

Selected Particles

(All masses in MeV/c²)

Baryons ($m \lesssim 1500$)				Mesons ($m < 900$)				Leptons (all)		
<u>Name</u>	<u>Mass</u>	<u>Spin</u>	<u>S</u>	<u>Name</u>	<u>Mass</u>	<u>Spin</u>	<u>S</u>	<u>Name</u>	<u>Mass</u>	<u>Spin</u>
p^+	938	1/2	0	π^+	139	0	0	e^-	0.511	1/2
n^0	940	1/2	0	π^0	135	0	0	ν_1	~0	1/2
Λ^0	1116	1/2	-1	π^-	139	0	0	μ^-	105.7	1/2
Σ^+	1189	1/2	-1	K^+	494	0	+1	ν_2	~0	1/2
Σ^0	1193	1/2	-1	K^0	498	0	+1	τ^-	1777	1/2
Σ^-	1197	1/2	-1	\bar{K}^0	498	0	-1	ν_3	~0	1/2
Δ^{++}	1231	3/2	0	K^-	494	0	-1	Other Particles (all)		
Δ^+	1232	3/2	0	η	547	0	0	<u>Name</u>	<u>Mass</u>	<u>Spin</u>
Δ^0	1234	3/2	0	ρ^+	770	1	0	photon	0	1
Δ^-	1235	3/2	0	ρ^0	770	1	0	W^\pm	80,425	1
Ξ^0	1315	1/2	-2	ρ^-	770	1	0	Z	91,188	1
Ξ^-	1321	1/2	-2	ω	782	1	0	gluon	0	1
Σ^{*+}	1383	3/2	-1	K^{*+}	896	1	+1	Higgs	125,100	0
Σ^{*0}	1384	3/2	-1	K^{*0}	892	1	+1	graviton	0	2
Σ^{*-}	1387	3/2	-1	\bar{K}^{*0}	892	1	-1			
Λ^{*0}	1406	1/2	-1	K^{*-}	896	1	-1			
N^{*+}	1440?	1/2	0							
N^{*0}	1440?	1/2	0							
Ξ^{*0}	1532	3/2	-2							
Ξ^{*-}	1535	3/2	-2							

Categories of Interactions

Decision process:

- If charge conservation violated → Impossible
- Else if baryon number violated → Impossible
- Else if odd # fermions (both sides) → Impossible
- Else if decay AND too little energy → Impossible
- Else if strangeness violated → Weak
- Else if all particles are strong → Strong
- Else if neutrinos → Weak
- Else → E & M

Standard Model Particles

(All masses in MeV/c^2)

Almost all fermions have an anti-particle whose charge is reversed, but its spin, mass, and number of colors are the same. The exception is the neutrino, which is probably its own anti-particle.

The other particles are all their own anti-particles, except for the W^\pm , which are anti-particles of each other.

Name	Symbol	Charge	Colors	Spin	Mass	
Electron	e^-	-1	1	$\frac{1}{2}$	0.511	leptons
Neutrino 1	ν_1	0	1	$\frac{1}{2}$	0?	
Muon	μ^-	-1	1	$\frac{1}{2}$	105.7	
Neutrino 2	ν_2	0	1	$\frac{1}{2}$	0?	
Tau	τ^-	-1	1	$\frac{1}{2}$	1777	
Neutrino 3	ν_3	0	1	$\frac{1}{2}$	0?	
Up quark	u	+2/3	3	$\frac{1}{2}$	3	quarks
Down quark	d	-1/3	3	$\frac{1}{2}$	5	
Charm quark	c	+2/3	3	$\frac{1}{2}$	1,300	
Strange quark	s	-1/3	3	$\frac{1}{2}$	120	
Top quark	t	+2/3	3	$\frac{1}{2}$	174,000	
Bottom quark	b	-1/3	3	$\frac{1}{2}$	4,300	
Photon	γ	0	1	1	0	force carriers
Gluon	g	0	8	1	0	
W-bosons	W^\pm	± 1	1	1	80,400	
Z-boson	Z^0	0	1	1	91,200	
Higgs boson	H^0	0	1	0	125,100	
Graviton	?	0	1	2	0	Not in the standard model

Standard model particles