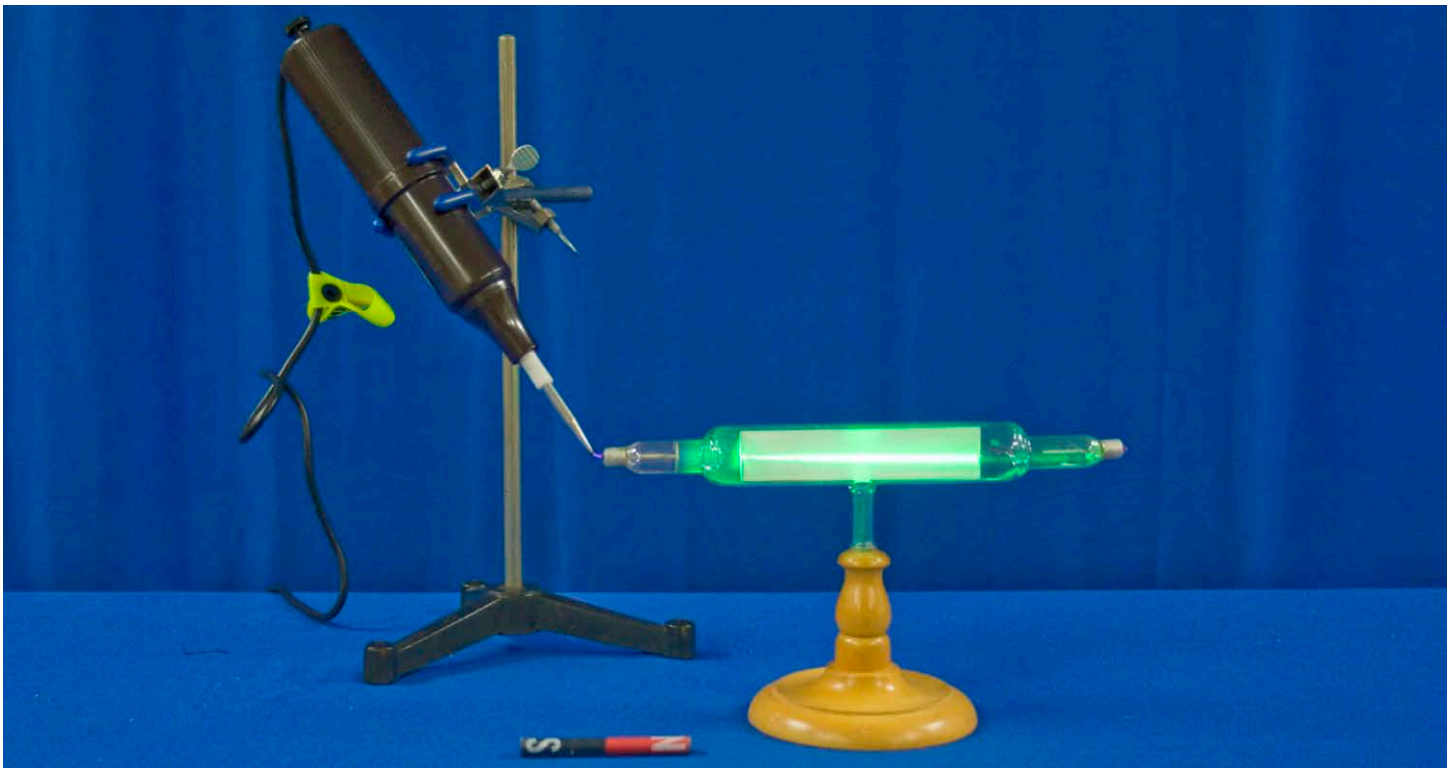
BENDING AN ELECTRON BEAM 5H30.15



Concept:

High voltage applied to one end of the tube produces a horizontal electron beam. A bar magnet with its long axis oriented perpendicular to the plane of the above picture produces a vertical deflection of the beam. The direction of the force causing this deflection is given by:

$$\mathbf{F} = q\mathbf{v} \times \mathbf{B}$$

where **v** is the electron's velocity and **B** is the magnetic field.

Equipment:

- Handheld Tesla Coil
- Support Stand
- Rod Clamp
- Large 3 Pronged Clamp
- Bar Magnet
- Wooden Stand
- Evacuated Glass Tube with Fluorescent Screen

Procedure:

1. Assemble apparatus so the end of the glass tube with the slit is touching the tip of the Tesla coil.
2. Plug in the Tesla coil to power it on (there is no on/off switch).
3. If necessary, dial the knob on the top of the Tesla coil until you see the bright electron beam.
4. Bringing the north (or south) pole of the magnet from behind the glass tube and perpendicular to the beam will bend the electron beam upwards (or downwards).

Notes and Extras:

- Video Link
- In this demonstration q is negative. This produces a force opposite in direction to that expected for the same magnetic field applied to a current carrying wire.