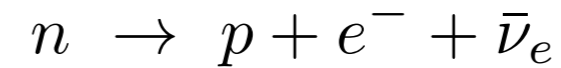


Neutrino-less $\beta\beta$ decay

◉ β decay most common decay mode for unstable nuclei



◉ $\beta\beta$ decay occurs when 2β energetically disfavoured

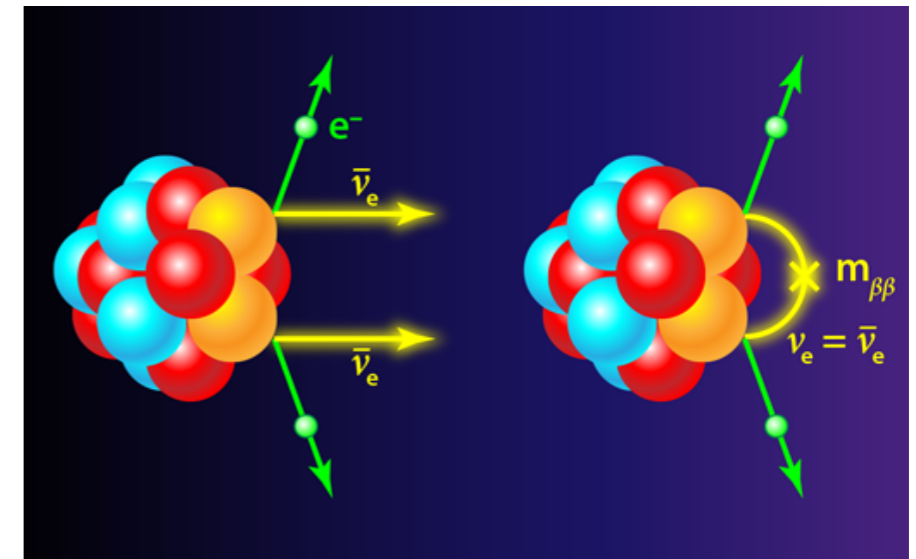
◉ $2\nu\beta\beta$ decay experimentally established for 14 nuclei

◉ $0\nu\beta\beta$ decay undetected so far

◉ If observed, $0\nu\beta\beta$ would have important consequences

◉ It would prove the **Majorana** nature of neutrinos

◉ It would provide precious information on the neutrino (absolute) **mass** and **mass hierarchy**



◉ Decay half-life depend on nuclear structure

$$\left[T_{1/2}^{0\nu\beta\beta} (0_i^+ \rightarrow 0_f^+) \right]^{-1} = G^{0\nu\beta\beta} |M^{0\nu\beta\beta}|^2 m_{\beta\beta}^2$$

nuclear transition matrix element

◉ **Reliable structure calculations** needed

