Final: Fun Facts

Speed of Light: c = 1 Planks constant: $\frac{h}{2\pi} = 1$

$\alpha = 10^{-2}$ $\alpha_W \equiv 0.5\alpha$ $\alpha_G \equiv G_N m_p^2 = 10^{-39}$

GeV^{-1}=10^{-15}m GeV = 10^{-27}kg $\text{GeV}^{-1} = 6 \cdot 10^{-25}$ s

$r_{\text{nucleus}} \sim 10^{-15}$ meters.

The mass of the electron is $\sim 10^{-3}$ GeV

The mass of the muon is $\sim 10^{-1}$ GeV

The mass of the tauon is ~ 1 GeV

The mass of the bottom quark is ~ 5 GeV

The mass of the top quark is ~ 175 GeV

The mass of the W-boson $\sim$ mass Z-boson ~ 100 GeV

1 TeV = 1000 GeV

Cross section: $\sigma \sim \frac{1}{E_1 E_2}|M|^2 d\Pi_{LIPS}$ Decay rate: $\Gamma \sim \frac{1}{E}|M|^2 d\Pi_{LIPS}$

Life-time: $\tau = \frac{1}{\Gamma}$

Branching Ratios: Br(X→YY) = $\frac{\Gamma(X\to YY}{\sum_f \Gamma(X\to ff)}$

$$\mathscr{L}_{scalar} = \frac{1}{2}(\partial_\mu\phi)(\partial^\mu\phi) + \frac{m^2}{2}\phi^2$$

$$\mathscr{L}_{spin1/2} = \bar{\psi}(i\gamma_\mu\partial^\mu - m)\psi$$

$$\mathscr{L}_{spin1} = F_{\mu\nu}F^{\mu\nu} \text{ where } F_{\mu\nu} = \partial_\mu A_\nu - \partial_\mu A_\nu$$

sagitta: $\frac{\Delta p_T}{p_T} = \frac{\Delta s}{s}$ $\Delta s \sim$ constant ($\sim 10\mu m$)

Uniform Circular Motion: $r_c = \frac{p_T}{qB}$