Nonlinear Ion Dynamics, LLC

A comprehensive stable isotope separation business

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NID,LLC

2008

Facility

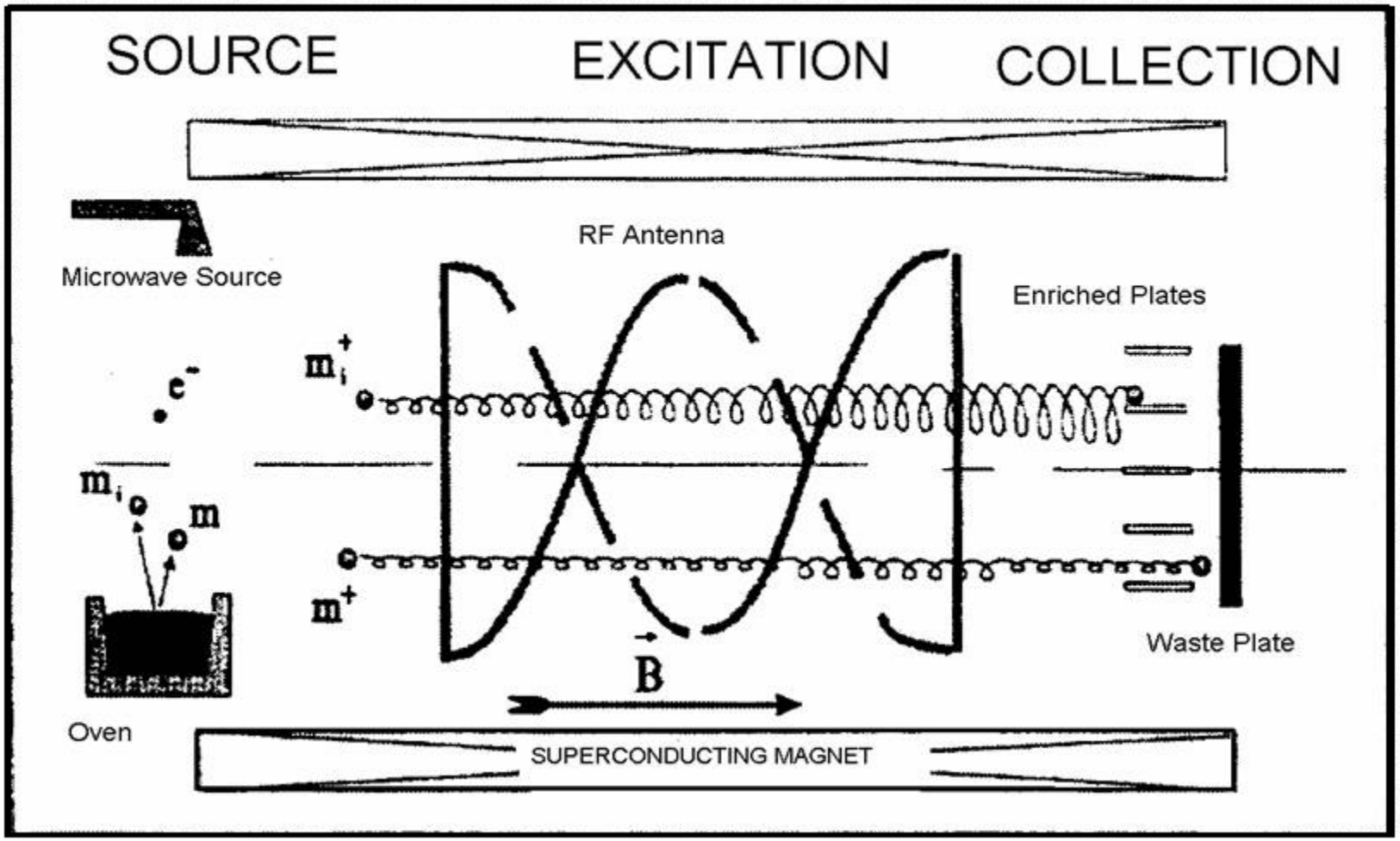
Producer of Enriched Stable Isotopes

Nonlinear Ion Dynamics, LLC
– 20,000 square feet space

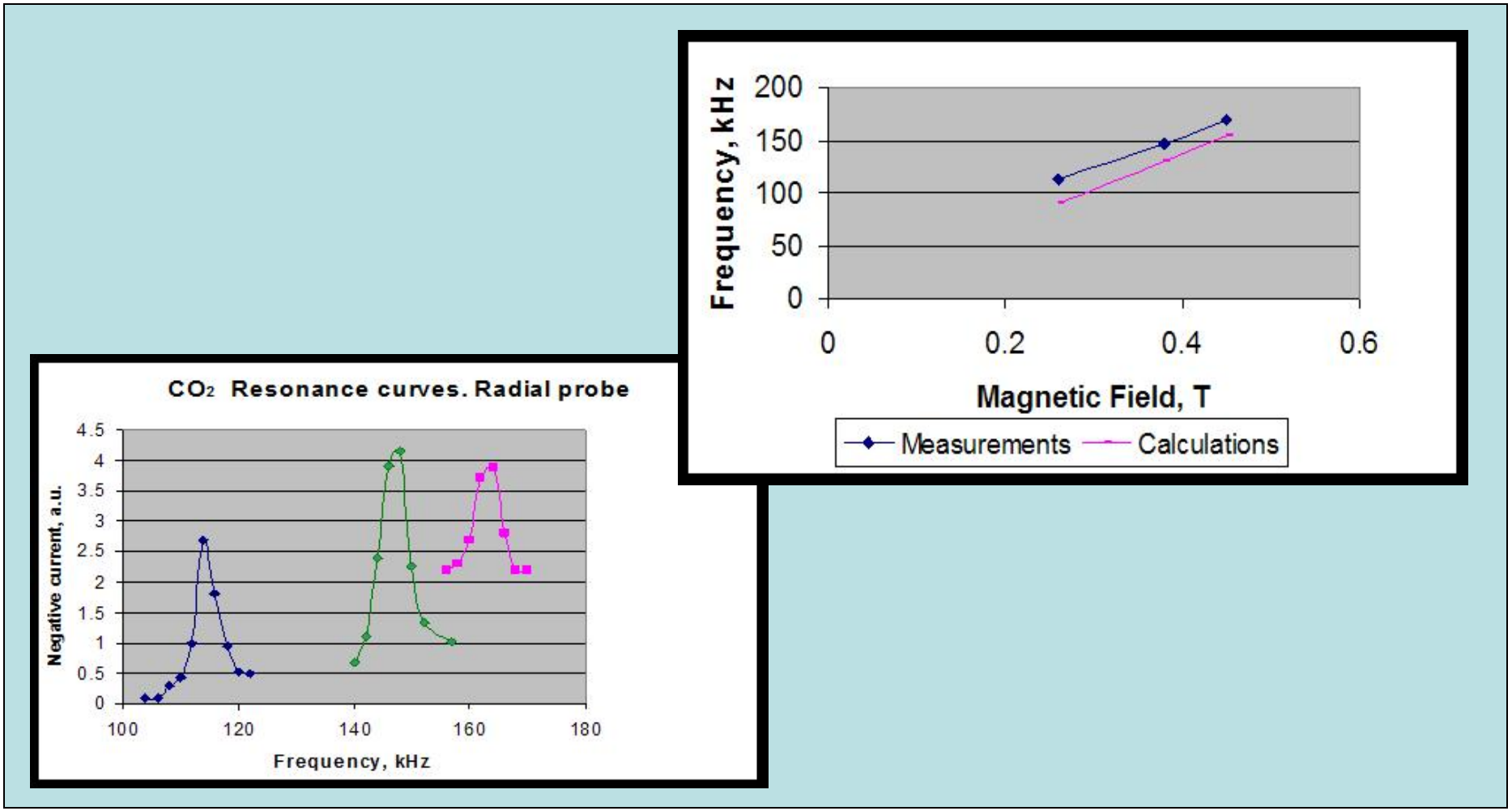
stable isotope separation device

Lab Superconducting magnetized device for separation of Ion species according to by their on cyclotron frequencies

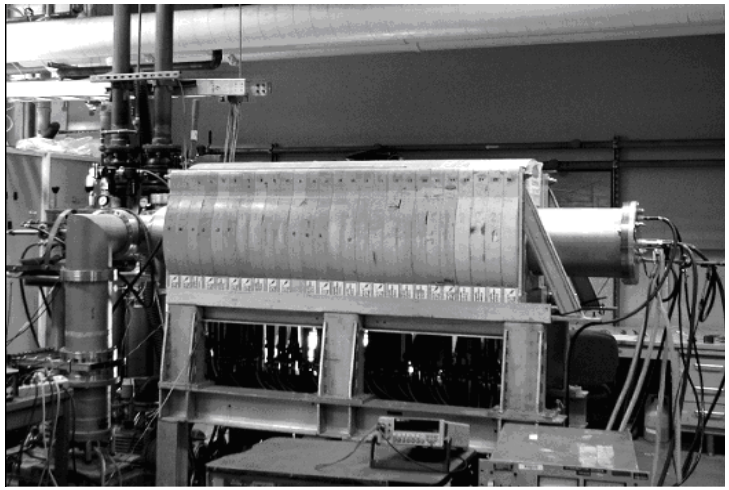
Laboratory Expts showing selective ions accelerated at their cyclotron frequency

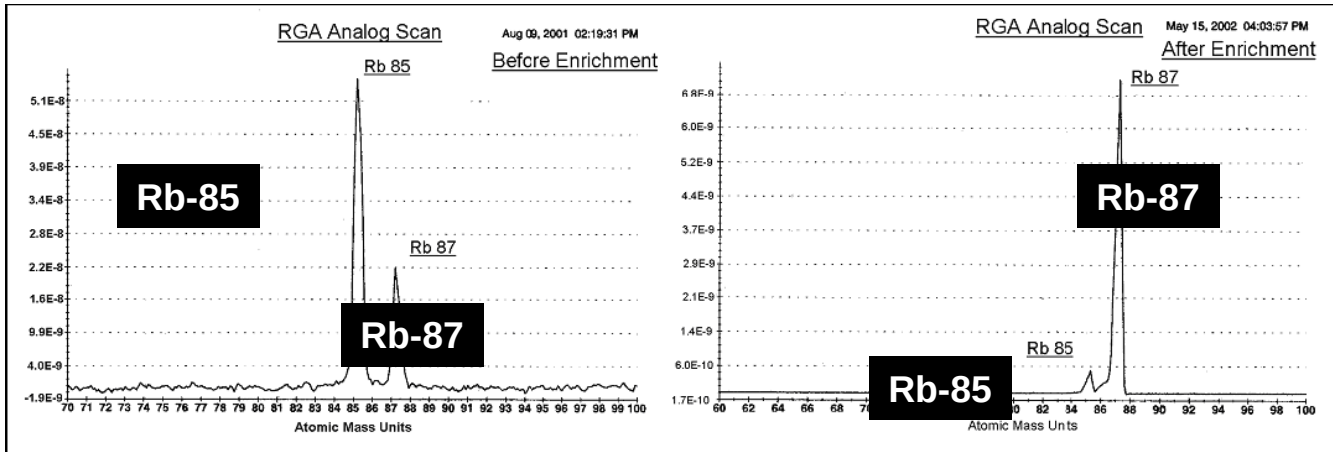


Observed Laboratory ejection of CO2- , minority species, along divergent magnetic field at one end, for three different B fields at the center of the lab device.



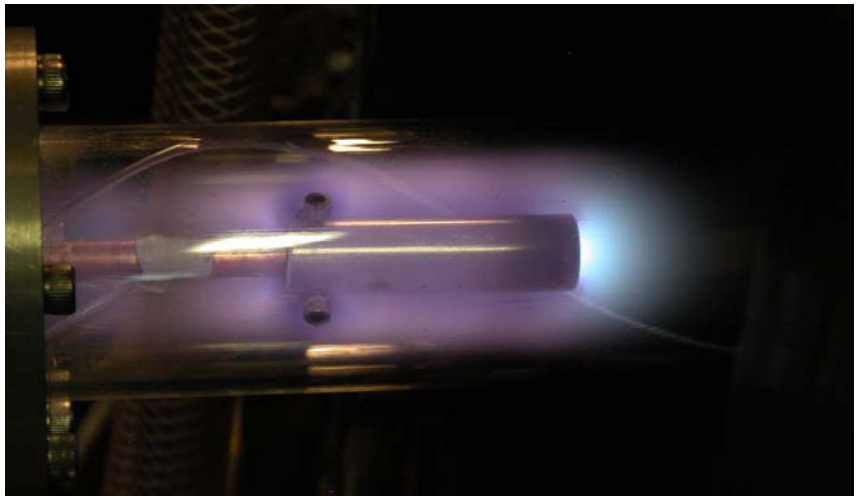
Prototype and Proof of Principle

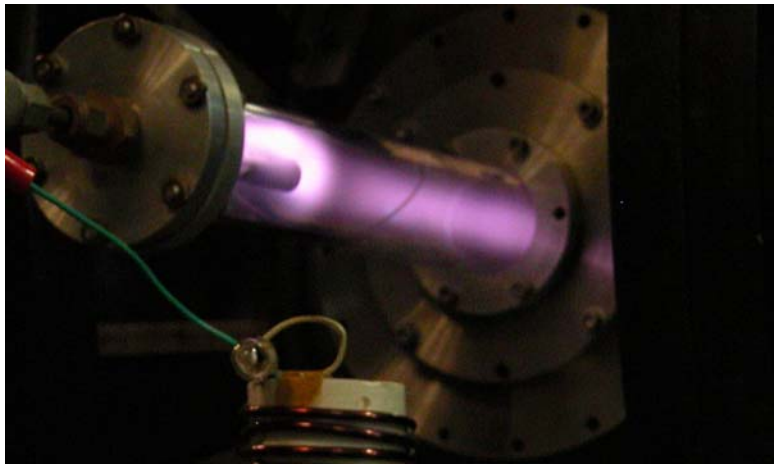




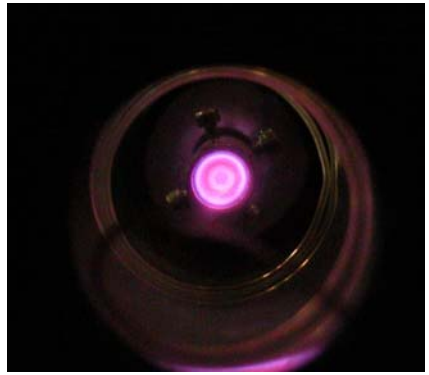
Enhancement of Rb-87 from the natural 27.83% (left) to 96% (right) from the prototype device (top)

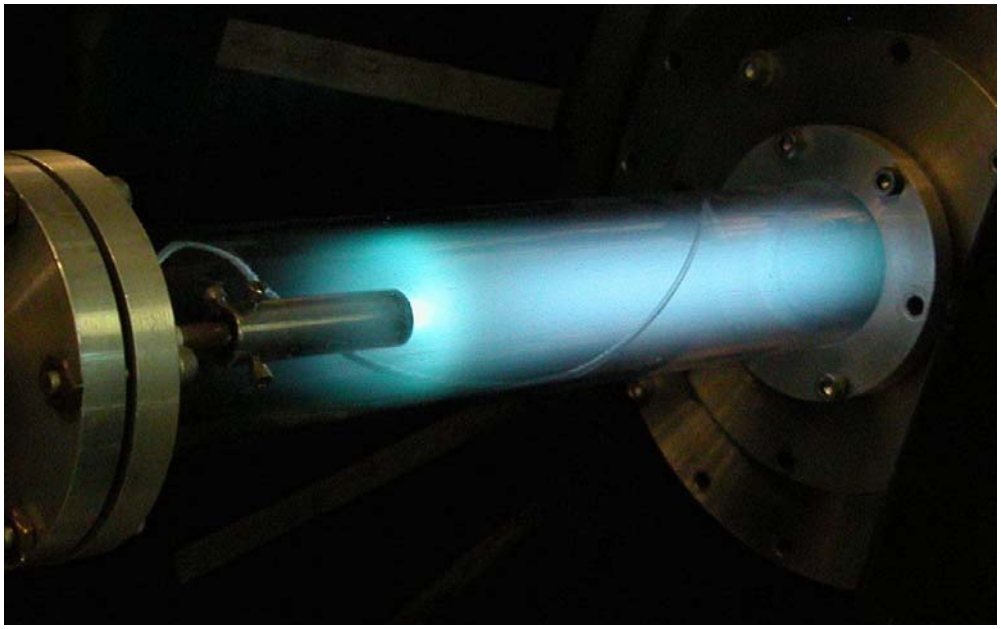
RF Discharge Pictures of 5 gases 5/28/08



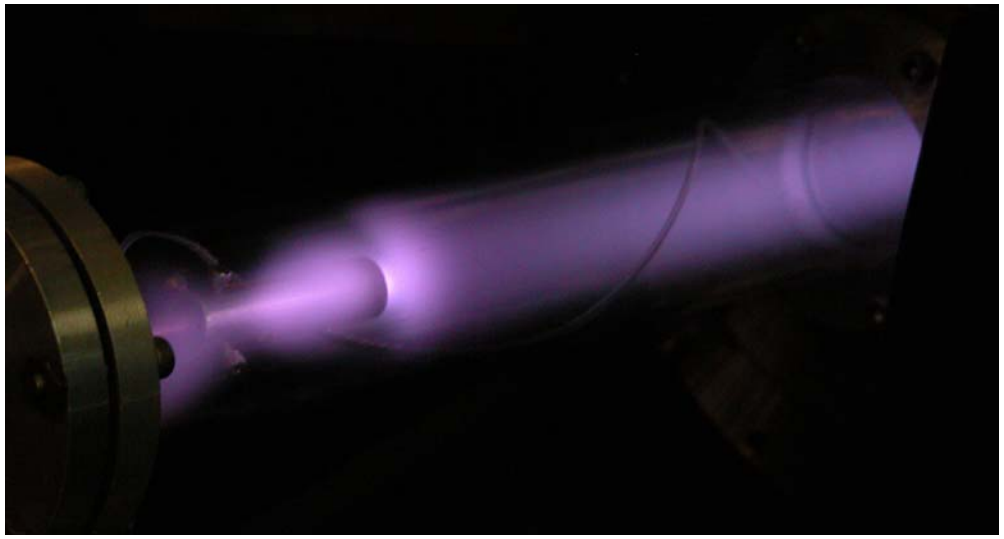


Argon

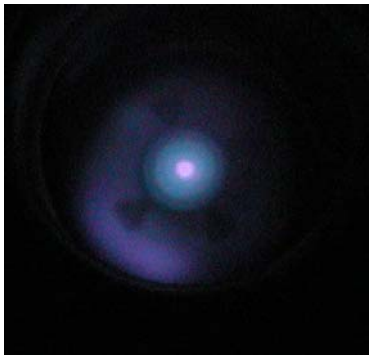


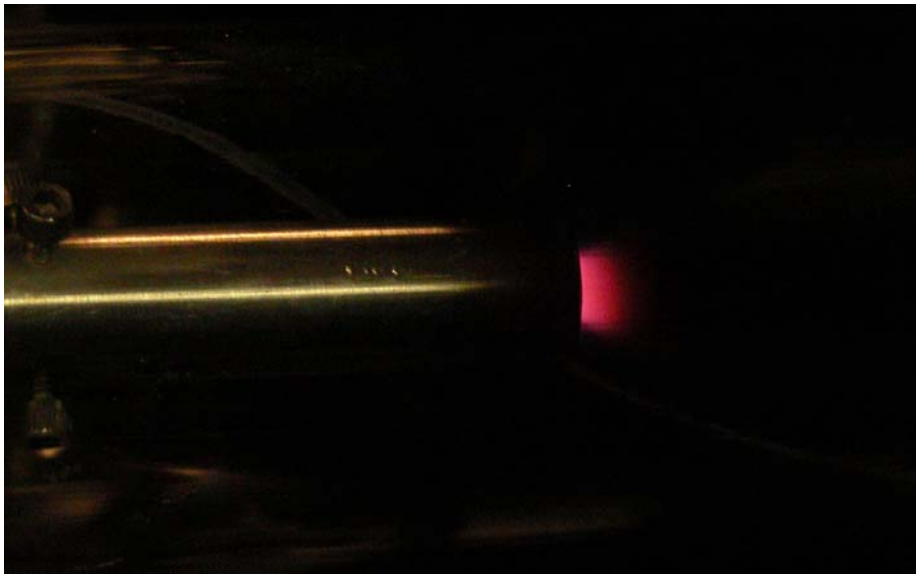


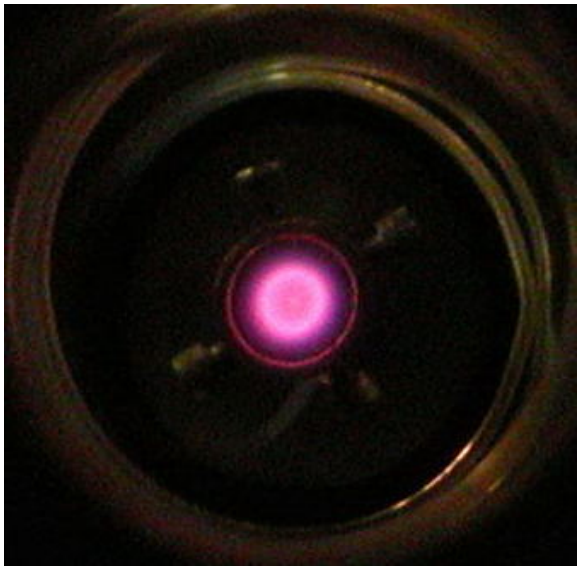
Helium



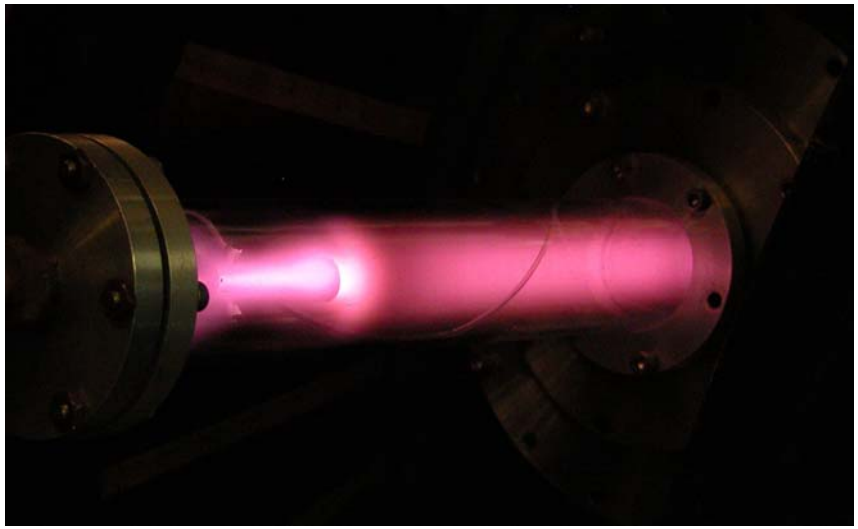
Xenon







Krypton



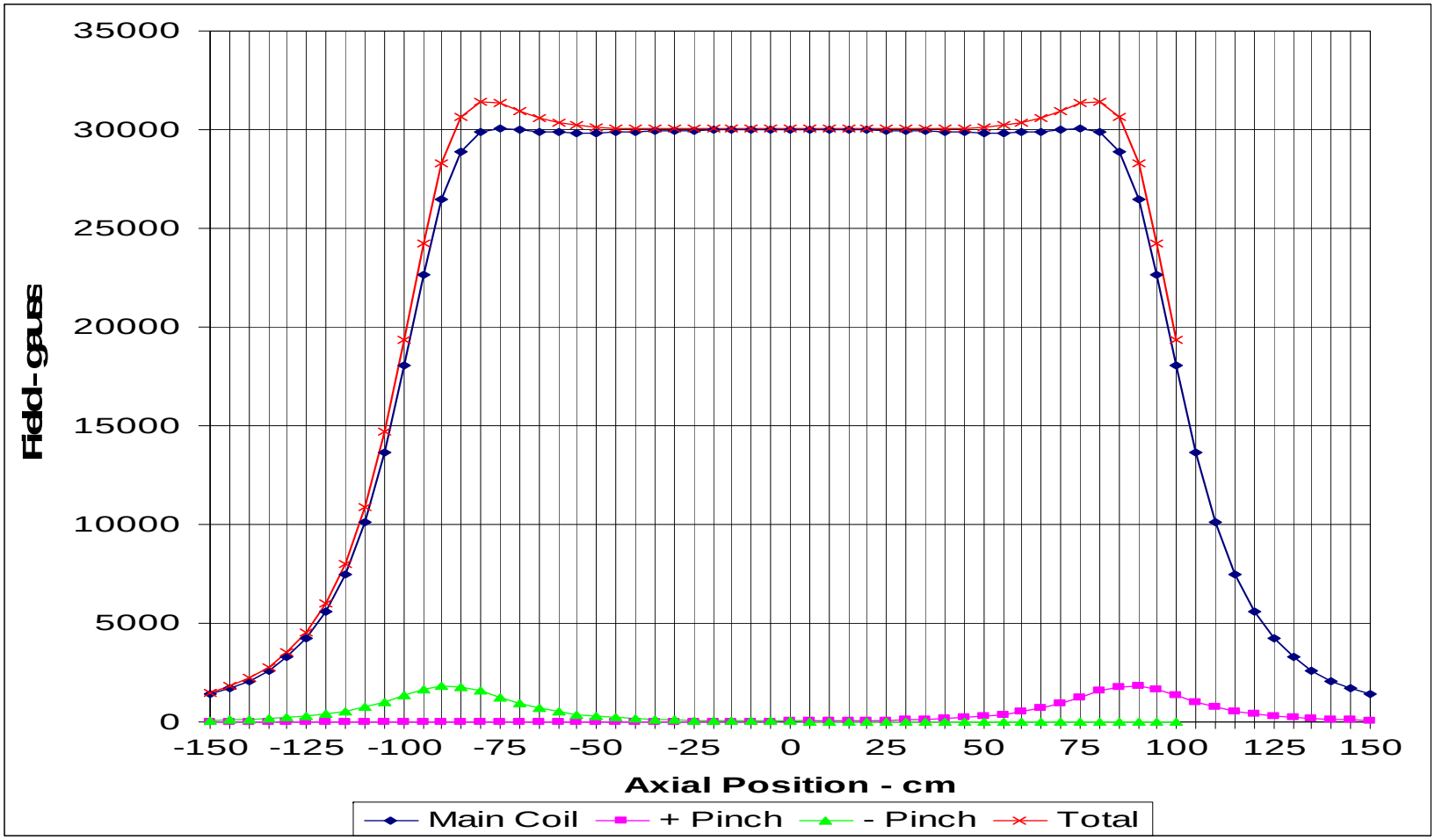
Nitrogen

Device Parameters

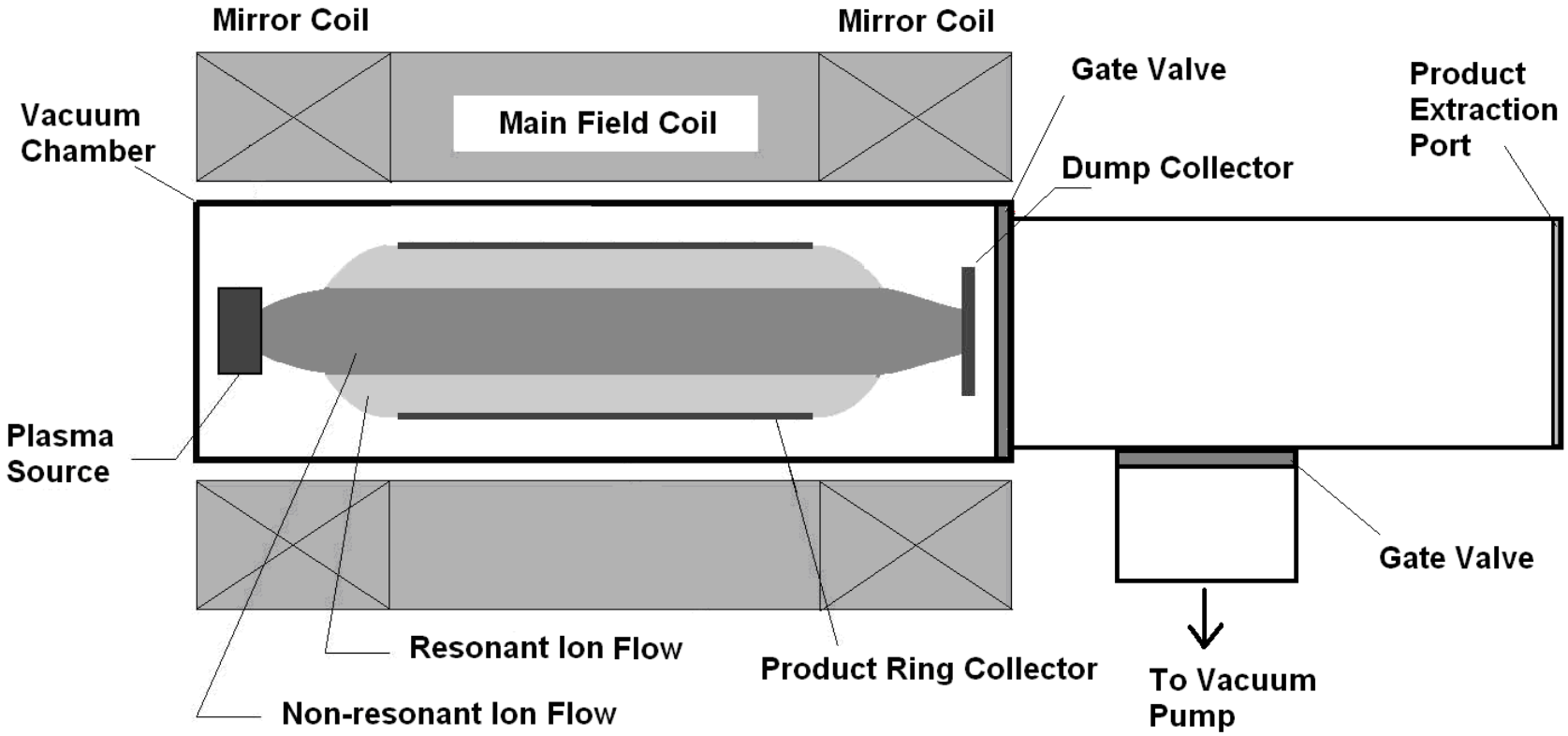
- Plasma density ~1×10^{14} cm^{-3}
- Ion temperature ~2 eV
- Ion drift rate 98,000 cm/sec
- Plasma diameter 1 m
- Particle flux 7.7×10^{22} sec^{-1}
- Throughput 92 kg/hr
- Device length ~5.5 m
- Magnetic field 4 T
- Electron gyro frequency 90 GHz
- Ion gyro frequency ~30 kHz

* Assuming average mass of 200.

Magnetic Geometry



Double-Mirror MPEP



Schematic of the double mirror collection system, which is featured with increasing magnetic fields on both ends of the device. The resonant particles with higher perpendicular energy are reflected by both mirrors and are trapped inside the separation region. The non-resonant particles travel directly through the device to the dump collector.