

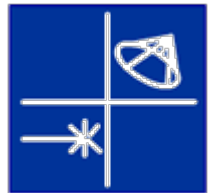
# PIXE PAN 2007



NUCLEAR STRUCTURE LABORATORY

# ISNAP

UNIVERSITY OF NOTRE DAME



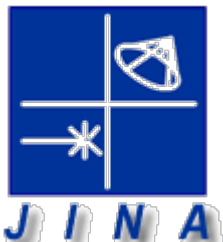
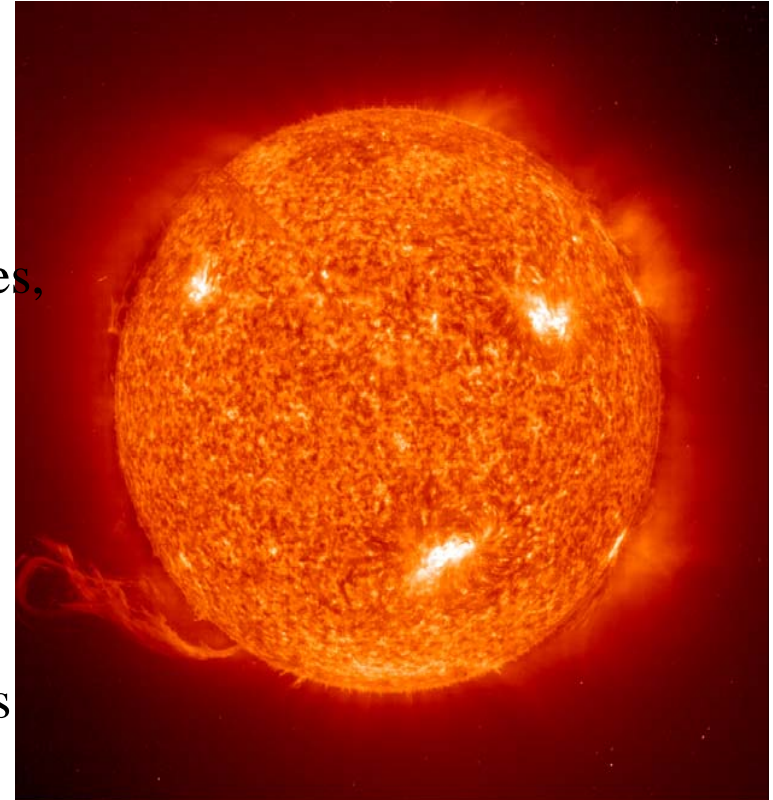
**J I N A**

*The Joint Institute for Nuclear Astrophysics*

[www.JINAweb.org](http://www.JINAweb.org)

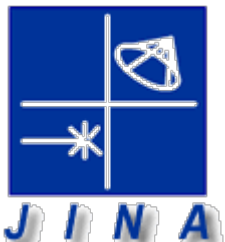
# Purpose of the Lab

- Nuclear Structure
  - Determine physical characteristics of individual isotopes (mass, level schemes, half lives)
- Nuclear Astrophysics
  - Recreate stellar conditions to help determine the origin of the elements
- Radiation Chemistry
  - Studies the effect ionizing radiation has on various molecules
- Other Various Projects

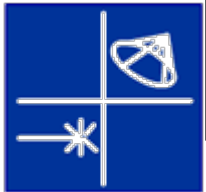
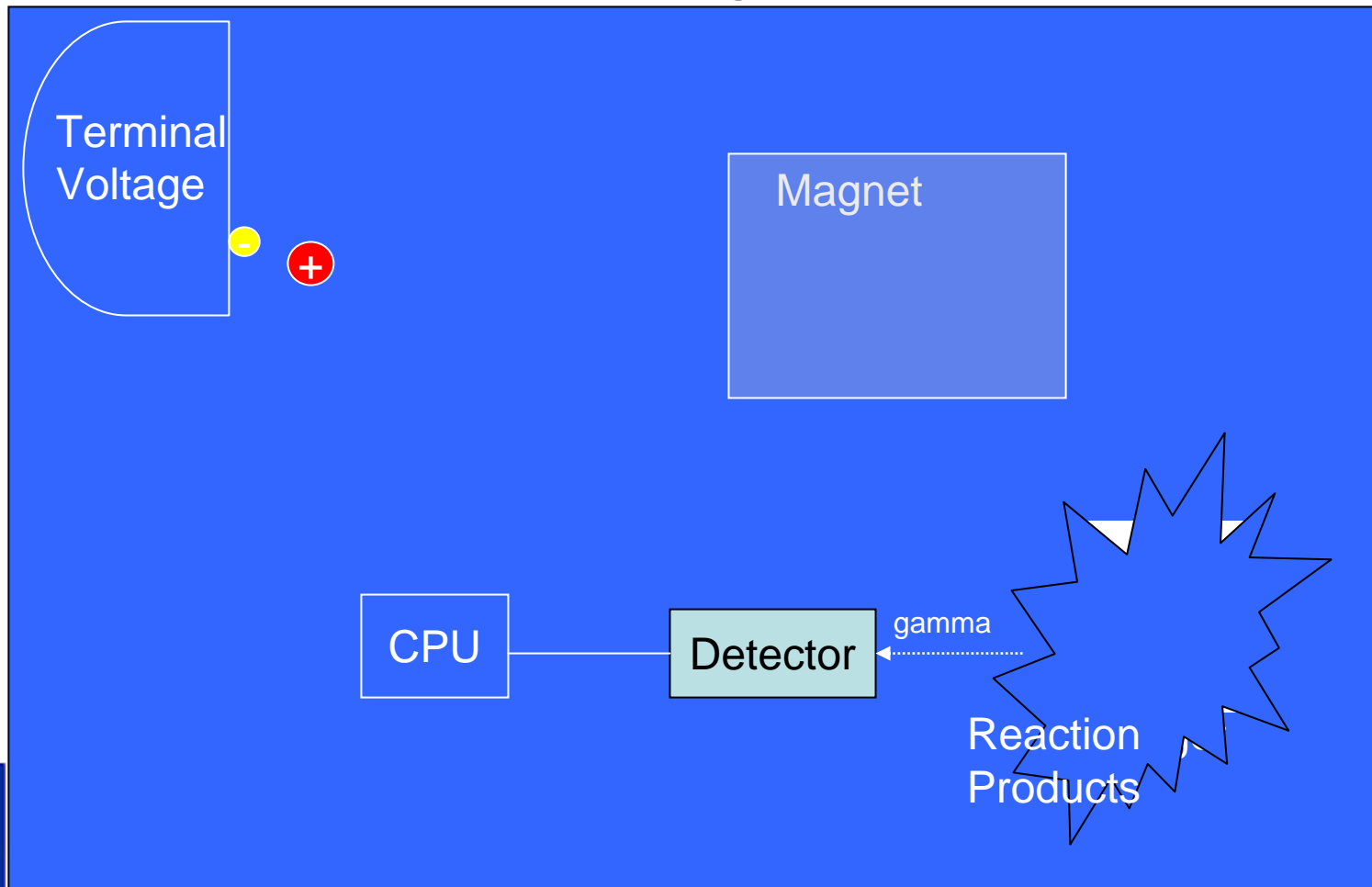


# How to make a Nuclear Reaction

- Create High Electrical Potentials
- Use these to provide kinetic energy to charged particles (nuclei)
- Direct these particles so they interact with desired target material

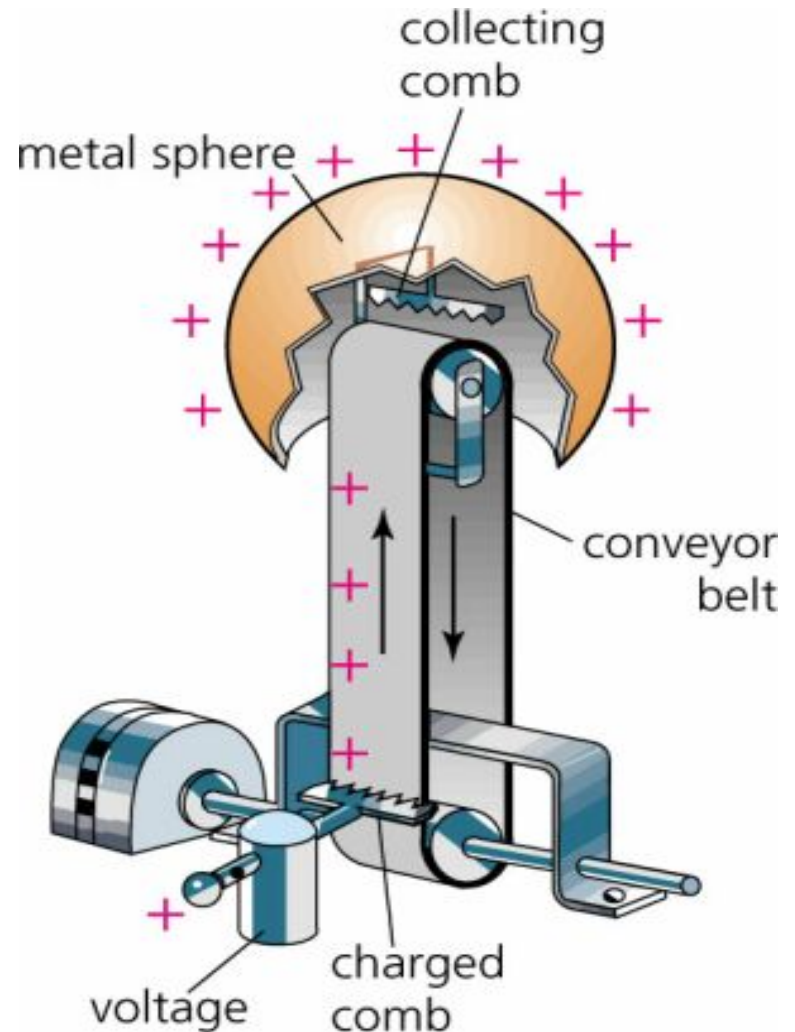


# The General Idea:



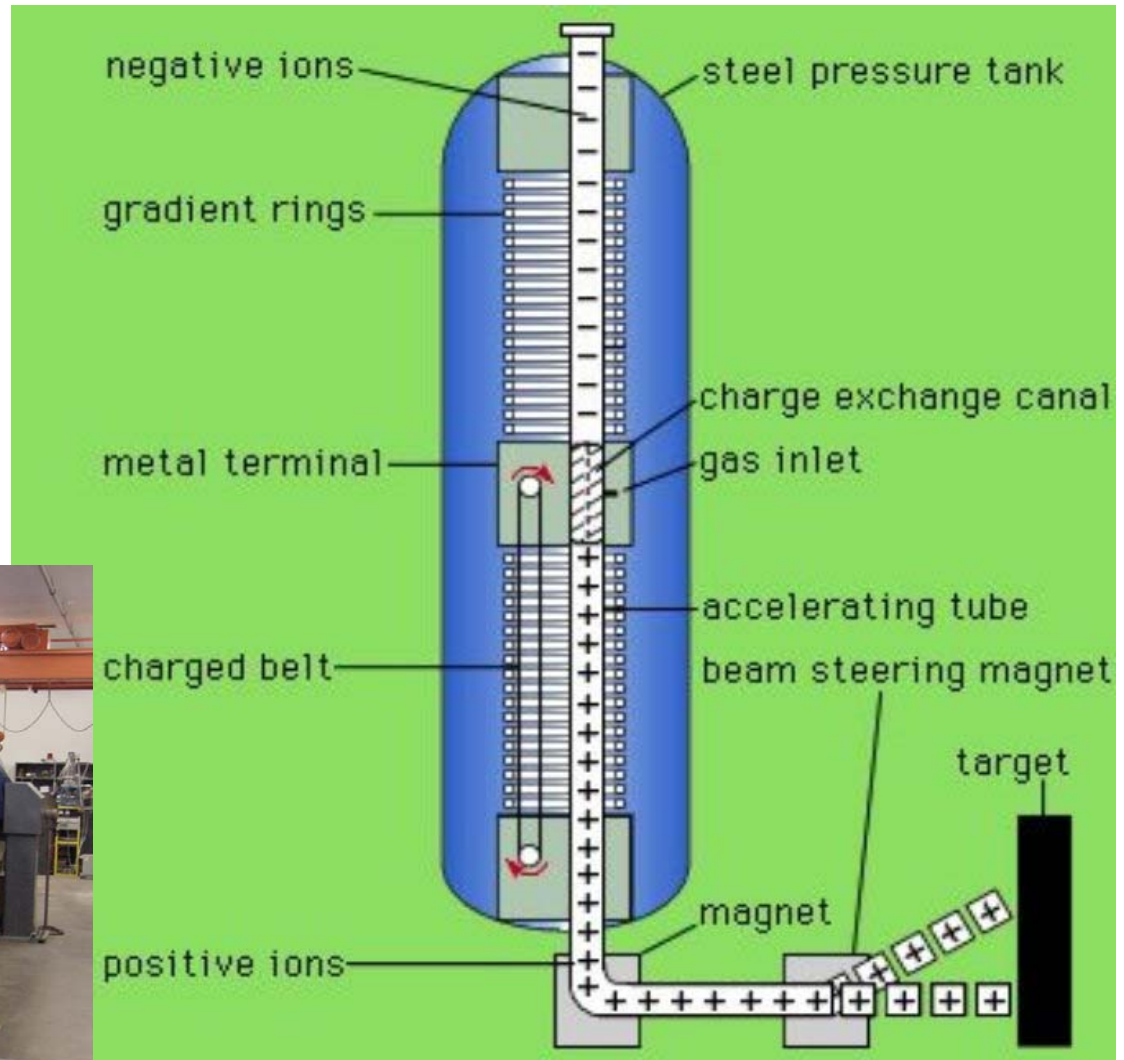
# The Van de Graaff

- Our accelerators are based upon Van de Graaff Generators first developed by Robert Van de Graaff in the early 1900's
- Very High Voltages can be achieved with this method
  - JN 1 Million Volts
  - KN 4 Million Volts
  - FN 10 Million Volts



# From Generator to Accelerator

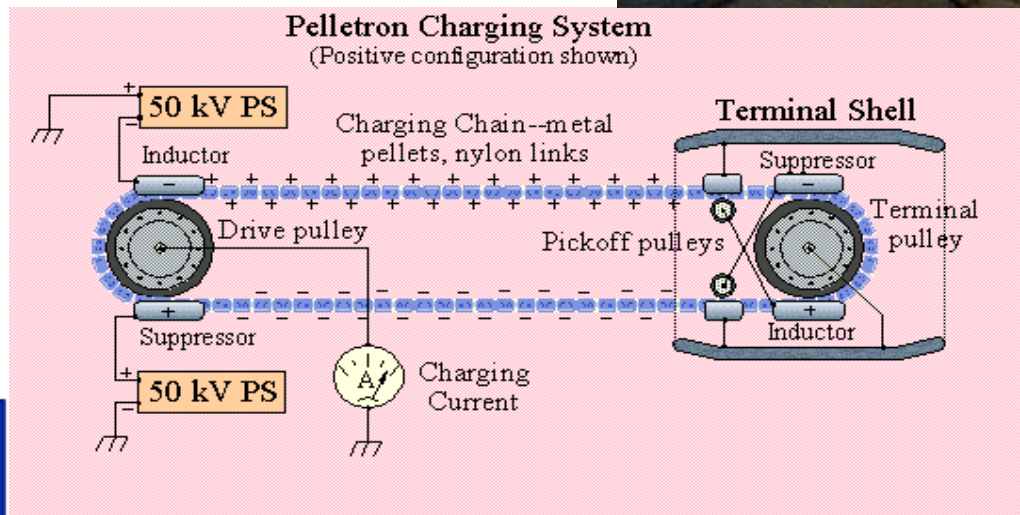
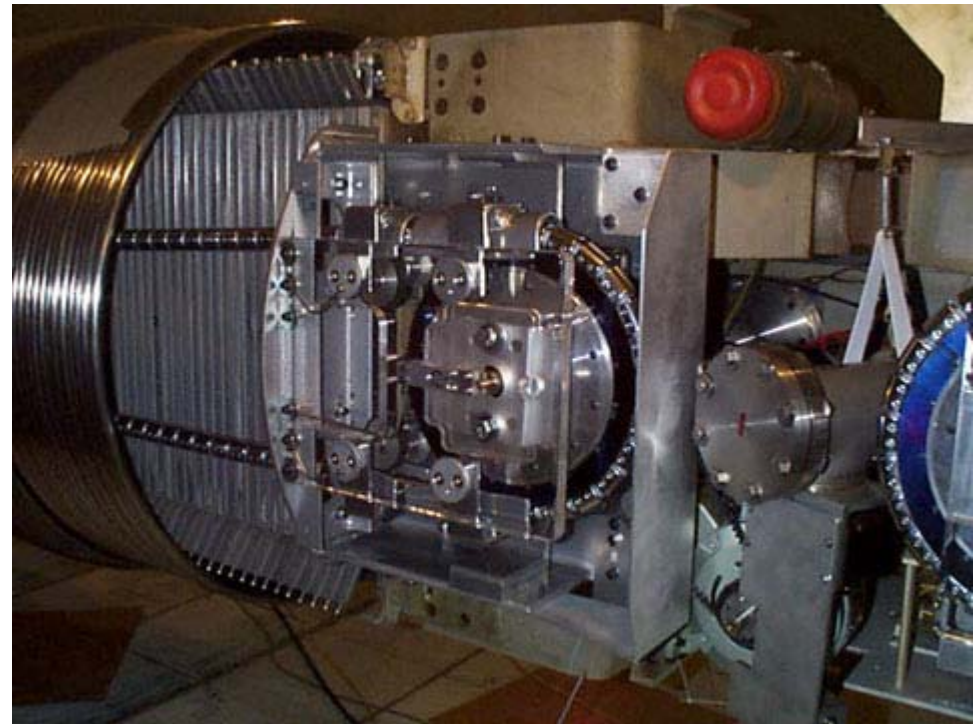
- Need to provide a evacuated path for the ions
- Need to be able to provide a stable yet variable terminal voltage
- Need to provide a smooth gradient from the terminal



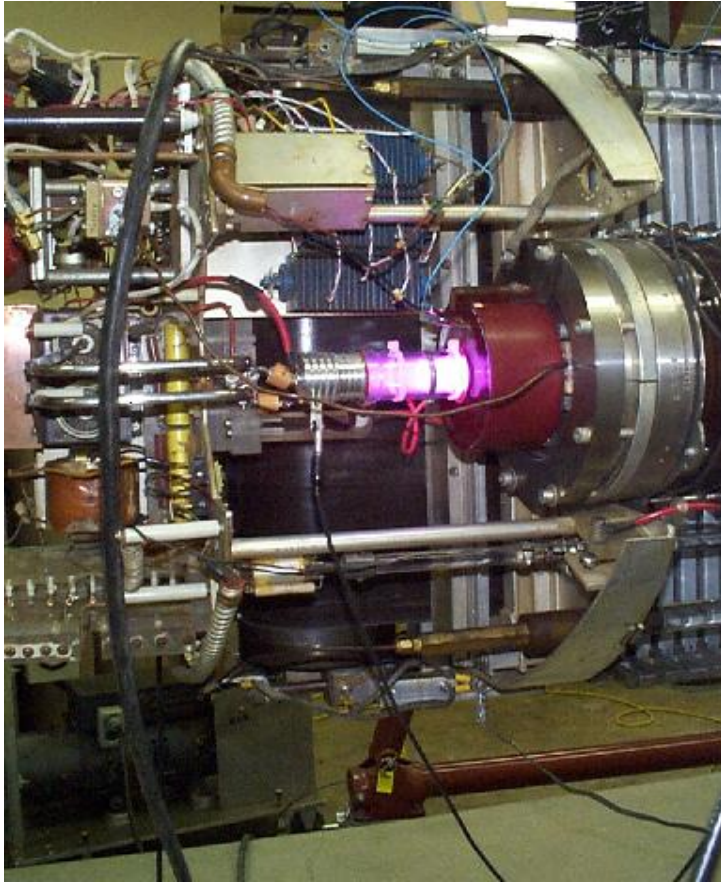


# The Pelletron

An improvement over the belt based charging system by NEC which is used in our FN.



# Making Beam

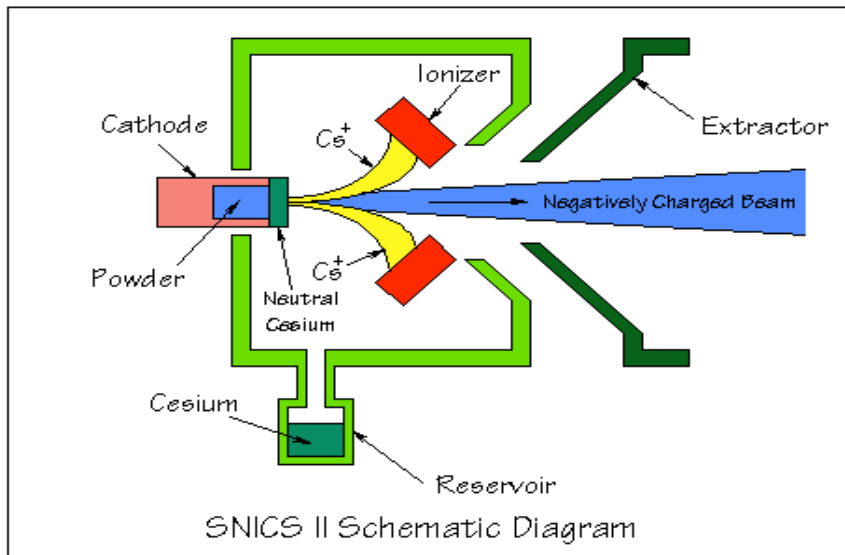
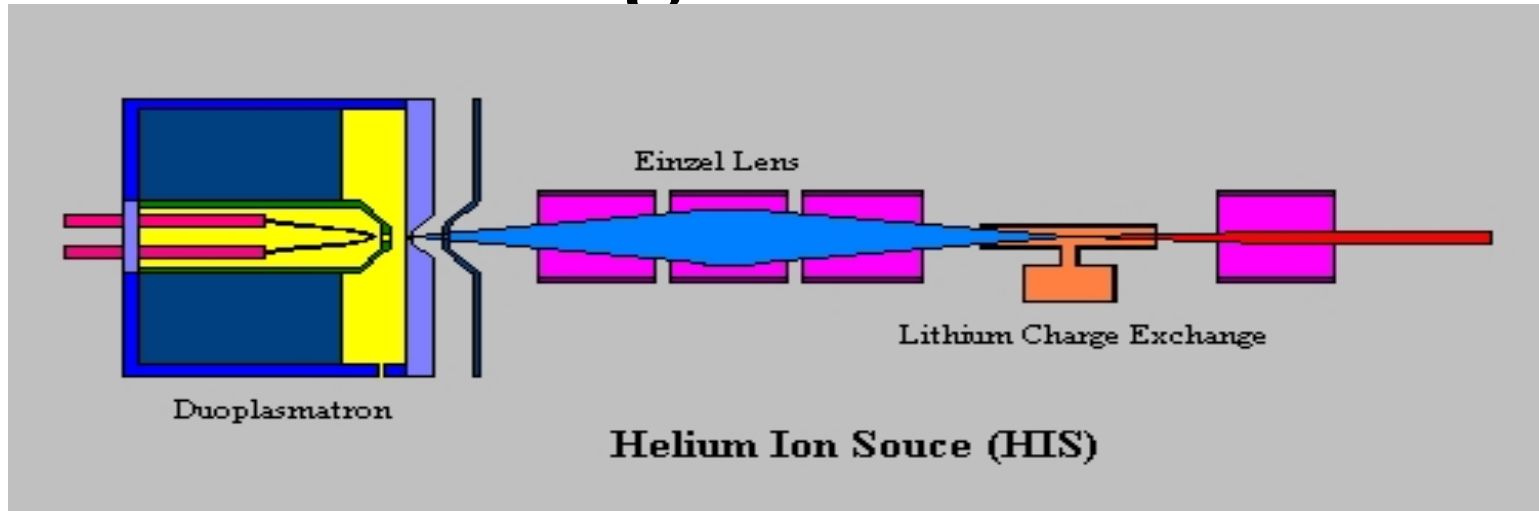


Single Ended machines use  
RF Ion Source

- Uses Gases typically H or He
- Produces Positive Ions
- Ion Source Inside Tank

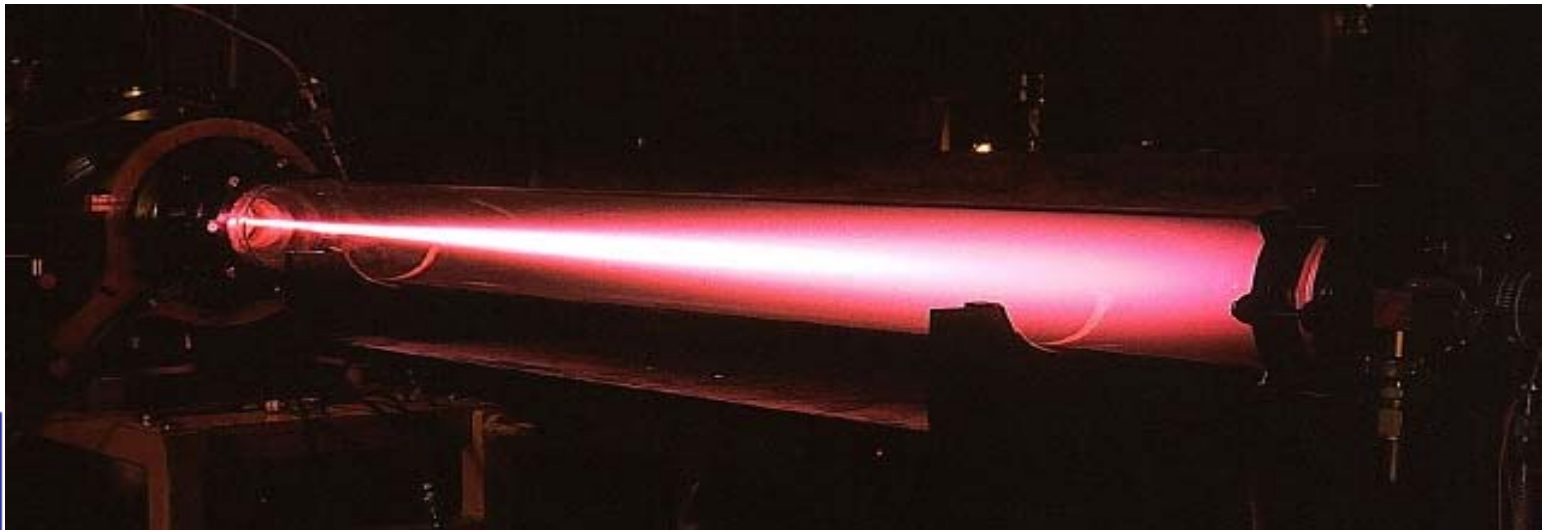


# Making FN Beams



- Makes Negative Beams
- Outside of Tank

# What Does The Beam Look Like?



# What Do Targets Look Like?



# Where am I?



# Words of Caution

- You do not have to worry about being exposed to radiation on your tour but for your own safety, please...
- **WATCH YOUR HEAD**, there are many low pieces of beamline on which to hit it
- **Watch Your Step**, there are also floor trenches and cables on which to trip

