Things to remember. Numerical data

- $M_p \approx M_n \approx 1$ GeV, but $M_n > M_p$
- Approximate values of: $m_e \approx 0.5$ MeV, $m_\mu \approx$ 100 MeV, $m_\pi \approx 140$ MeV, $m_K \approx 500$ MeV, $M_W \approx$ 80 GeV, $M_Z \approx 90$ GeV
- Quark content of *p, n, K,* π
- Quark charges, hierarchy of quark masses
- Nuclear levels up to 4 levels of the Shell Model ($1s_{1/2} - 1d_{5/2}$)

Things to remember. Formulae

$$E^2 = p^2 + m^2,\ E = m\gamma,\ p = m\beta\gamma \ldots$$

General form of Yukawa potential

Scattering amplitude $$f(\vec{q}) = \frac{-g^2\hbar^2}{\left|\vec{q}\right|^2 + M_X^2 c^2}$$

Two definitions of luminosity: $L = N\, n_b v_i$ and $L = \frac{n N_1 N_2 f}{A}$

$$\Gamma = \frac{\hbar}{\tau} \qquad R_{nucl} \approx 1.2 A^{1/3}\ fm$$

Interaction, absorption or collision length $$l = \frac{1}{n\sigma}$$

Radiation length formula $$-\frac{dE}{dx} = \frac{E}{L_R} \Rightarrow \qquad E = E_0 \exp(-x/L_R)$$

Cerenkov condition and angle $$\beta > \frac{1}{n} \quad \cos\theta_C = \frac{1}{\beta n}$$