

1. Suppose that a particle accelerator is constructed out of two parallel metal plates. The plates are circular with a diameter $0.5m$, are separated by a distance $2m$, and a vacuum ($\kappa = 1$) exists between the plates. What is the capacitance of this system?
2. Suppose that a potential difference of $2.2MV$ was placed across the plates. What is the magnitude and direction of the electric field between the plates?
3. What charge was on a plate of this capacitor?

4. How much energy is stored in the electric fields of the capacitor?

5. Suppose that a helium ion (${}^4_2\text{He}^{+2}$) was accelerated from rest through this accelerator. What would the speed of the helium ion be when it exited the accelerator?