\[ E = 3 \times \left( \frac{a^2}{4\pi B} \right)^{\frac{1}{2}} + \frac{9}{3\pi^3} \left( \frac{a^2}{4\pi B} \right)^{3/4} \]

\[ = \left( \frac{4\pi B}{3} \right)^{1/4} (a^2)^{3/4} \frac{1}{3} = m_p \Rightarrow B = 9.6 \text{ MeV} \]

\[ R = \frac{\sqrt{\frac{a^2}{m_p}}} = 1.7 \text{ fm} \]

One can do the same exercise for mesons:

\[ m_\pi = \frac{2V}{R} + \frac{4\pi^2}{3} R \beta \]

then one finds: \[ m_\pi = 692 \text{ MeV} \]

Because the pion is a Goldstone boson, its mass is actually much less.