

Particle Properties

Gauge Bosons

Particle	Symbol	Spin	Mass
Photon	γ	1	0.0
Gluon	g	1	0.0
W	$W^{\pm}$	1	80 GeV/c ²
Z	Z^0	1	91 GeV/c ²
Higgs	H^0	0	Unknown

Quarks

Particle	Symbol	Spin	Mass	Anti-Particle
up	u	1/2	5 MeV/c ²	$\bar{u}$
down	d	1/2	10 MeV/c ²	$\bar{d}$
strange	s	1/2	~0.2 GeV/c ²	$\bar{s}$
charm	c	1/2	~1.5 GeV/c ²	$\bar{c}$
bottom	b	1/2	~4.5 GeV/c ²	$\bar{b}$
top	t	1/2	~170 GeV/c ²	$\bar{t}$

Leptons

Particle	Symbol	Spin	Mass	Anti-Particle
Electron	e^{-}	1/2	0.511 MeV/c ²	e^{+}
Muon	μ^{-}	1/2	0.106 GeV/c ²	μ^{+}
Tau	τ^{-}	1/2	1.78 GeV/c ²	τ^{+}
Electron neutrino	ν_e	1/2	~ 0	$\bar{\nu}_e$
Muon neutrino	ν_{μ}	1/2	~ 0	$\bar{\nu}_{\mu}$
Tau neutrino	ν_{τ}	1/2	~ 0	$\bar{\nu}_{\tau}$

Mesons

Particle	Symbol	Quark Content	Spin	Mass (GeV/c ²)	Anti-Particle	Content
charged pion	π^+	$u\bar{d}$	0	0.140	π^-	$d\bar{u}$
neutral pion	π^0	$u\bar{u}, d\bar{d}$	0	0.135		
eta	η	$u\bar{u}, d\bar{d}, s\bar{s}$	0	0.547		
eta prime	η'	$u\bar{u}, d\bar{d}, s\bar{s}$	0	0.958		
charged kaon	K^+	$u\bar{s}$	0	0.494	K^-	$s\bar{u}$
neutral kaon	K^0	$d\bar{s}$	0	0.498	$\bar{K}^0$	$s\bar{d}$
charged rho	ρ^+	$u\bar{d}$	1	0.770	ρ^-	$d\bar{u}$
neutral rho	ρ^0	$u\bar{u}, d\bar{d}$	1	0.770		
omega	ω	$u\bar{u}, d\bar{d}$	1	0.782		
phi	ϕ	$s\bar{s}$	1	1.020		
charged K star	K^{*+}	$u\bar{s}$	1	0.892	K^{*-}	$s\bar{u}$
neutral K star	K^{*0}	$d\bar{s}$	1	0.892	$\bar{K}^{*0}$	$s\bar{d}$
J/ ψ	ψ	$c\bar{c}$	1	3.097		
Upsilon	Υ	$b\bar{b}$	1	9.460		
D plus	D^+	$c\bar{d}$	0	1.869	D^-	$d\bar{c}$
D zero	D^0	$c\bar{u}$	0	1.865	$\bar{D}^0$	$u\bar{c}$
D sub s	D_s^+	$c\bar{s}$	0	1.969	D_s^-	$s\bar{c}$
B plus	B^+	$u\bar{b}$	0	5.279	B^-	$b\bar{u}$
B zero	B^0	$d\bar{b}$	0	5.279	$\bar{B}^0$	$b\bar{d}$
B sub s	B_s^0	$s\bar{b}$	0	5.375	$\bar{B}_s^0$	$b\bar{s}$

Baryons

Particle	Symbol	Quark Content	Spin	Mass (GeV/c ²)	Anti-Particle	Content
Proton	p	uud	1/2	0.938	$\bar{p}$	$\bar{u}\bar{u}\bar{d}$
Neutron	n	udd	1/2	0.940	$\bar{n}$	$\bar{u}\bar{d}\bar{d}$
Sigma plus	Σ^+	uus	1/2	1.189	$\bar{\Sigma}^-$	$\bar{u}\bar{u}\bar{s}$
Sigma zero	Σ^0	uds	1/2	1.193	$\bar{\Sigma}^0$	$\bar{u}\bar{d}\bar{s}$
Lambda zero	Λ^0	uds	1/2	1.116	$\bar{\Lambda}^{*0}$	$\bar{u}\bar{d}\bar{s}$
Sigma minus	Σ^-	dds	1/2	1.197	$\bar{\Sigma}^+$	$\bar{d}\bar{d}\bar{s}$
Cascade zero	Ξ^0	uss	1/2	1.315	$\bar{\Xi}^0$	$\bar{u}\bar{s}\bar{s}$
Cascade minus	Ξ^-	dss	1/2	1.321	$\bar{\Xi}^+$	$\bar{d}\bar{s}\bar{s}$
Delta plus plus	Δ^{++}	uuu	3/2	1.232	$\bar{\Delta}^{--}$	$\bar{u}\bar{u}\bar{u}$
Delta plus	Δ^+	uud	3/2	1.232	$\bar{\Delta}^-$	$\bar{u}\bar{u}\bar{d}$
Delta zero	Δ^0	udd	3/2	1.232	$\bar{\Delta}^0$	$\bar{u}\bar{d}\bar{d}$
Delta minus	Δ^-	ddd	3/2	1.232	$\bar{\Delta}^+$	$\bar{d}\bar{d}\bar{d}$
Sigma star plus	Σ^{*+}	uus	3/2	1.189	$\bar{\Sigma}^{*-}$	$\bar{u}\bar{u}\bar{s}$
Sigma star zero	Σ^{*0}	uds	3/2	1.193	$\bar{\Sigma}^{*0}$	$\bar{u}\bar{d}\bar{s}$
Sigma star minus	Σ^{*-}	dds	3/2	1.197	$\bar{\Sigma}^{*+}$	$\bar{d}\bar{d}\bar{s}$
Cascade star zero	Ξ^{*0}	uss	3/2	1.315	$\bar{\Xi}^{*0}$	$\bar{u}\bar{s}\bar{s}$
Cascade star minus	Ξ^{*-}	dss	3/2	1.321	$\bar{\Xi}^{*+}$	$\bar{d}\bar{s}\bar{s}$
Omega minus	Ω^-	sss	3/2	1.672	$\bar{\Omega}^+$	$\bar{s}\bar{s}\bar{s}$
Lambda c	Λ_c^+	udc	1/2	2.285	$\bar{\Lambda}_c^-$	$\bar{u}\bar{d}\bar{c}$
Lambda b	Λ_b^0	udb	1/2	5.641	$\bar{\Lambda}_b^0$	$\bar{u}\bar{d}\bar{b}$