47. The radius r of the path is given in problem 46 as $r = \gamma mvqB$. Thus,

$$\begin{aligned} m &= \frac{qBr\sqrt{1-\beta^2}}{v} \\ &= \frac{2(1.60\times10^{-19}\,\mathrm{C})(1.00\,\mathrm{T})(6.28\,\mathrm{m})\sqrt{1-(0.710)^2}}{(0.710)(3.00\times10^{8}\,\mathrm{m/s})} \\ &= 6.64\times10^{-27}\ \mathrm{kg}\ . \end{aligned}$$

Since $1.00\,\mathrm{u} = 1.66\times10^{-27}\,\mathrm{kg}$, the mass is $m = 4.00\,\mathrm{u}$. The nuclear particle contains four nucleons. Since there must be two protons to provide the charge $2e$, the nuclear particle is a helium nucleus (usually referred to as an alpha particle) with two protons and two neutrons.