A Small 200 keV Electrostatic Accelerator

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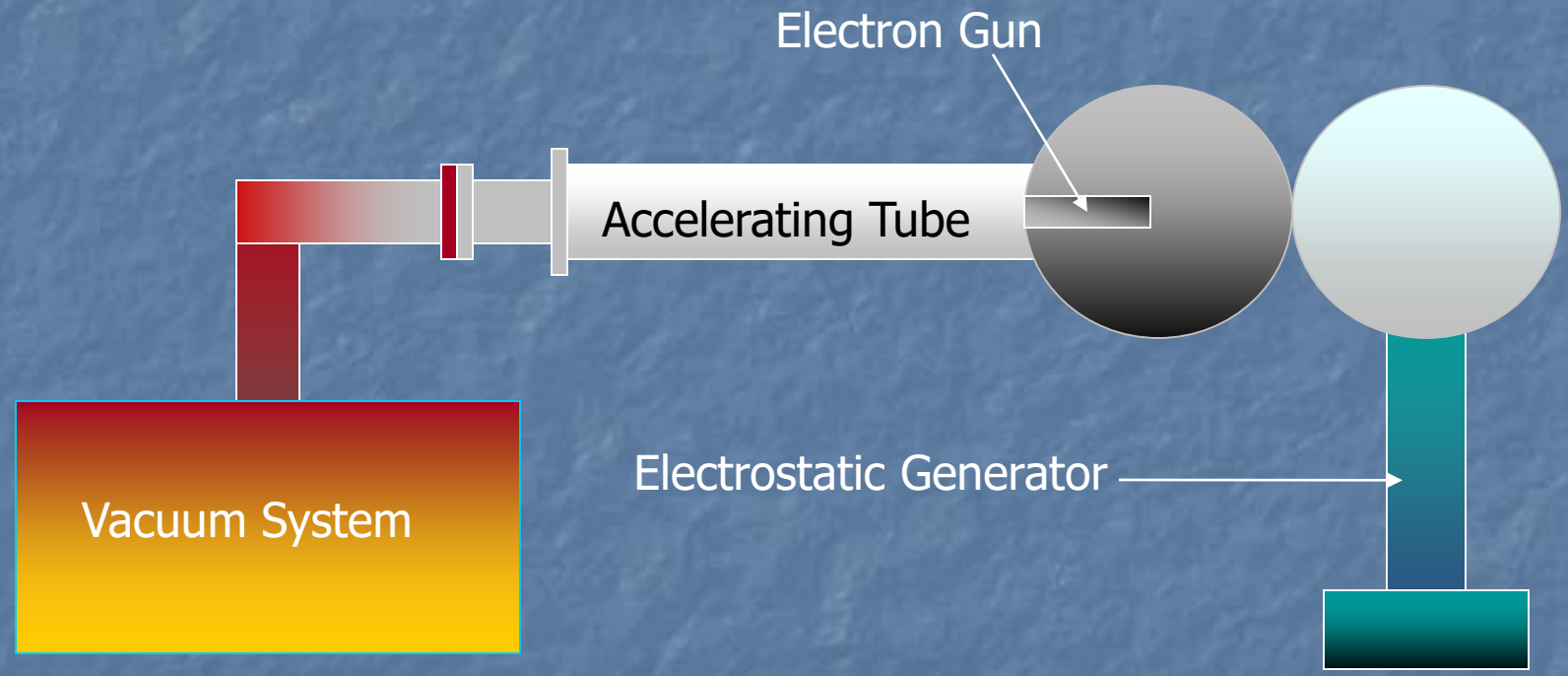
Why?

- Low energy scattering
- Nuclear structure
- X-Rays
- Neutron beams

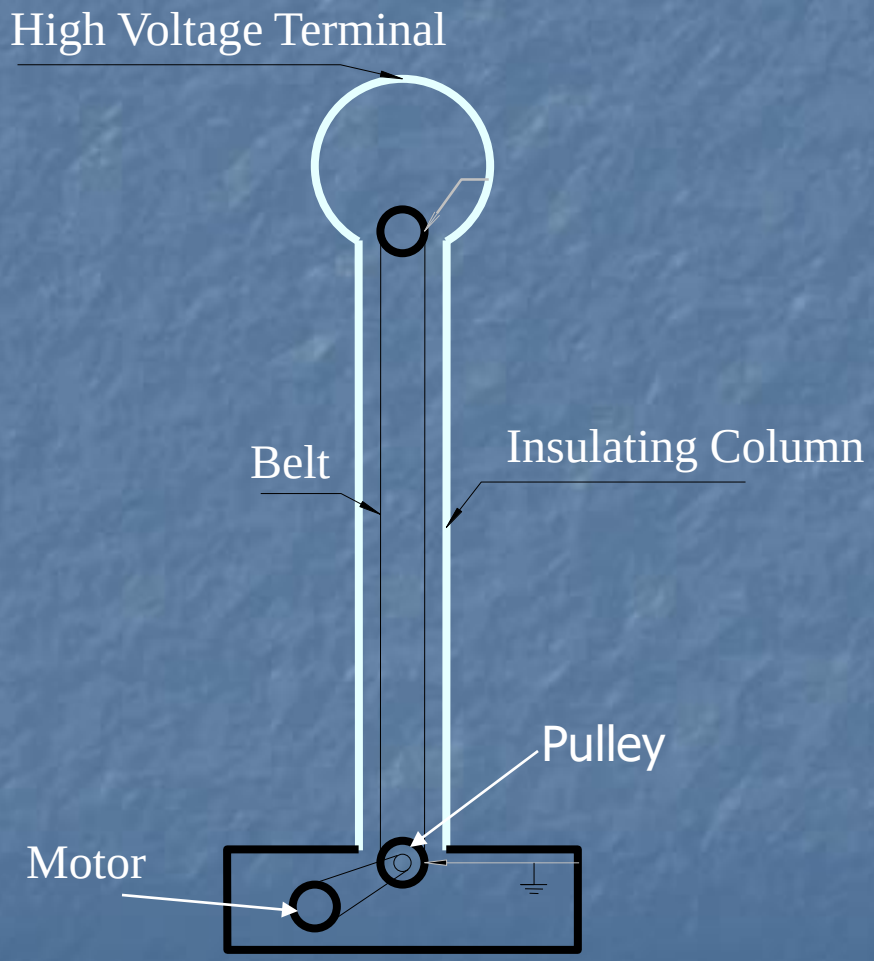
What is an Electrostatic Accelerator?

- An electrostatic accelerator uses a steady high voltage to accelerate particles.
- Advantages and Disadvantages

Simplified Schematic of Accelerator



Van de Graaff Generator



$Q = CV$

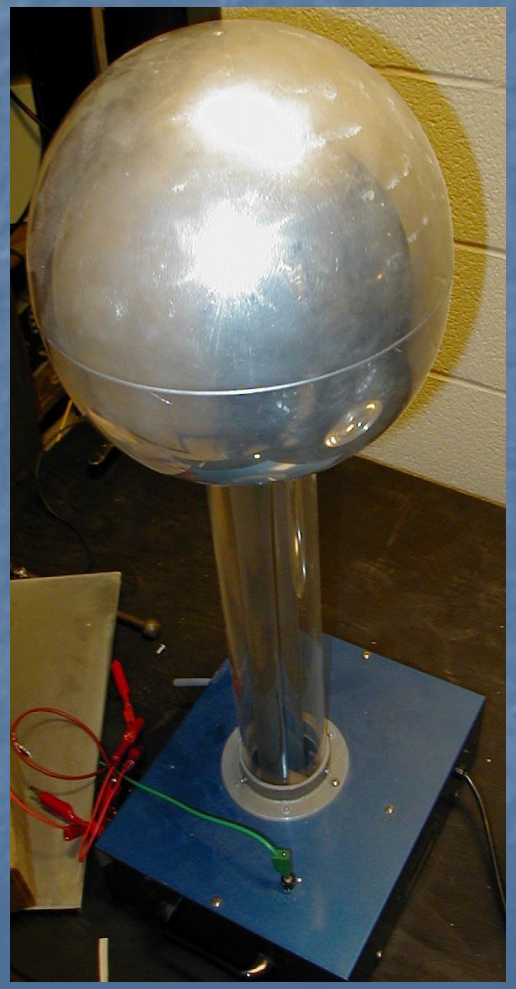
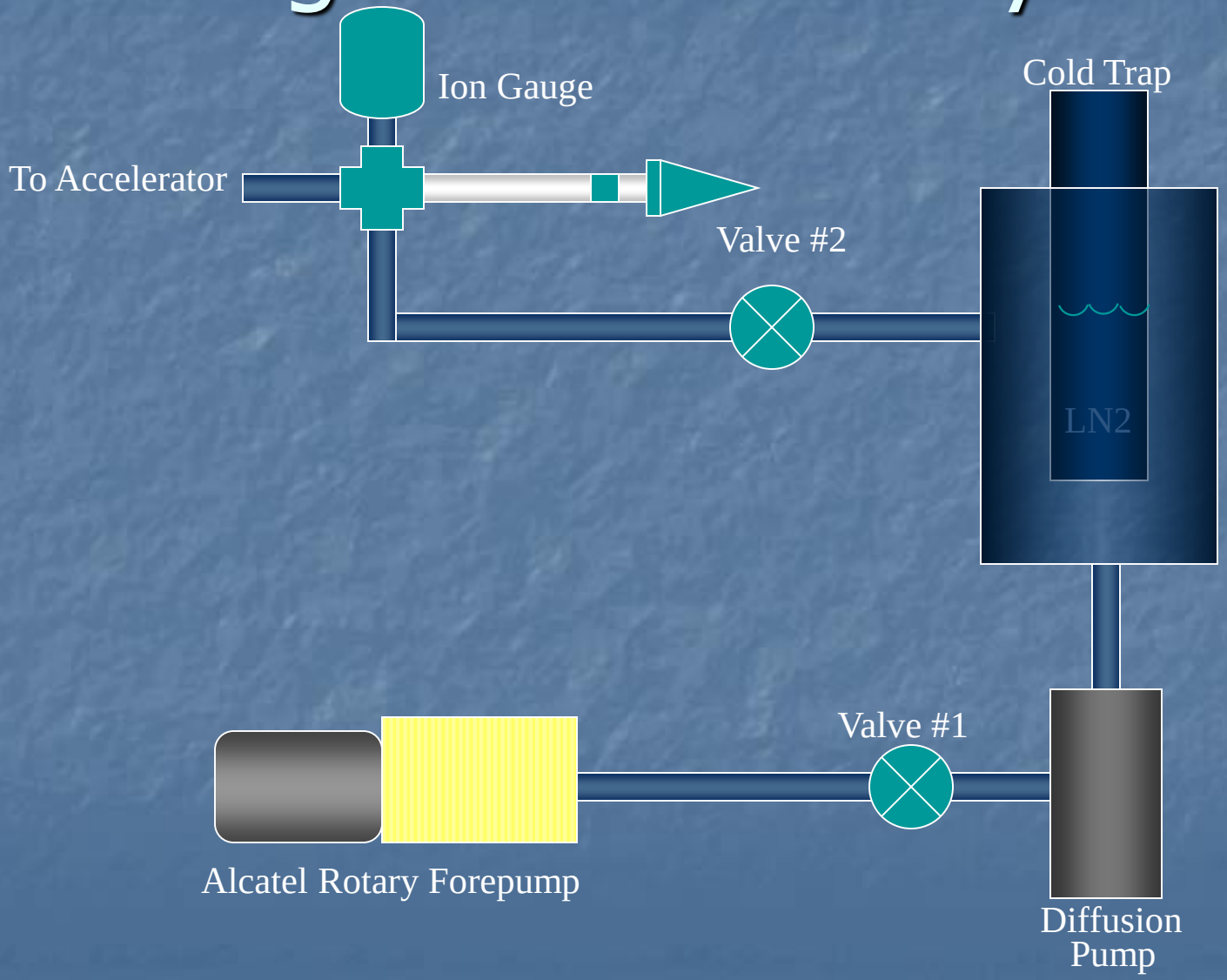
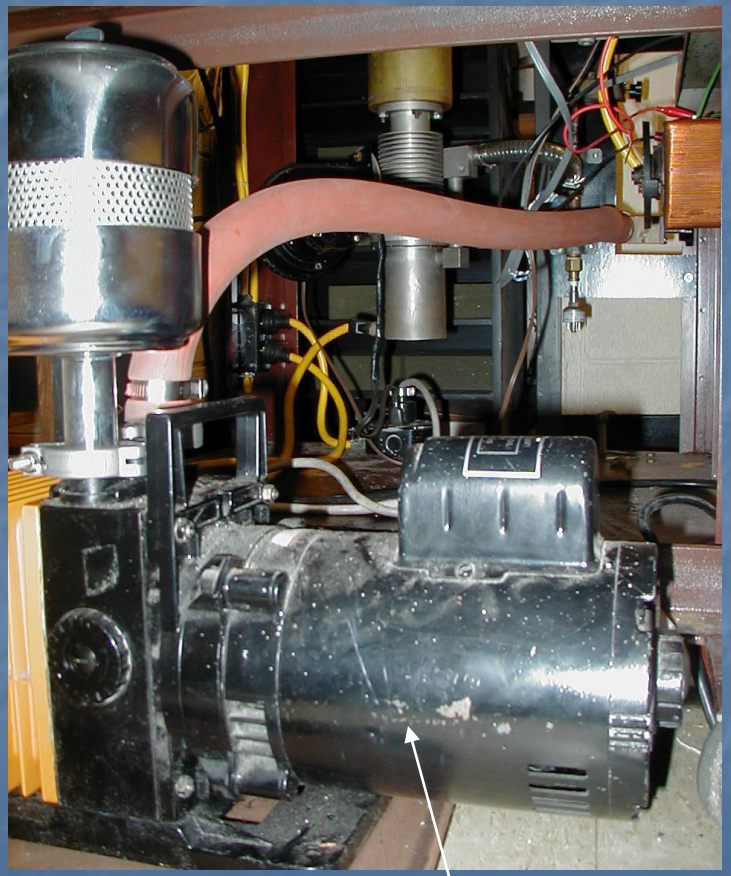


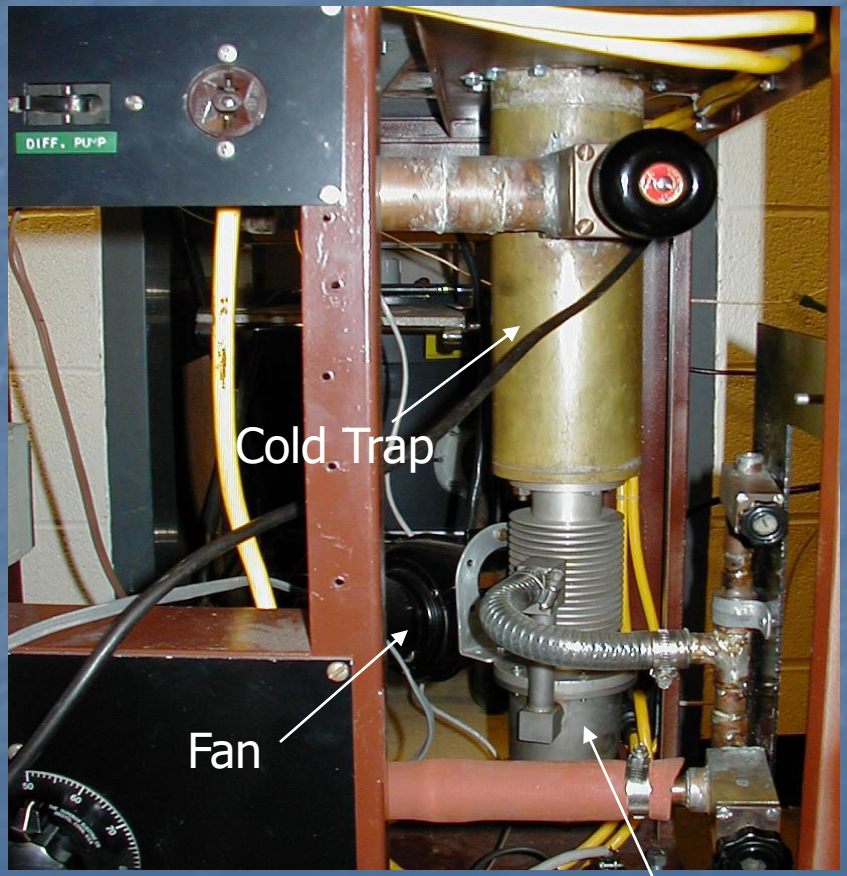
Diagram Vacuum System



Vacuum System

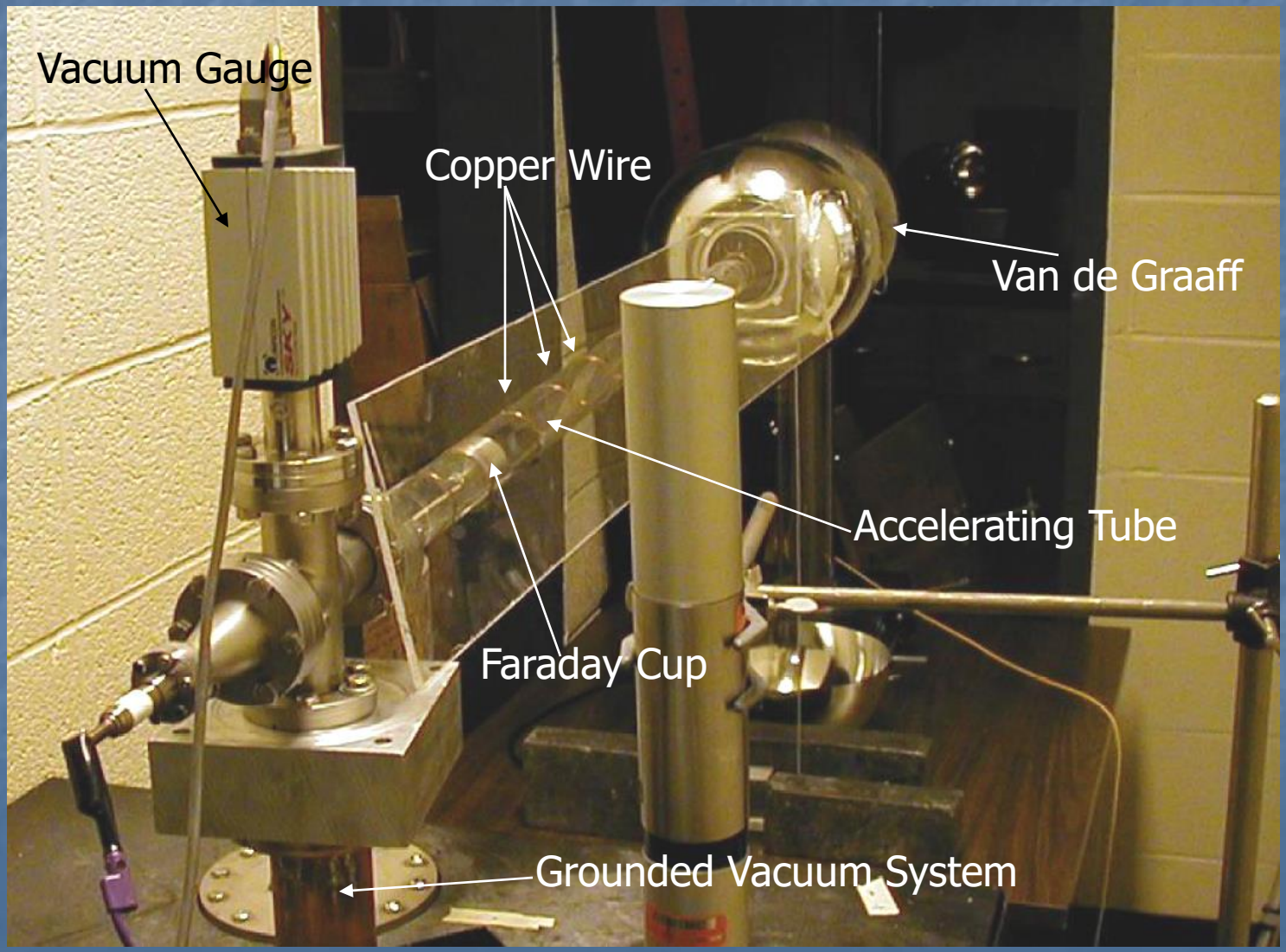


Forepump

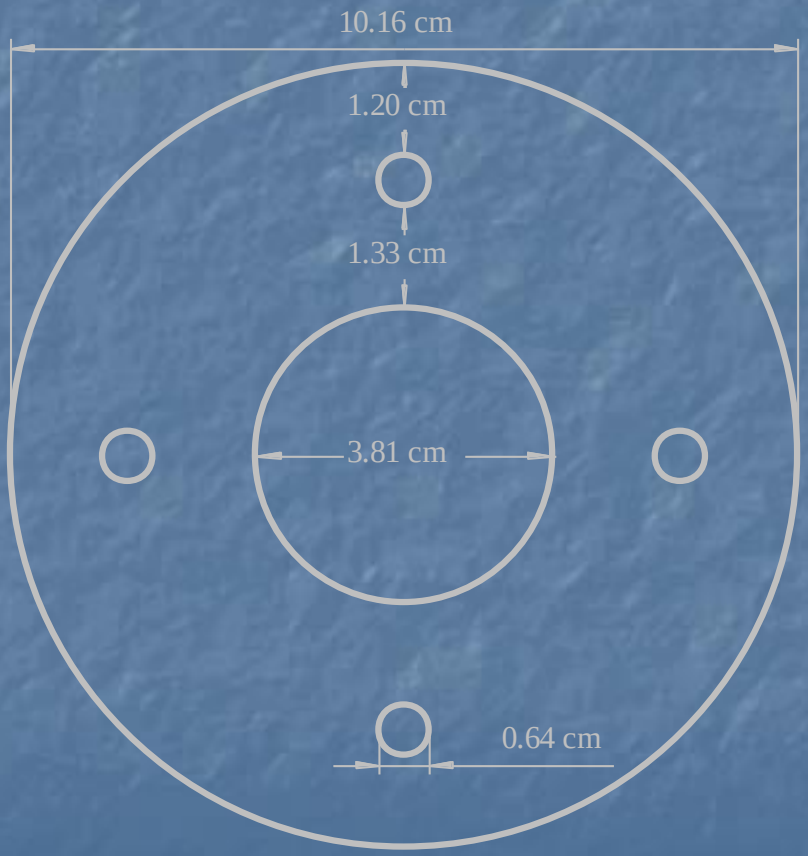


Diffusion Pump

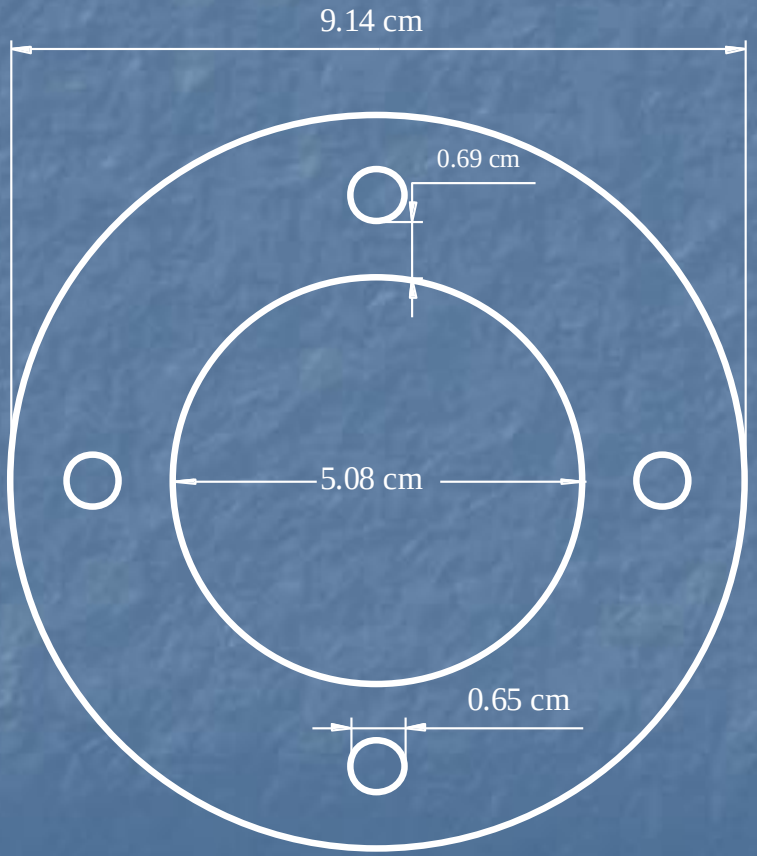
Preliminary Accelerating Tube



New Design for Accelerator Tube

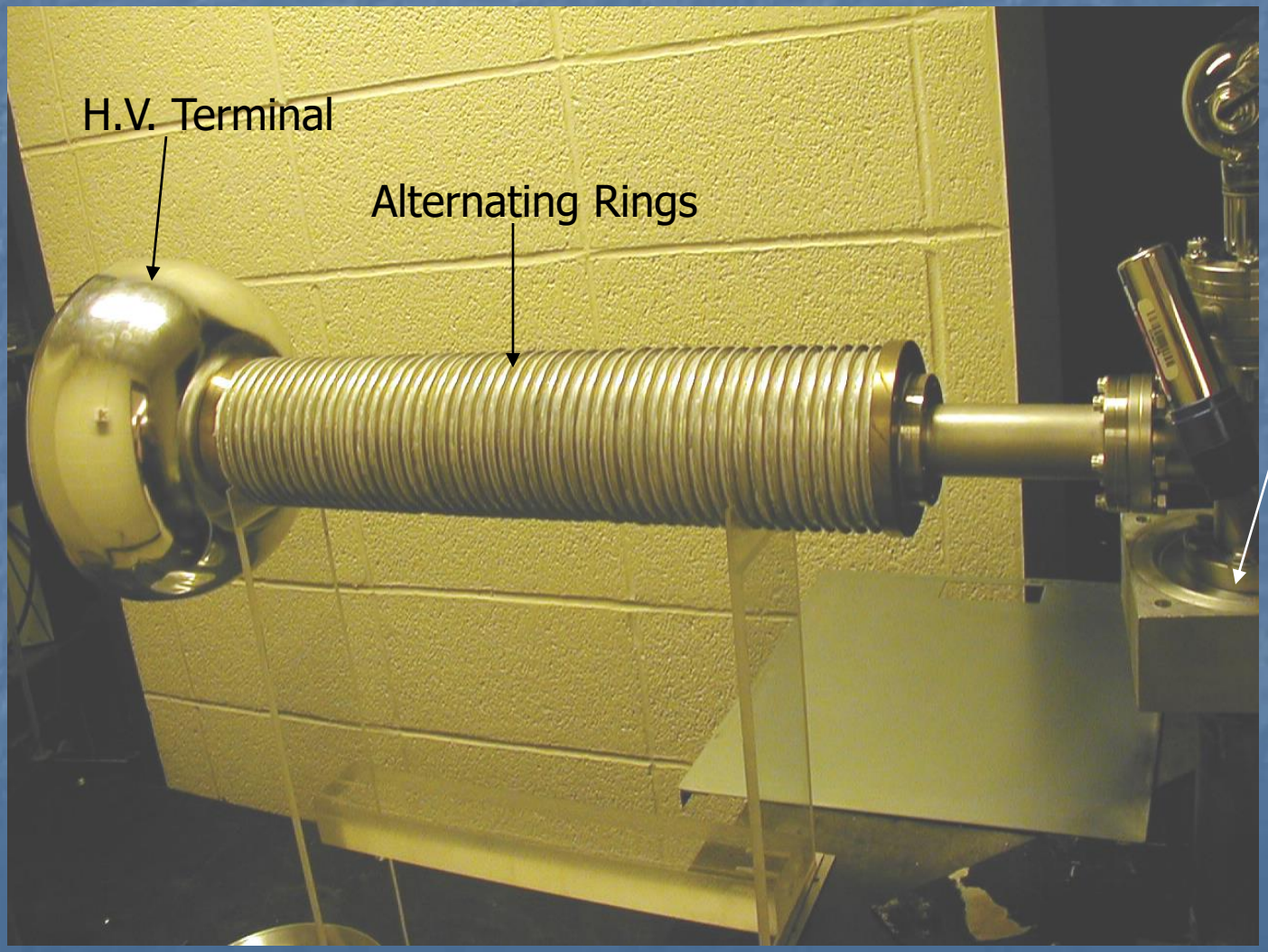


Aluminum Ring

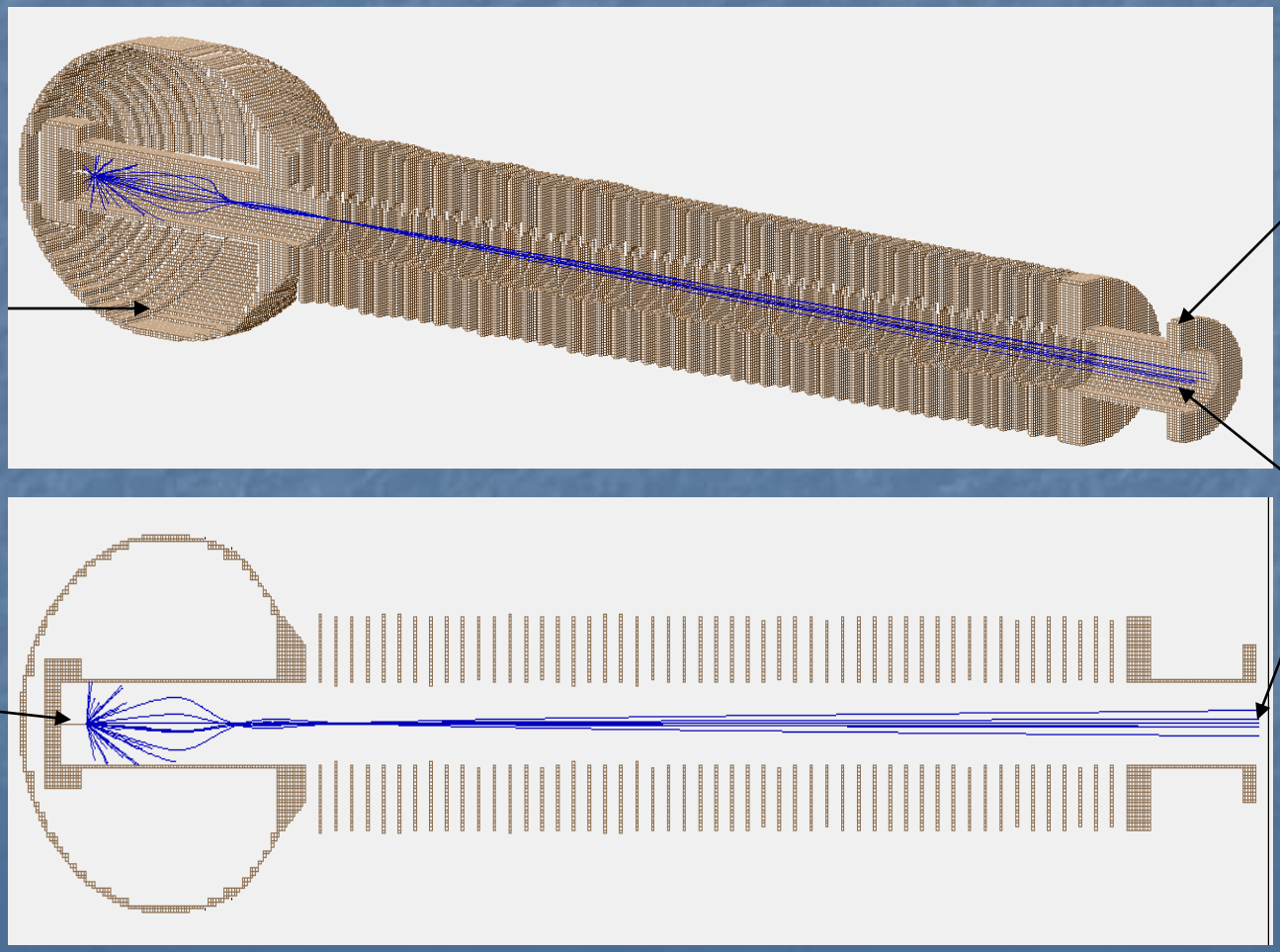


Plastic Ring

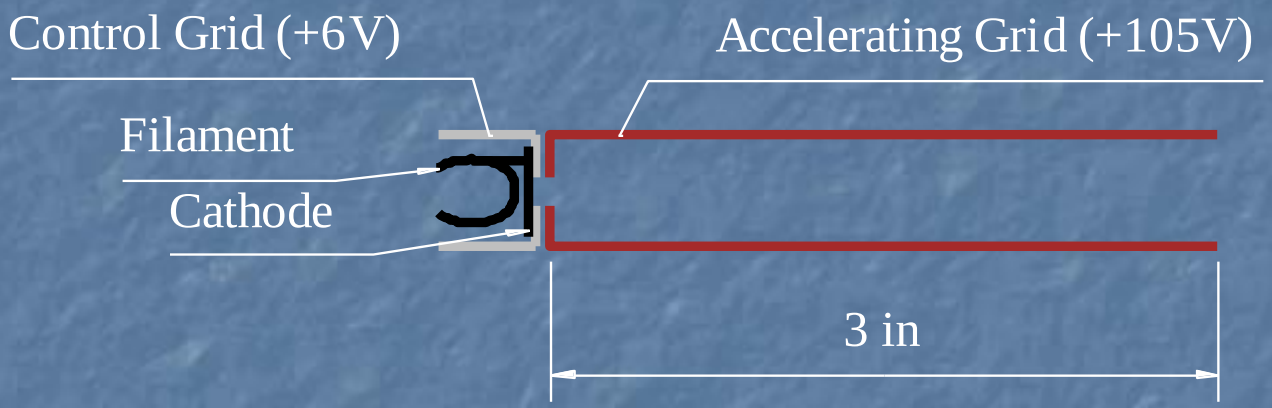
Accelerating Tube

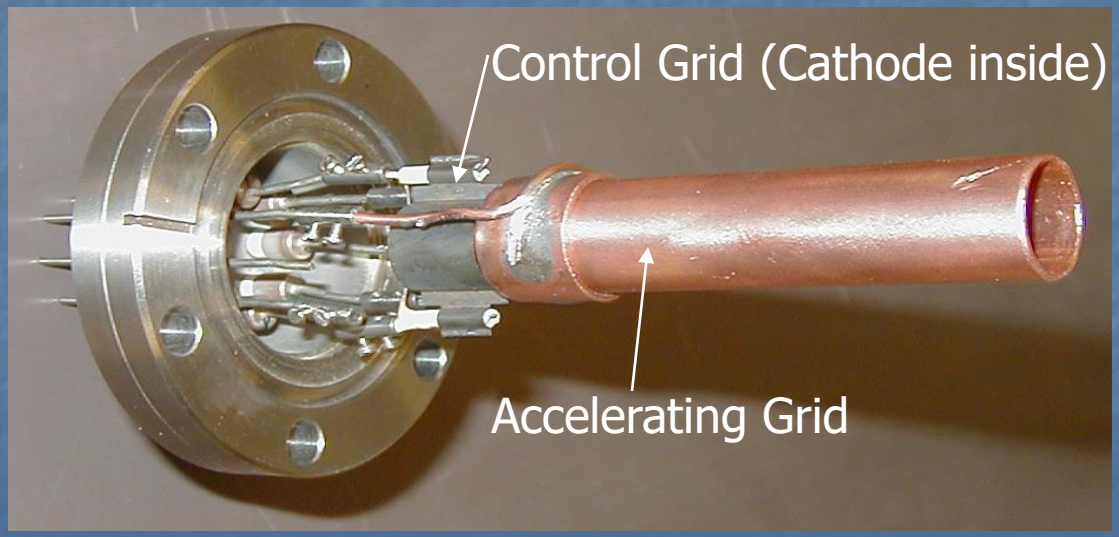


Simulations with Preliminary Electron Gun

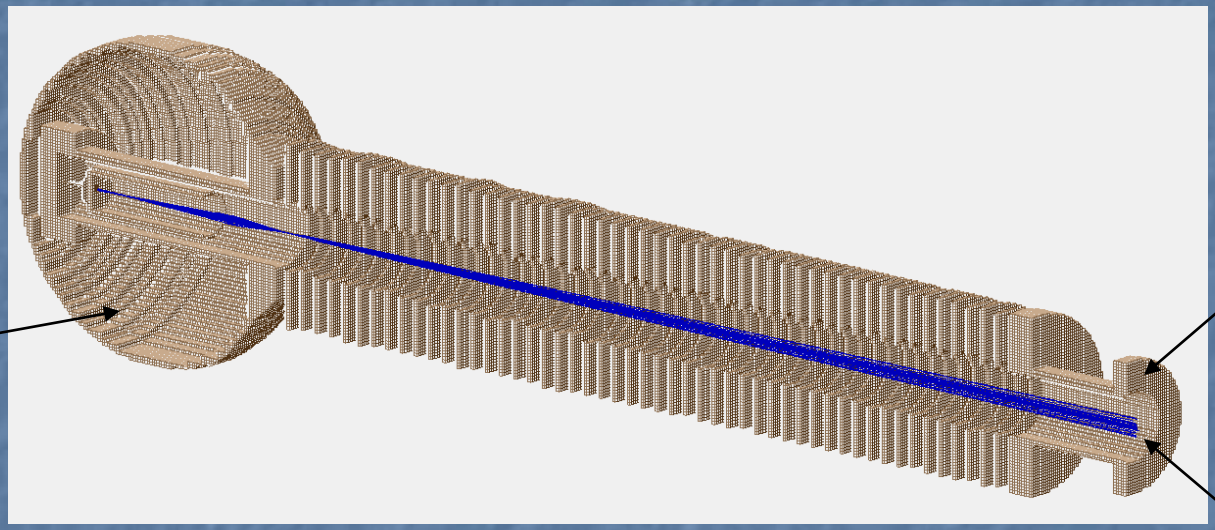


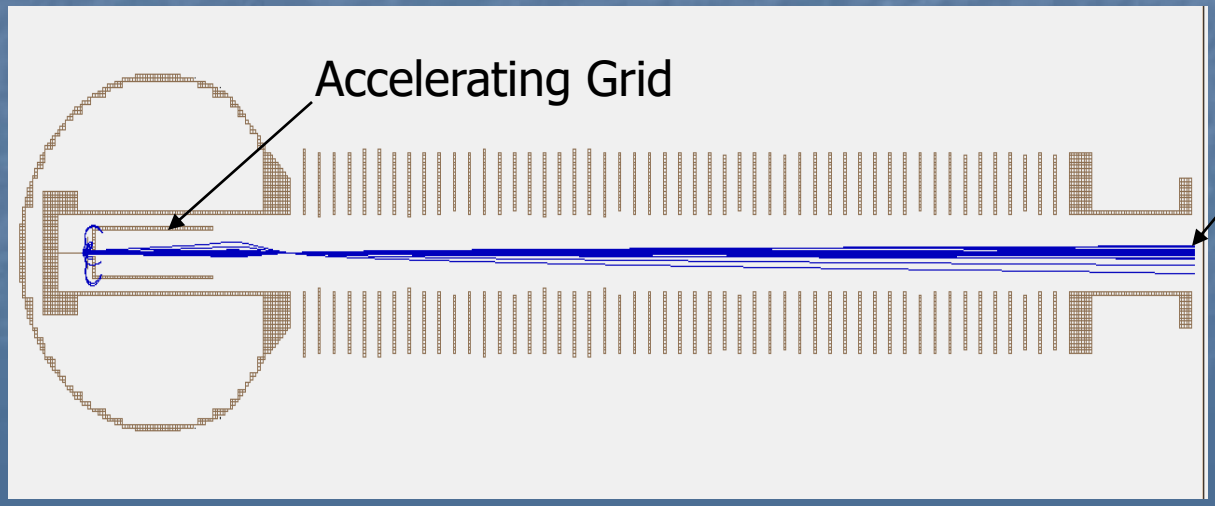
Electron Gun



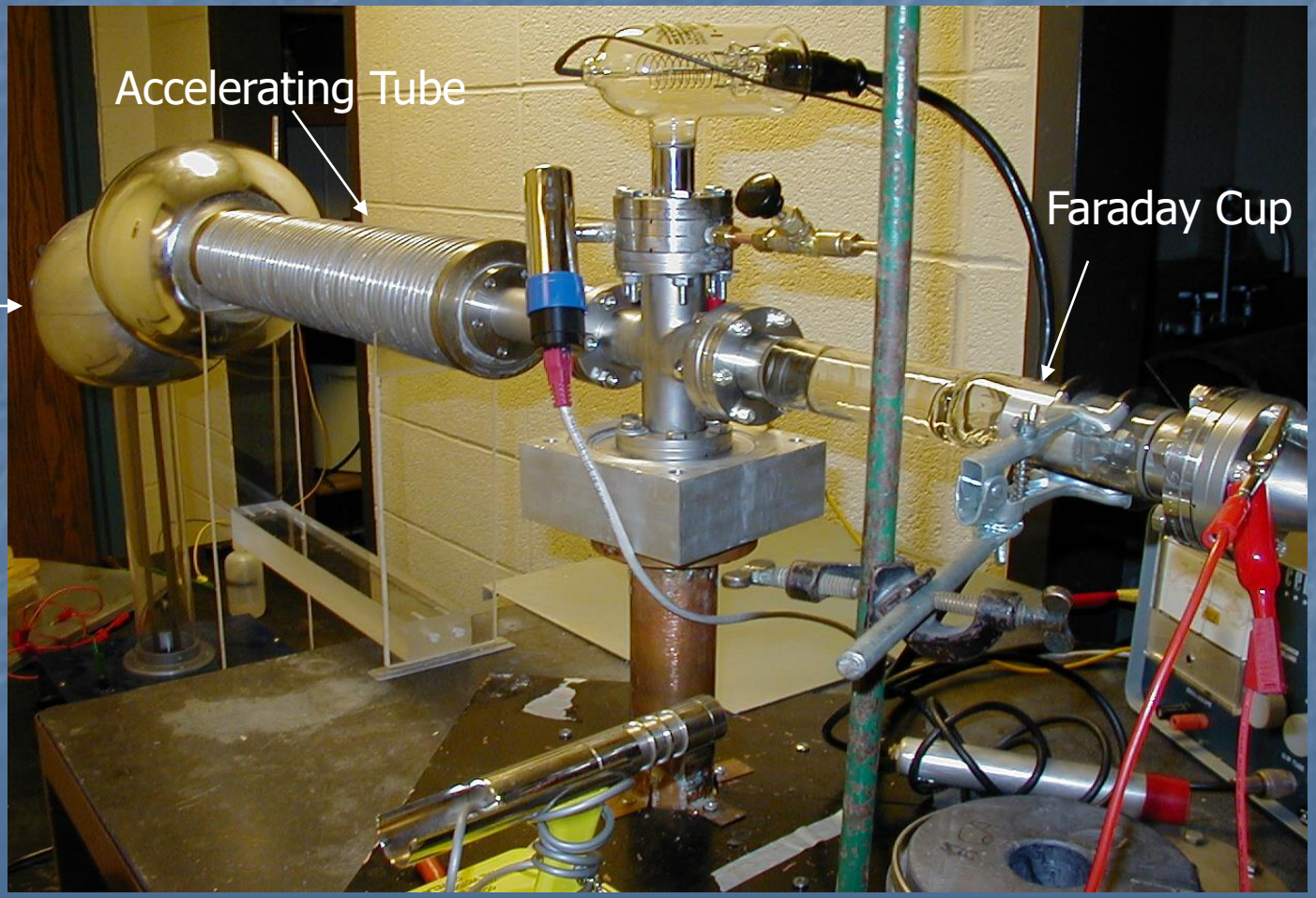


Simulations with New Electron Gun





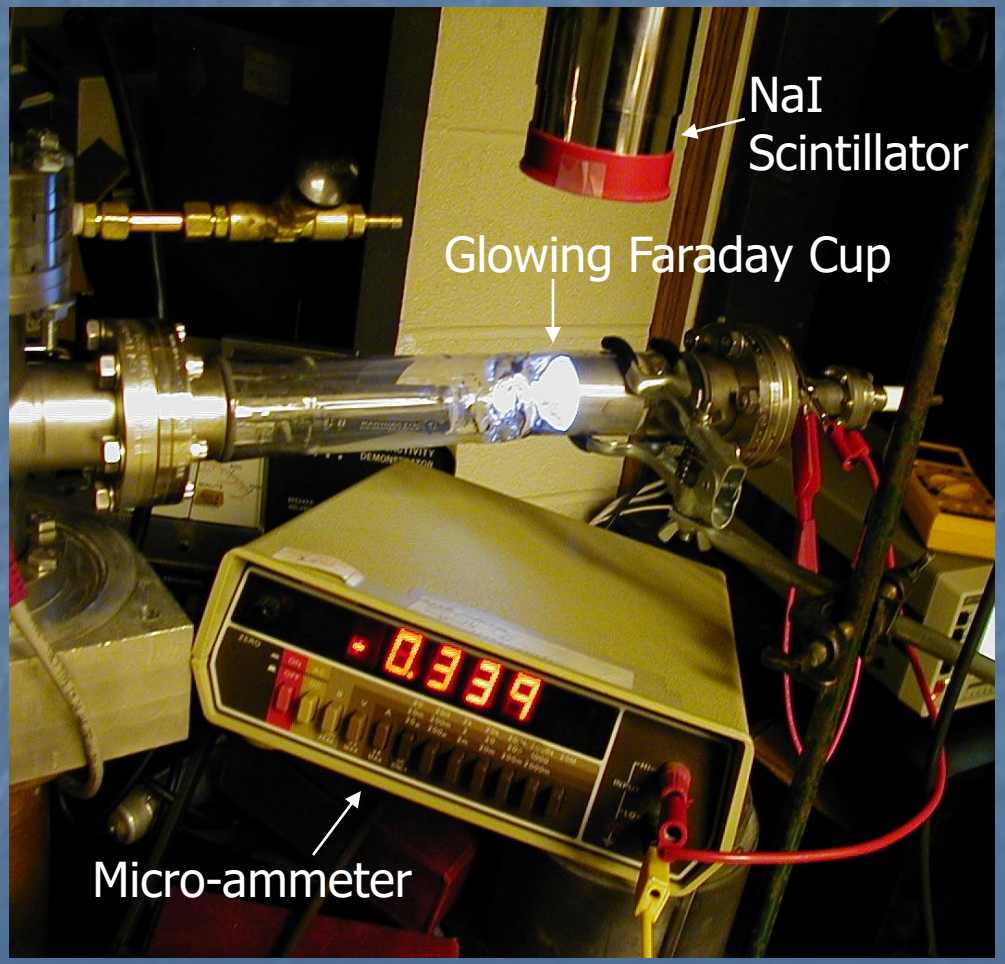
Experimental Set Up



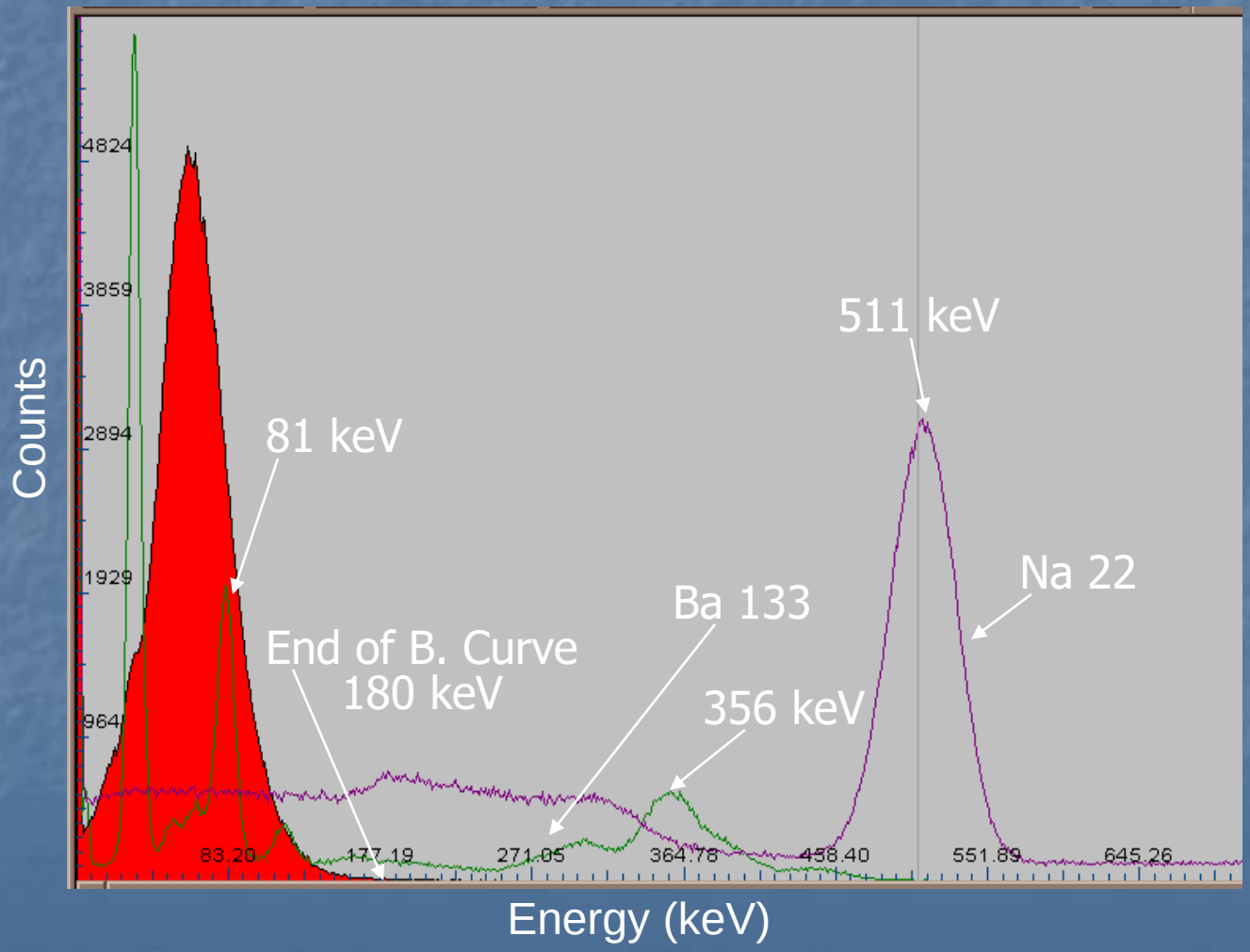
Results

Beam Current: 0.4 microamps

Radiation: 10 mrem/hour
approximately 1 ft.
from faraday cup



Bremsstrahlung x-ray Energy Spectrum



In the Future

- Focusing
- Ion Source
- New Filament