

Measurement of e/m_e for Electron



First experiment by J. J. Thomson (1897)

Method used here: velocity selector

$$\text{Equilibrium of forces: } eE = evB \Rightarrow v = \frac{E}{B}$$

$$\text{Work-energy relation: } eV = \frac{1}{2}m_e v^2 \Rightarrow v = \sqrt{\frac{2eV}{m_e}}$$

$$\text{Eliminate } v: \frac{e}{m_e} = \frac{E^2}{2VB^2} \simeq 1.76 \times 10^{11} \text{C/kg}$$

