

Non-Relativistic Rigidity



Rick Baartman, TRIUMF

January 20, 2015

Let mass be $M = Am_n$ where $m_n c^2 / e = 931 \times 10^6$ volt; charge $Q = qe$.

$$B\rho = \frac{Mv}{Q}$$

Speed v is given by “energy” E : $E = Mv^2/2$. So

$$B\rho = \frac{\sqrt{2ME}}{Q}$$

Define V as “voltage of beam” (source). $E = QV$. Thus

$$B\rho = \sqrt{\frac{2MV}{Q}} = \frac{1}{c} \sqrt{\frac{2Am_n c^2 V}{eq}} = \sqrt{\frac{A}{q}} \sqrt{\frac{V}{\text{Mvolt}}} 0.144 \text{ Tesla-metre}$$