

17. We note that $hc = 1240 \text{ MeV}\cdot\text{fm}$ (see problem 3 of Chapter 39), and that the classical kinetic energy $\frac{1}{2}mv^2$ can be written directly in terms of the classical momentum $p = mv$ (see below). Letting $p \simeq \Delta p \simeq h/\Delta x \simeq h/r$, we get

$$E = \frac{p^2}{2m} \simeq \frac{(hc)^2}{2(mc^2)r^2} = \frac{(1240 \text{ MeV}\cdot\text{fm})^2}{2(938 \text{ MeV})[(1.2 \text{ fm})(100)^{1/3}]^2} \simeq 30 \text{ MeV} .$$