

■ What we have learned in chapter 30: brush up:

■ Nuclei are approximately spherical in shape, with the radius of the sphere depending on the mass number:

$$R(A) = R_0 A^{1/3}, \text{ where } R_0 = 1.2 \text{ fm} \quad \text{--- Eq (3) - lecture 12.}$$

■ Nuclear mass is measured in multiples of the atomic mass unit, $1 \text{ u} \approx 1.6605 \cdot 10^{-27} \text{ kg}$, which is defined as being $[1/12]$ of the mass of the $^{12}_6\text{C}$ atom --- Eq (1) & Eq (2) - lecture 12.

■ Nuclear decays follow an exponential decay law: -

$N(t) = N_0 \exp(-\lambda t)$. The decay constant λ , half-life $T_{1/2}$, and mean lifetime τ are related via $T_{1/2} = \frac{\ln(2)}{\lambda} = \ln(2) * \tau$ --- Eq (5) → Eq (12) lecture 12

■ The SI unit for radioactivity is the becquerel:

$$1 \text{ Bq} = 1 \text{ nuclear decay/sec} \Rightarrow 1 \text{ Ci} = 3.7 \cdot 10^{10} \text{ Bq.}$$

