

1<sup>st</sup>2<sup>nd</sup>3<sup>rd</sup>

generation

fermions

gauge bosons

EWSB

quarks

leptons

2.2 MeV  
 $u$   
up

charge:  $+2/3$   
colour:  $rd/bb$   
spin:  $1/2$

1.27 GeV  
 $c$   
charm

charge:  $+2/3$   
colour:  $rd/bb$   
spin:  $1/2$

173 GeV  
 $t$   
top

charge:  $+2/3$   
colour:  $rd/bb$   
mass:  $173$   
spin:  $1/2$

← charge  
← colour  
← mass  
← spin

4.7 MeV  
 $d$   
down

charge:  $-1/3$   
colour:  $rd/bb$   
spin:  $1/2$

93 MeV  
 $s$   
strange

charge:  $-1/3$   
colour:  $rd/bb$   
spin:  $1/2$

4.18 GeV  
 $b$   
bottom

charge:  $-1/3$   
colour:  $rd/bb$   
spin:  $1/2$

$g$   
gluons

charge:  $0$   
spin:  $1$

strong interaction

511 keV  
 $e$   
electron

charge:  $-1$   
spin:  $1/2$

106 MeV  
 $\mu$   
muon

charge:  $-1$   
spin:  $1/2$

1.78 GeV  
 $\tau$   
tau

charge:  $-1$   
spin:  $1/2$

$\gamma$   
photon

charge:  $0$   
spin:  $1$

electromagnetic interaction

$\nu_e$   
 $e$  neutrino

spin:  $1/2$

$\nu_\mu$   
 $\mu$  neutrino

spin:  $1/2$

$\nu_\tau$   
 $\tau$  neutrino

spin:  $1/2$

80.4 GeV  
 $W^\pm$

charge:  $\pm 1$   
spin:  $1$

91.2 GeV  
 $Z$

spin:  $1$

weak interaction

125 GeV  
 $H$   
Higgs

spin:  $0$