

$$F_L = F_Z$$

$$e \cdot v \cdot B = m \cdot \frac{v^2}{r}$$

$$\frac{e}{m} = \frac{v}{B \cdot r}$$

$$\text{mit } v = \sqrt{2U \cdot \frac{e}{m}} : \quad \frac{e}{m} = \frac{1}{B \cdot r} \cdot \sqrt{2U \cdot \frac{e}{m}}$$

$$\text{Quadrieren:} \quad \left(\frac{e}{m}\right)^2 = \frac{1}{B^2 \cdot r^2} \cdot 2U \cdot \frac{e}{m}$$

$$\frac{e}{m} = \frac{2U}{B^2 \cdot r^2}$$

Versuch:

$$U = 300 \text{ V}, r = 5,0 \text{ cm}, B = 1,16 \text{ mT} \rightarrow$$

$$\frac{e}{m} = \frac{600 \text{ V}}{(1,16 \cdot 10^{-3} \text{ T})^2 \cdot (0,05 \text{ m})^2} = 1,78 \cdot 10^{11} \frac{\text{C}}{\text{kg}} \rightarrow$$

$$m = \frac{e}{\frac{e}{m}} = \frac{1,6 \cdot 10^{-19} \text{ C}}{1,78 \cdot 10^{11} \frac{\text{C}}{\text{kg}}} = 9,0 \cdot 10^{-31} \text{ kg}$$