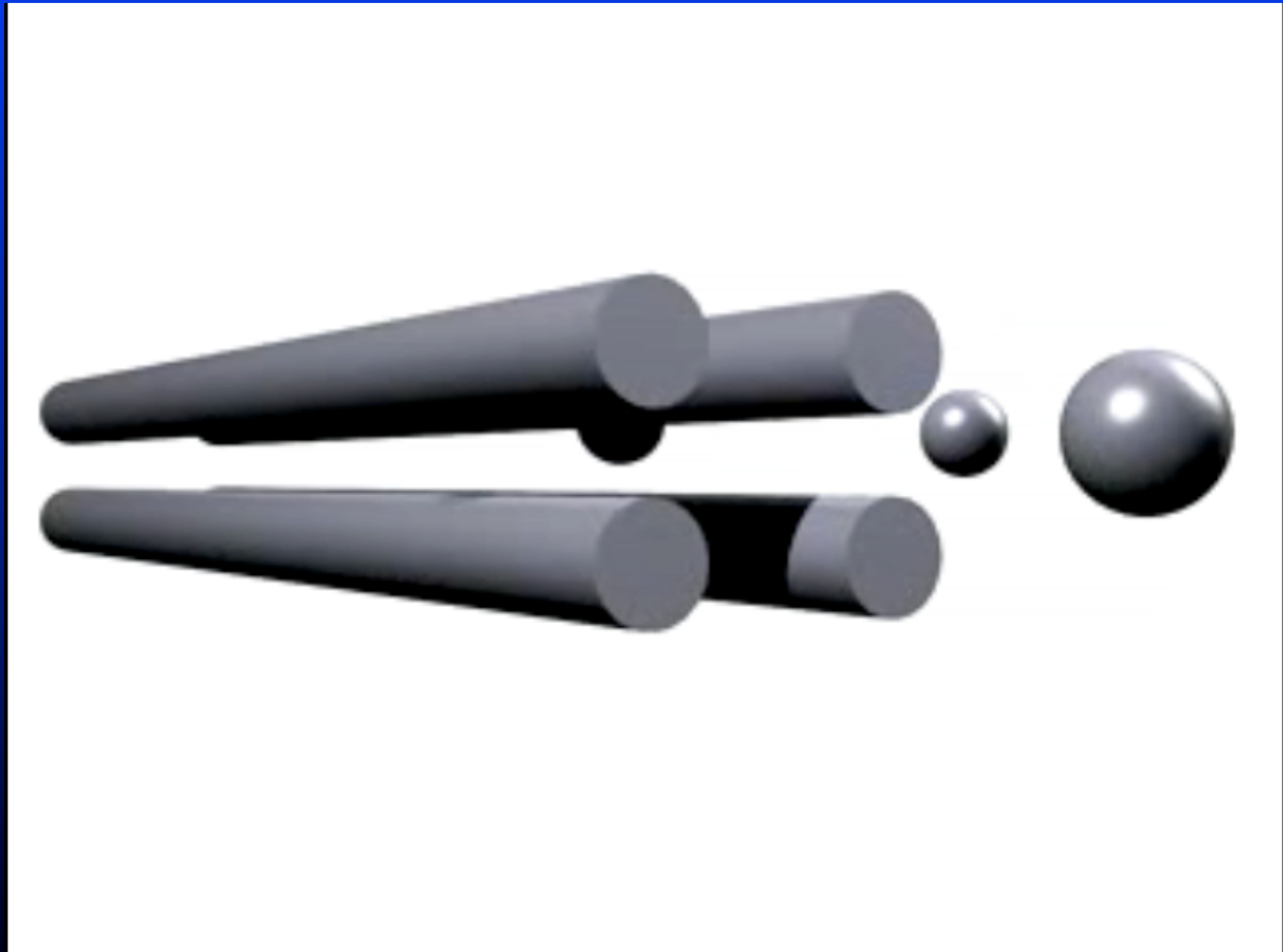
nESI

Q

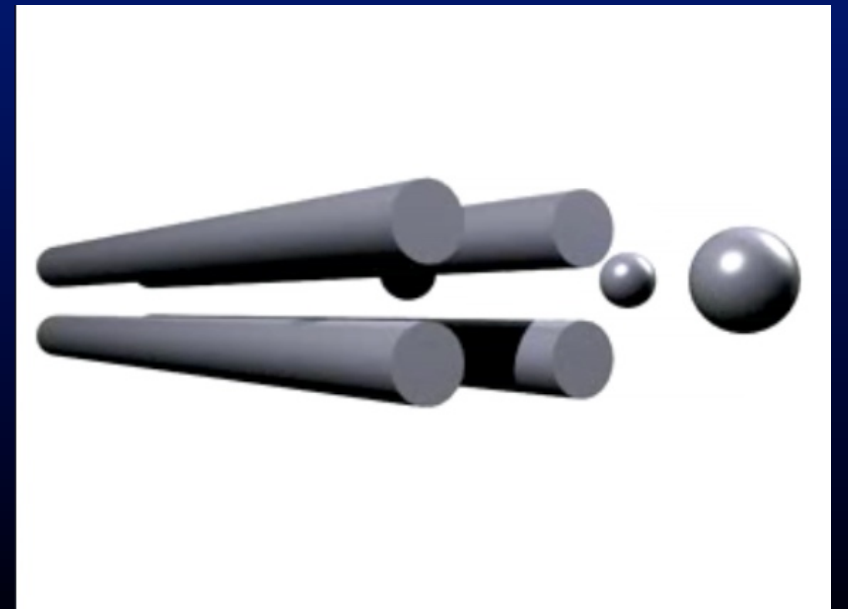
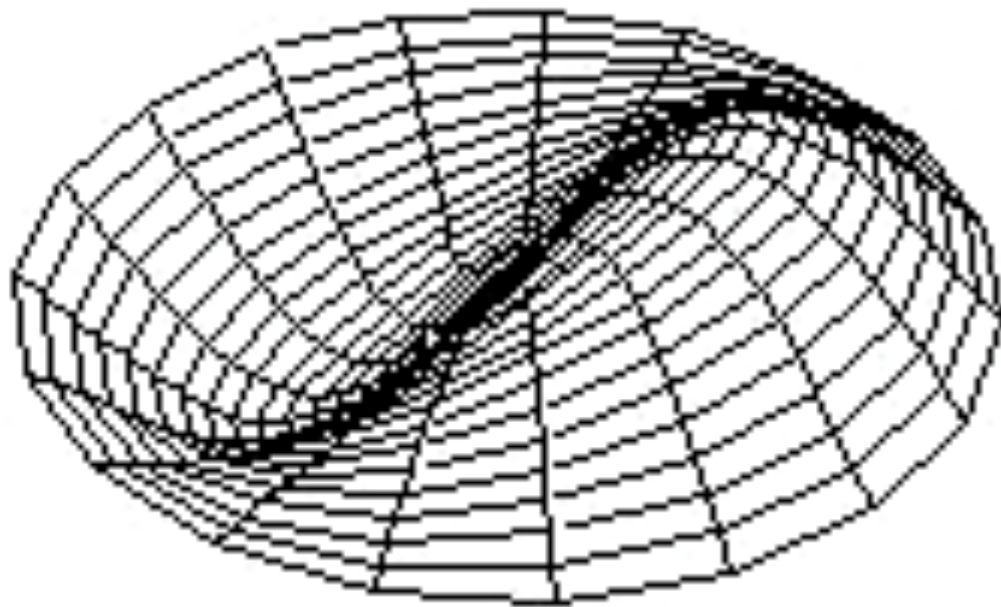
CID

TOF

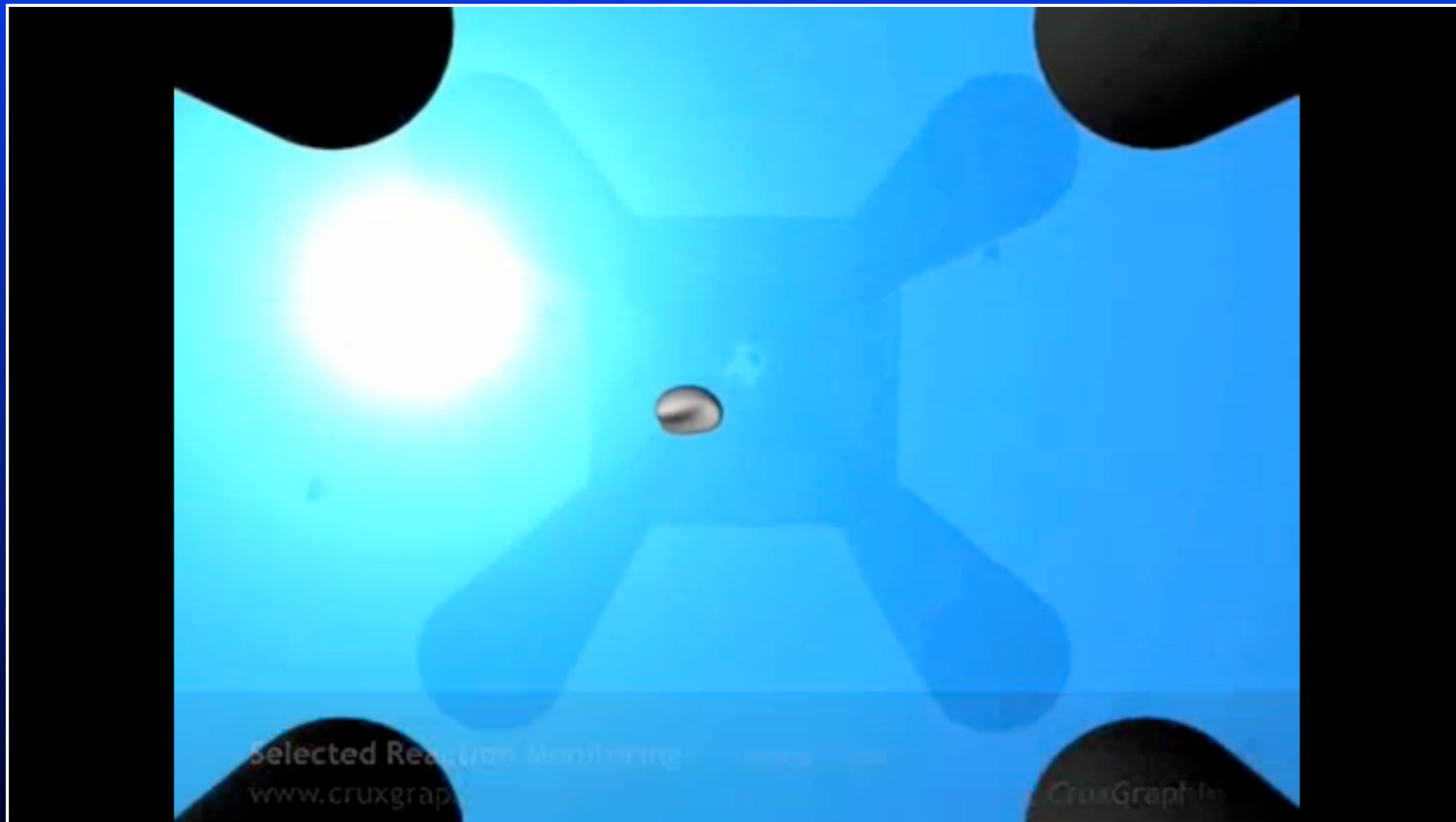
Our Q-Star Quadrupole movie



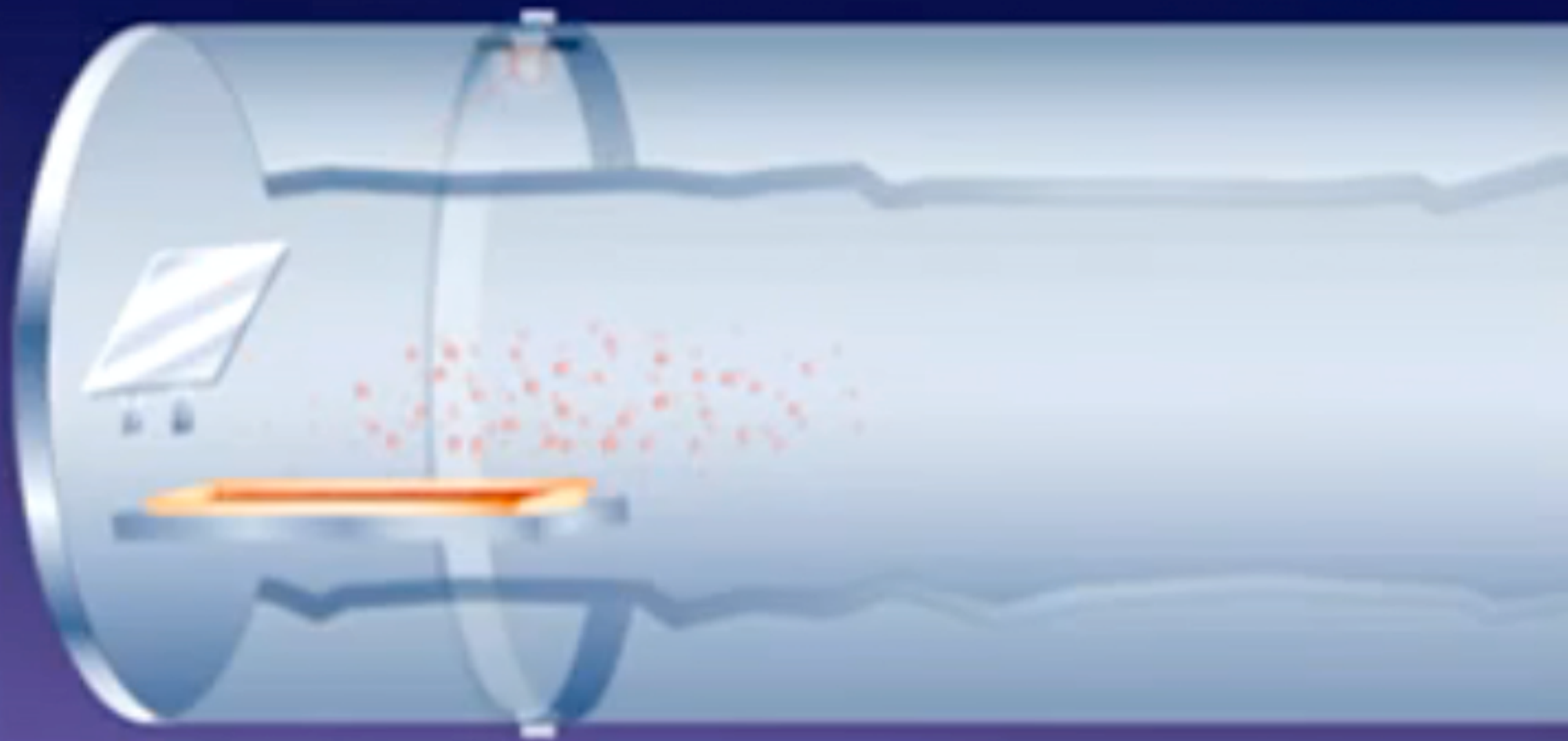
Our Q-Star Quadrupole movie



Our Q-Star Collision Induced Dissociation movie



Our Q-Star Time of Flight movie



Our Q-Star

Quadrupole Collision Induced Dissociation Time of Flight movie

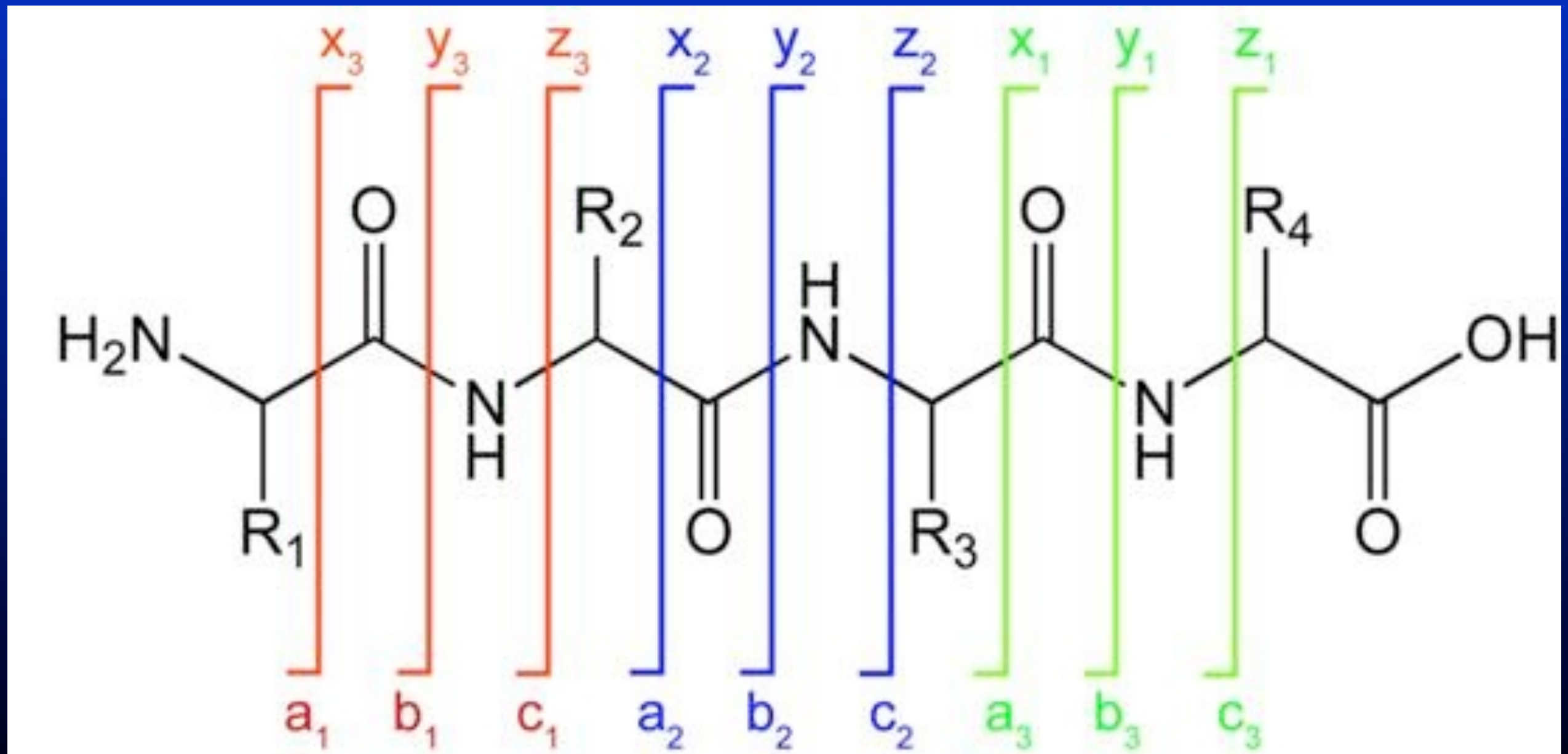


Atmospheric Pressure - Electron Capture Dissociation

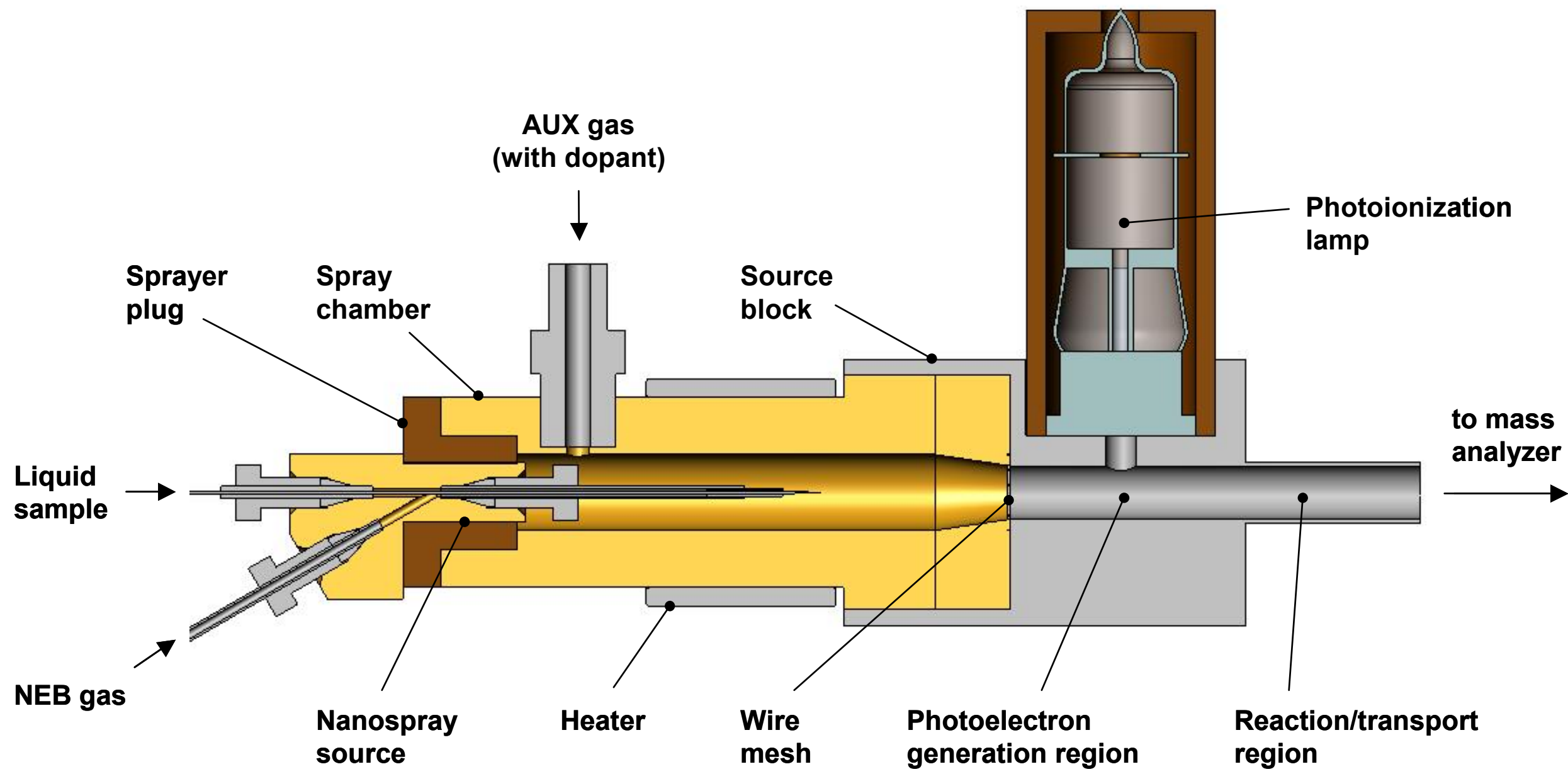
CID vs ECD

B & Y ions: Collision Induced Dissociation

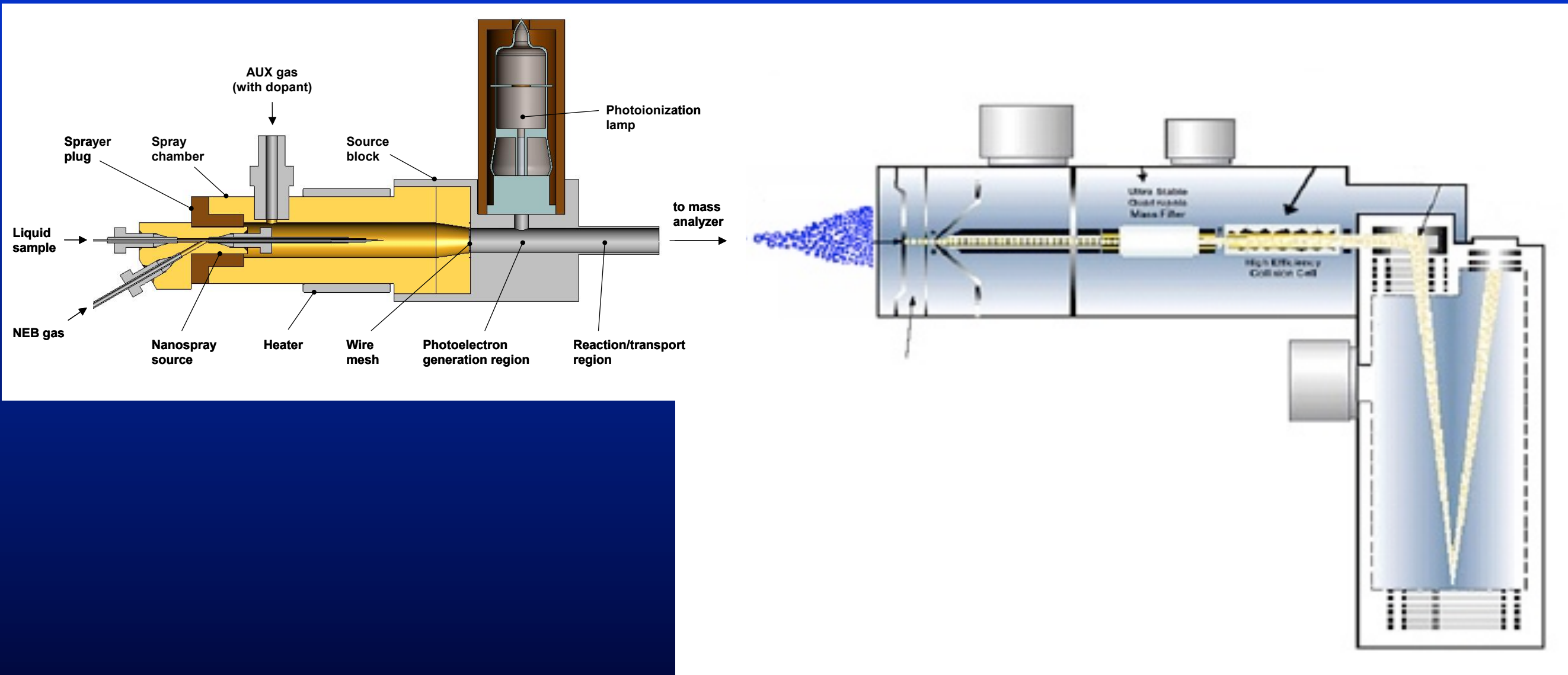
C & Z ions: Electron Capture Dissociation



Atmospheric Pressure - Electron Capture Dissociation Apparatus



Atmospheric Pressure - Electron Capture Dissociation Apparatus



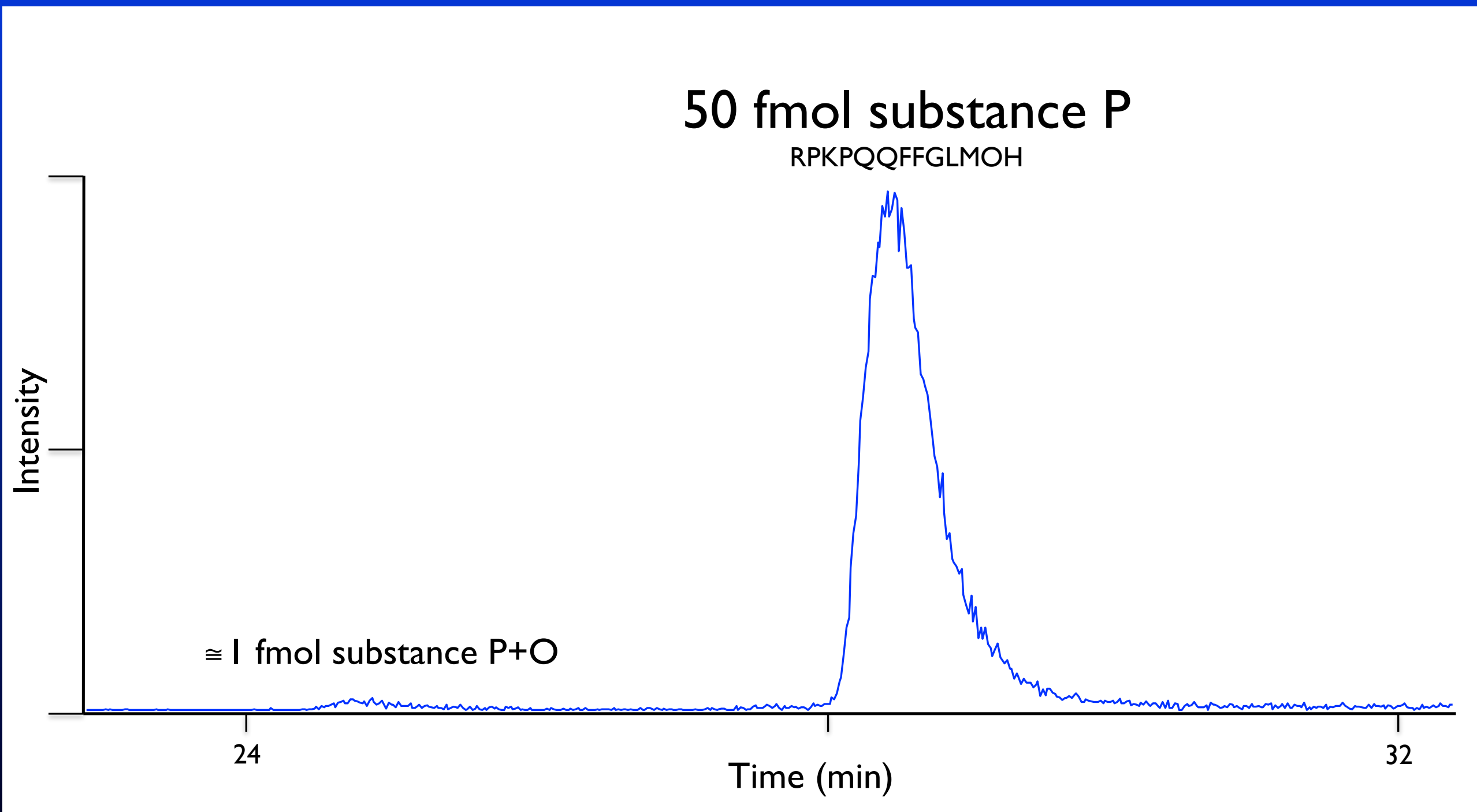
nESI AP-ECD

Q

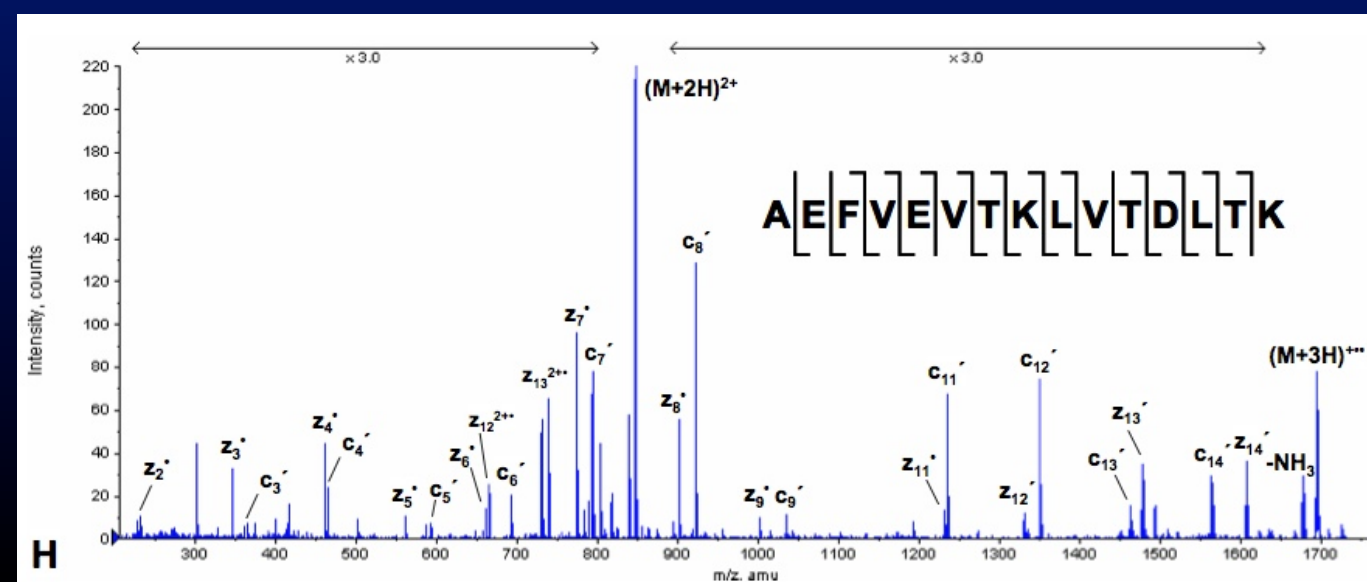
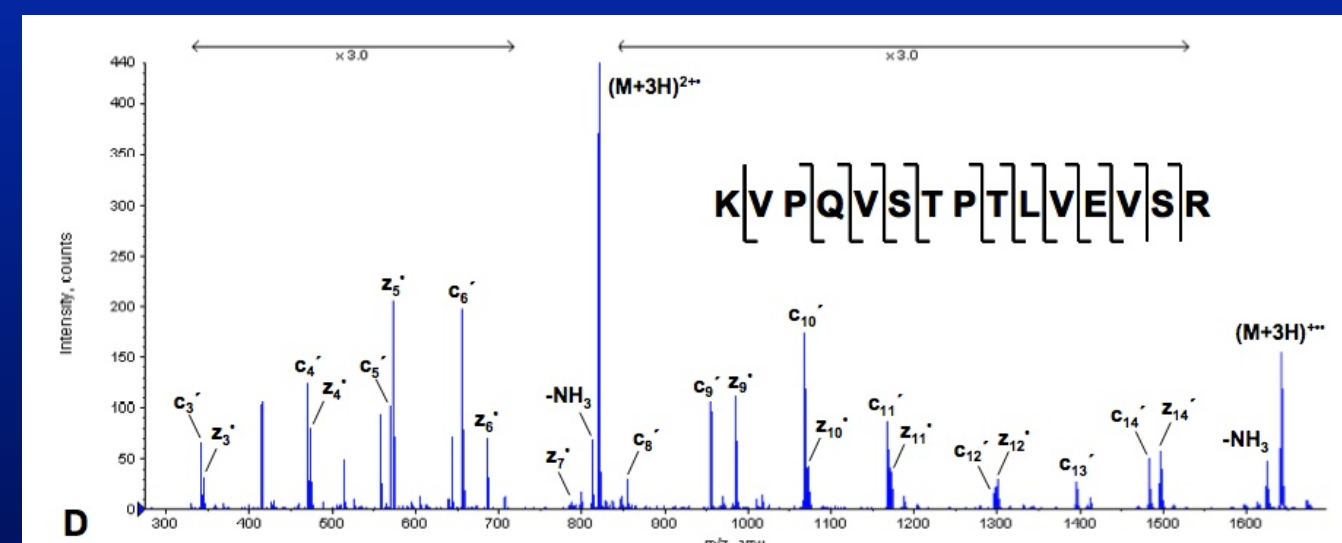
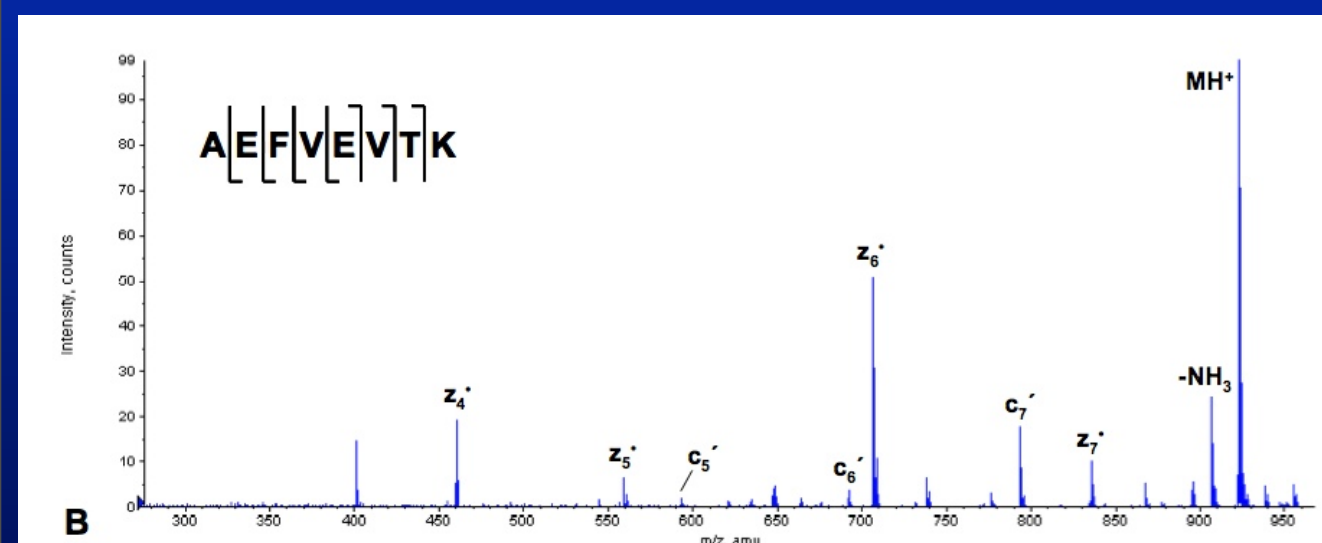
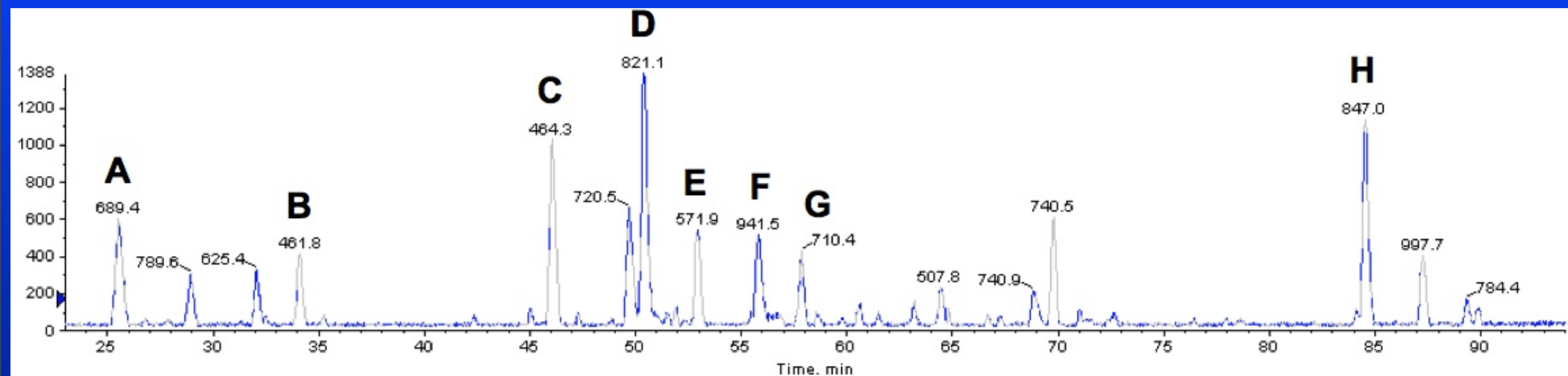
CID

TOF

Atmospheric Pressure - Electron Capture Dissociation Results - Sensitivity

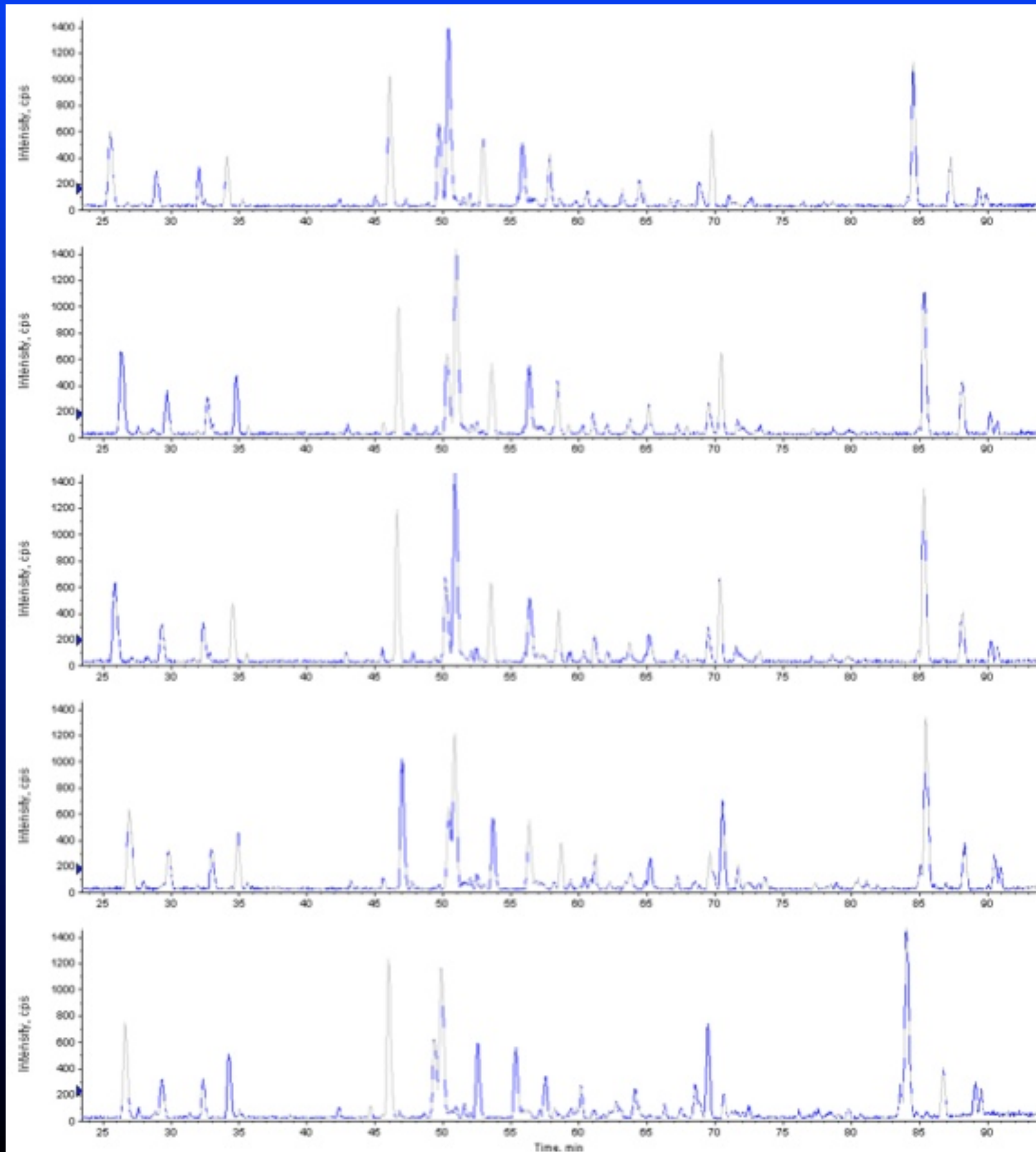


Atmospheric Pressure - Electron Capture Dissociation Results - Mixtures

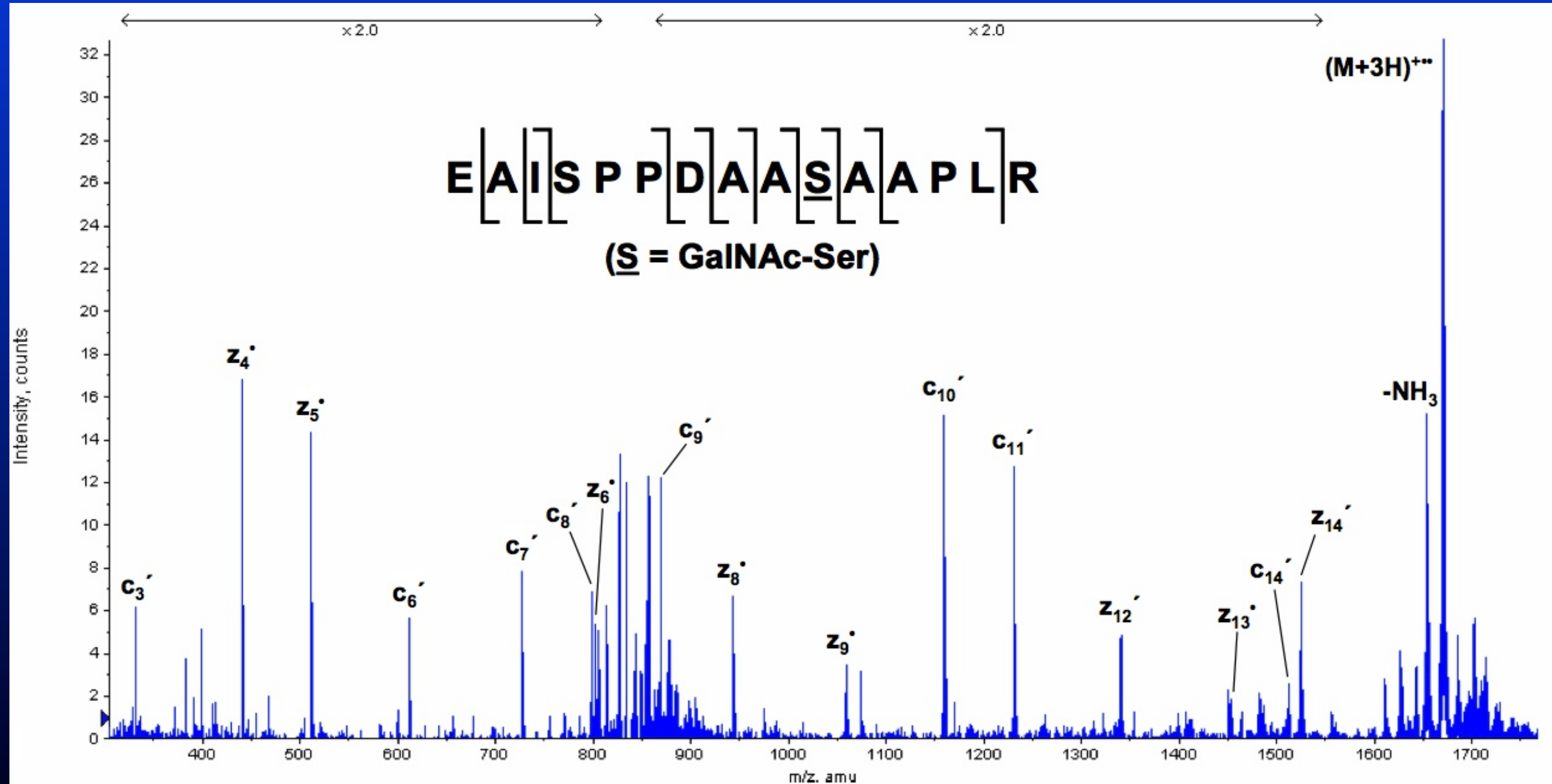


Atmospheric Pressure - Electron Capture Dissociation

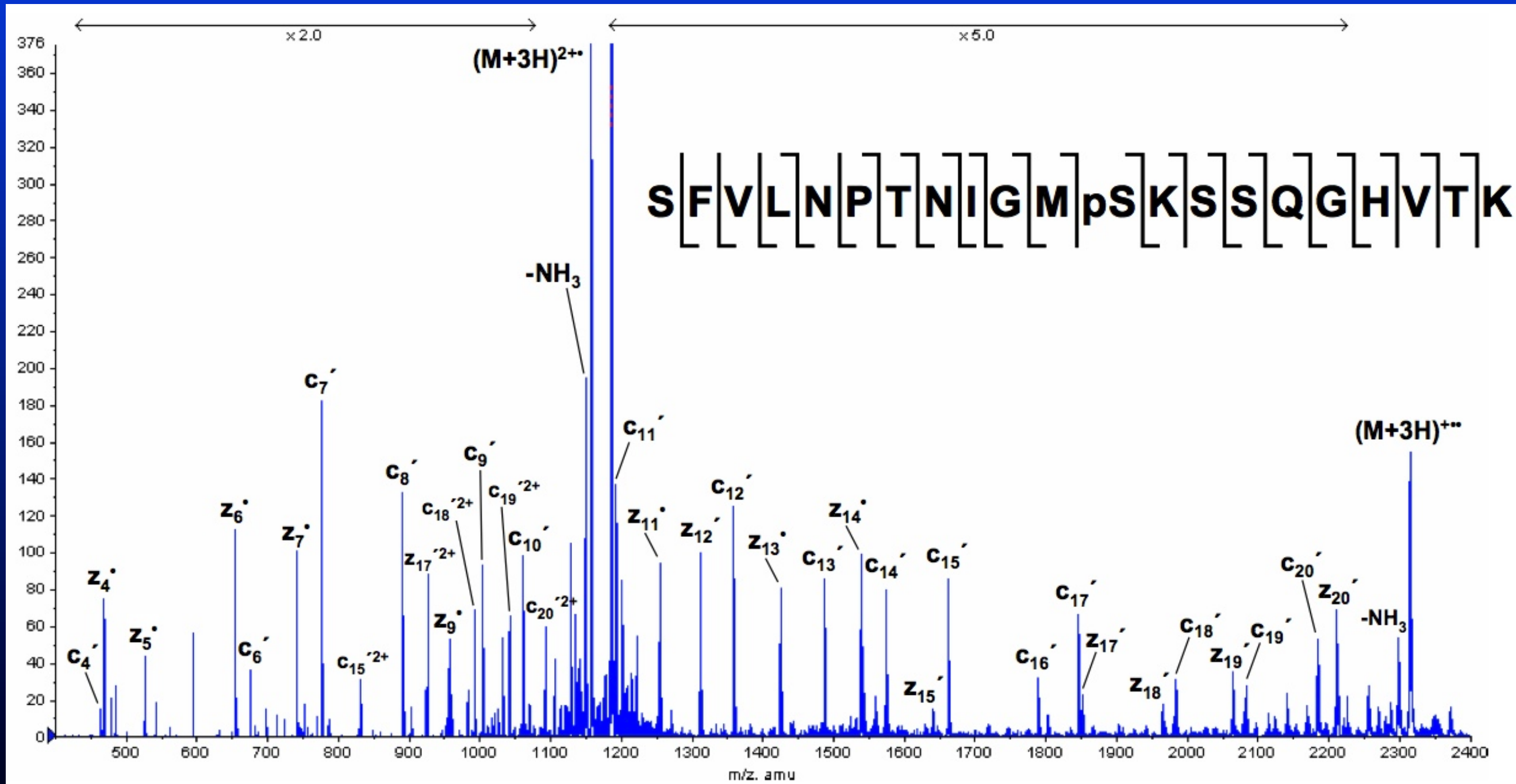
Results - Reproducibility



Atmospheric Pressure - Electron Capture Dissociation Results - Glycosylation



Atmospheric Pressure - Electron Capture Dissociation Results - Phosphopeptides



Coming up.....

Validate method further

Integrate with software

ECD-CID, ECD/ECD

Real Mixtures

HD exchange (Waters or Koenermann Alzeimer's)

Andrew Ross (phosphohistidines in bacterial proteins, methyglyoxal, ubiquitin)

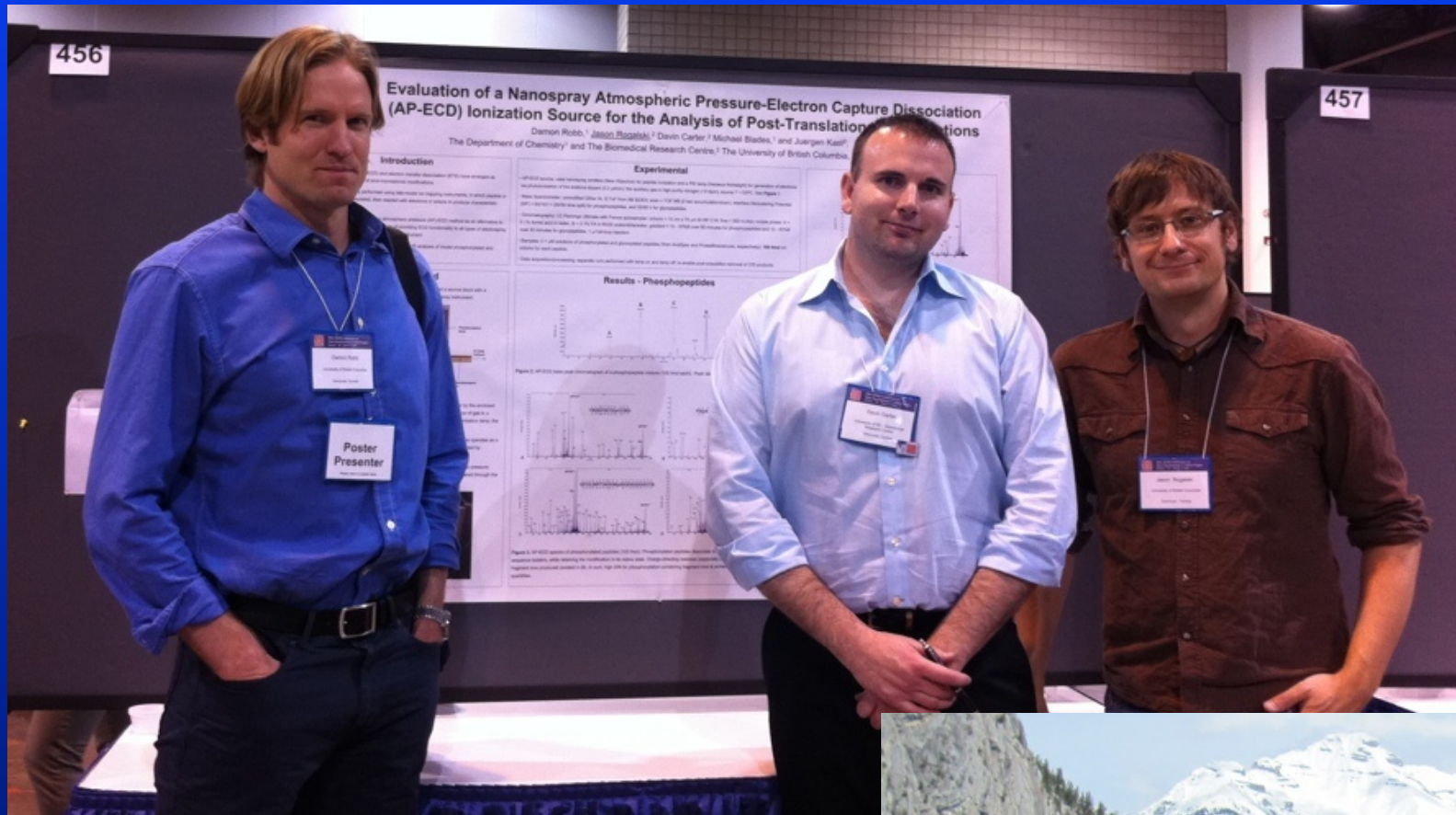
HW improvements (U. Wuppertal and/or Ross)

Colby Methylation

J & J Pharma (glyco and phosopho)

Acknowledgements

Kast Lab



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