Quarks



$$UP + \frac{2}{3}e$$
IM mechanism

$$1.28 \pm 0.03 \text{ GeV}/c^2$$

c charm
$$+\frac{2}{3}e$$

$$172.76~\mathrm{GeV}/c^2$$

t
$$top$$
 $+\frac{2}{3}e$

$$4.7^{+0.5}_{-0.4}~{
m MeV}/c^2$$

d down
$$-\frac{1}{3}e$$

$$4.7^{+0.5}_{-0.4}~{\rm MeV}/c^2$$

s strange
$$-\frac{1}{3}e$$

1964 - kaon decay

$$4.7^{+0.5}_{-0.4}~{
m MeV}/c^2$$



Leptons

$$0.511~{
m MeV}/c^2$$
 electron $-1e$

1895 - X-rays



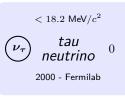
1936 - cosmic ray



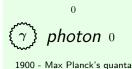
$$< 2.2 \text{ eV}/c^2$$
 v_e electron neutrino

1956 - nuclear reactor





Gauge Bosons







91.1876
$$\mbox{GeV}/c^2$$
 \mbox{Z} \mbox{Z}^0 0 1983 - UA1, UA2

