

Beam Velocity β and γ -Parameter

$$E = mc^2 = m_0\gamma c^2 = T + m_0c^2$$

$$\gamma = (1 - v^2/c^2)^{-1/2} = 1 + \frac{T}{m_0c^2} = 1 + \frac{T/A_1[\text{MeV}/u]}{931.5}$$

$$\beta = v/c = \sqrt{1 - \left(\frac{931.5}{931.5 + T/A_1[\text{MeV}/u]} \right)^2}$$

$$\beta\gamma = \frac{\sqrt{(T/A_1)^2 + 1863(T/A_1)}}{931.5}$$

