

Particle Zoo

leptons (don't feel strong force)
 • fundamental

- Electron -1
- muon -1
- Tau -1
- ν_e neutrino 0
- ν_μ neutrino 0
- ν_τ neutrino 0
- antiparticles +1, 0

lepton
 (smallest)

meson
 (middle)

baryon
 (biggest)

Baryons

mass \geq proton
 • 3 quarks + 3 antiquarks

- proton uud
- neutron udd
- lambda udc
- Sigma dds

Hadrons

feel all 4 forces

Mesons

$e < \text{mass} < p$
 # quarks and # antiquarks

- $u\bar{d}$ π^- Pion π^+ $u\bar{u}$
- $\bar{d}s$ Kaon K^0 $d\bar{s}$

pg 348 Fusion Q If a radioisotope has a half life of 12500 yrs, construct a graph of activity vs time and estimate the # years for the activity of sample to reduce to $\frac{2}{3}$ of its original value.

* beta decay - mass-energy did not add up
Pauli solved problem by suggesting existence of neutrino

○ neutral, very small mass, low energy

* electroscopes must be \ominus charged when demonstrating the photoelectric effect.

* use $\frac{x}{y}$ function on calculator as $3 \div 5 \times 10^8$
 ~~$\frac{3}{5 \times 10^8}$~~

* Americium not found naturally \rightarrow man made during Manhattan project, not natural decay series, half life = short with use of inverse

○ * Solid state detector : PN junction, Radiation hits depletion layer forming e^- hole pairs \Rightarrow current flows through junction \rightarrow external amplifier & counter converts current to counts.

* GM principle of Op = forms ion pairs - ionization caused by radiation

* Diagram for Cockcroft & Walton L. Particle accelerator

|| 400kV
|| 200kV
|| 0V

* Mass pg (34) on log tables for Leptons/Mesons/Baryons
is given rel to e^- so $\pi = 273$ means $(273 \times m_e)$

* Formula not in log tables: * MUST look thro Log tables

* $1u = 1.6605402 \times 10^{-27}$ kg! (Can work ans out in u if you like & then convert to kg \rightarrow then to Joules/energy)

⊛ * $t_{\frac{1}{2}}$ = time for $\frac{1}{2}$ radioactive nuclei to decay - also time for activity to $\frac{1}{2}$.
 $A \propto N$ * units of $\lambda = 1/s$ or s^{-1} $A =$ rate of decay!
activity

* Fusion!

○ * Distinguish between \Rightarrow give definitions!

* demonstrate ionization \rightarrow charged electroscope ionizes air near electroscope cap
this carries away charge from cap

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