Reminders 5-01-08:
-Read Chapter 29-30

Objectives:
-Relativistic Dynamics
-Introduction to Nuclear Physics

$E = mc^2$ = rest energy

$$= \frac{(9.11\times10^{-31}\,kg)(3\times10^{8})^2}{1.6\times10^{-19}\,J/eV} = 511{,}000\,eV$$

$$.511\,MeV = m_e c^2$$

$$m_e = .511\,\frac{MeV}{c^2}$$

$E_{proton} = 938.3\,MeV$

$$m = 938.3\,\frac{MeV}{c^2}$$

$$\left(.511\,\frac{MeV}{\cancel{c^2}}\right)(\cancel{c^2})$$

Radioactivity- Half-Life

- The isotope of ^{14}C has a half-life of 5730 yrs. If its activity is 1000 decays per second, what will it be in 22,920 yrs?

Start with N_0 how much do you have left after 22,920 yrs

$N = N_0 e^{-\lambda t}$ half life = 5730

$t_{1/2} = .693/\lambda$

$N = N_0 e^{\frac{.693}{5730} t}$

$\lambda = \frac{.693}{5730}$

$\frac{N}{N_0} = e^{-\left(\frac{.693}{5730}\right)22,920} = .0625$

activity decreases by factor of 16 (multiply 1000 by .0625)

$1000 \cdot .0625 = 62.5$