

Leptons:

The leptons are the lightweight & smallest elementary particles.

Leptons interact through the electromagnetic, weak and gravitational force but do not interact through strong nuclear force.

There are 6 leptons in total, each with their anti-lepton counterpart which is given below.

Name	Symbol	Charge	Spin	antiparticle	Charge	Spin
Electron	e^-	-1	$\frac{1}{2}$	e^+ positron	+1	$\frac{1}{2}$
Electron neutrino	ν_e	0	$\frac{1}{2}$	$\bar{\nu}_e$	0	$\frac{1}{2}$
Muon	μ^-	-1	$\frac{1}{2}$	μ^+	+1	$\frac{1}{2}$
Muon neutrino	ν_μ	0	$\frac{1}{2}$	$\bar{\nu}_\mu$	0	$\frac{1}{2}$
Tau	τ^-	-1	$\frac{1}{2}$	τ^+	+1	$\frac{1}{2}$
Tau neutrino	ν_τ	0	$\frac{1}{2}$	$\bar{\nu}_\tau$	0	$\frac{1}{2}$

Note:- Electron and neutrino are stable.

Quarks:

The fundamental constituent of all the Hadrons is called Quarks. It is the building block of Hadrons. Hadrons are considered to be composed of quarks and different Hadrons have different composition of quarks.

1. Quarks do not exist independently.
2. Mesons consist of a quark & antiquark.
3. A Baryon consist 3 quarks but an antibaryon consists of 3 antiquarks.
4. Quarks are strongly interacting particles which do not exist in single.
5. Quark combination leads to produce Hadrons.

Table of Quarks

Quark / Antiquark	Symbol	Charge/e		Baryon number, B		Strangeness, S		
up	u	\bar{u}	+2/3	-2/3	1/3	-1/3	0	0
down	d	\bar{d}	-1/3	+1/3	1/3	-1/3	0	0
charm	c	\bar{c}	+2/3	-2/3	1/3	-1/3	0	0
strange	s	\bar{s}	-1/3	+1/3	1/3	-1/3	-1	1
top	t	\bar{t}	+2/3	-2/3	1/3	-1/3	0	0
bottom	b	\bar{b}	-1/3	+1/3	1/3	-1/3	0	0

Hadrons:

The elementary particles which have comparatively heavy masses are called as Hadrons. Hadrons are the strongly interacting particles. They are also called composite particles and are less stable.

Hadrons are divided into baryons and mesons.

a) **Baryons:**

The baryons are a class of fermions, including the proton, neutron, and other particles.