

Standard Model of Elementary Particles

three generations of matter
(fermions)

interactions / force carriers
(bosons)

I

II

III

mass
charge
spin

QUARKS

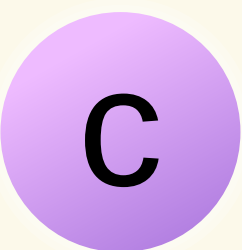
LEPTONS

$\approx 2.2 \text{ MeV}/c^2$



up

$\approx 1.28 \text{ GeV}/c^2$



charm

$\approx 173.1 \text{ GeV}/c^2$



top

$\approx 4.7 \text{ MeV}/c^2$



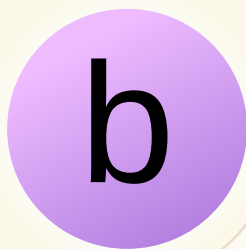
down

$\approx 96 \text{ MeV}/c^2$



strange

$\approx 4.18 \text{ GeV}/c^2$



bottom

$\approx 0.511 \text{ MeV}/c^2$



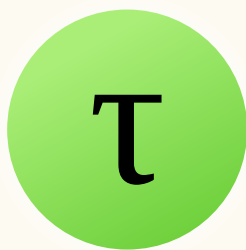
electron

$\approx 105.66 \text{ MeV}/c^2$



muon

$\approx 1.7768 \text{ GeV}/c^2$



tau

$< 1.0 \text{ eV}/c^2$



electron
neutrino

$< 0.17 \text{ MeV}/c^2$



muon
neutrino

$< 18.2 \text{ MeV}/c^2$



tau
neutrino

0



gluon

$\approx 124.97 \text{ GeV}/c^2$



higgs

0



photon

0



Z boson

$\approx 80.39 \text{ GeV}/c^2$



W boson

0



0



± 1



1

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS