Some Questions of Units
and Connections to the Electromagnetic Spectrum

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Two fundamental constants:

1. \( c = 3 \times 10^{10} \) cm/sec: relates length to time. Natural to set \( c = 1 \) and use same units for both. Similarly energy and momentum.

2. \( \hbar = 6.58211899 \pm 10^{-22} \) MeV s. Related energy to time. Natural to set \( \hbar = 1 \). Then energy, mass, momentum have same units. Similarly time, length have (inverse) units.

Examples:

1. Visible light: \( \text{eV}^{-1} \sim 10^{-15} \) sec.
2. X-rays: \( \text{KeV}^{-1} \sim 10^{-18} \) sec.
3. \( \gamma \)-rays: \( \text{MeV} - \text{GeV}^{-1} \sim 10^{-21} - 10^{-24} \) sec.
4. 1 fm = size of nucleus = \( 3 \times 10^{-24} \) sec.