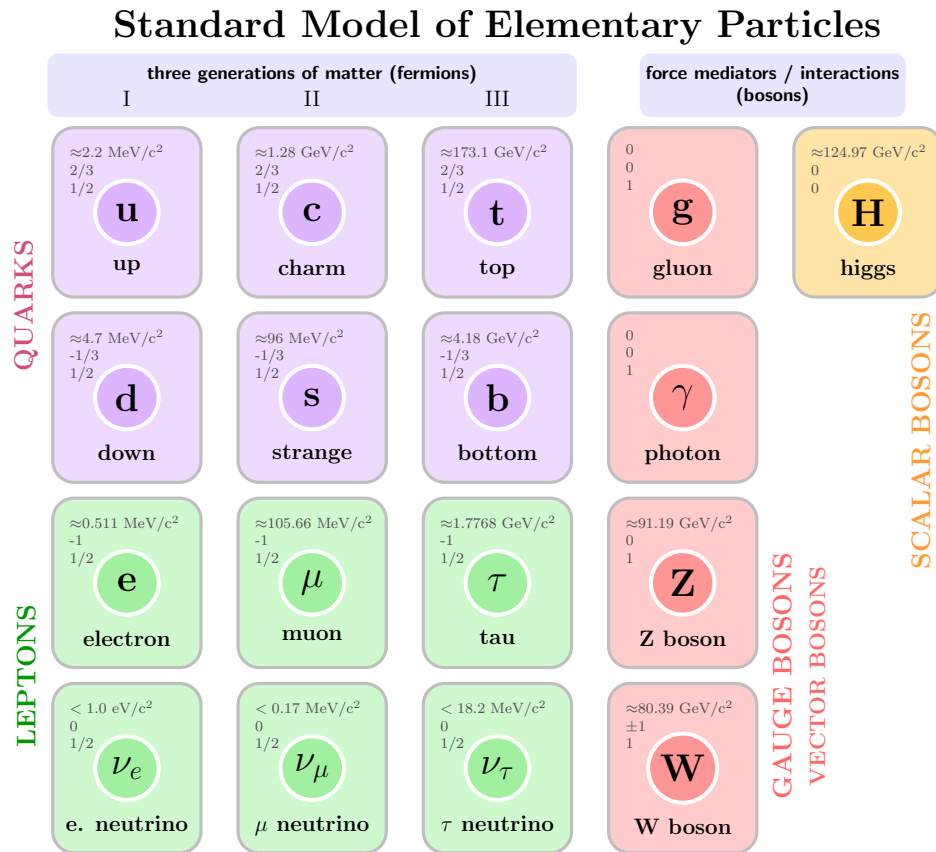
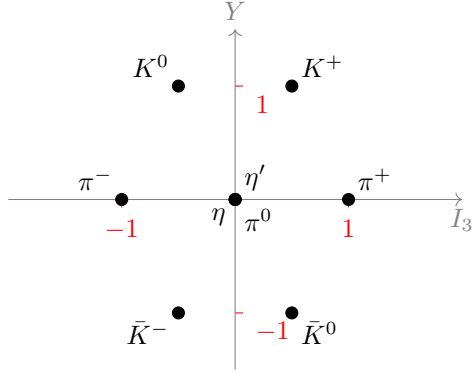


Elementary Particle 1 - Formulary

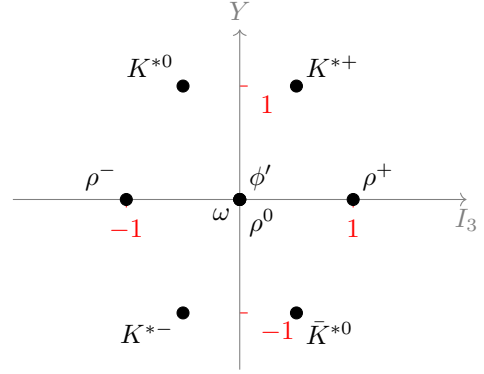
Gabriele Cembalo ([personal page](#))

a.a. 2025-2026

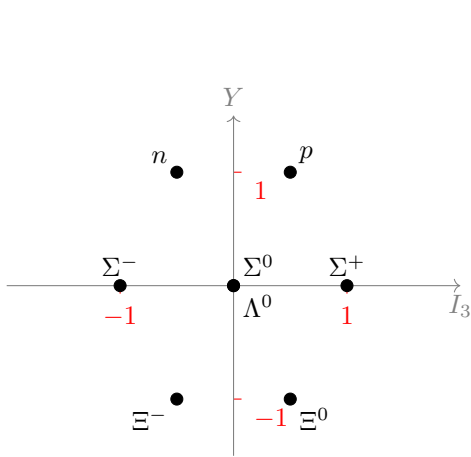




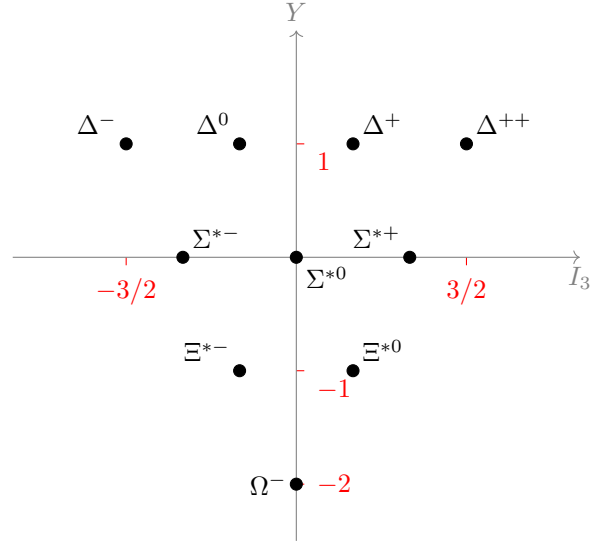
(a) Meson octet of spin 0 with similar masses.



(b) Meson octet of spin 1 with similar masses.



(c) Baryon octet of spin 1/2 with similar masses.



(d) Baryon decuplet of spin 3/2 with similar masses.

Figure 1: Hadron Multiplets.

Category	Symbol	Quarks	Charge (e)	Mass (MeV/ c^2)	$J^{P(C)}$	I	I_3
Baryons (Three quarks)	p	uud	+1	938.27	$\frac{1}{2}^+$	$\frac{1}{2}$	$+\frac{1}{2}$
	n	udd	0	939.57	$\frac{1}{2}^+$	$\frac{1}{2}$	$-\frac{1}{2}$
	Δ^{++}	uuu	+2	1232	$\frac{3}{2}^+$	$\frac{3}{2}$	$+\frac{3}{2}$
	Δ^+	uud	+1	1232	$\frac{3}{2}^+$	$\frac{3}{2}$	$+\frac{1}{2}$
	Δ^0	udd	0	1232	$\frac{3}{2}^+$	$\frac{3}{2}$	$-\frac{1}{2}$
	Δ^-	ddd	-1	1232	$\frac{3}{2}^+$	$\frac{3}{2}$	$-\frac{3}{2}$
	Λ^0	uds	0	1115.68	$\frac{1}{2}^+$	0	0
	Σ^+	uus	+1	1189.37	$\frac{1}{2}^+$	1	+1
	Σ^0	uds	0	1192.64	$\frac{1}{2}^+$	1	0
	Σ^-	dds	-1	1197.45	$\frac{1}{2}^+$	1	-1
	Σ^{*+}	uus	+1	1382.83	$\frac{3}{2}^+$	1	+1
	Σ^{*0}	uds	0	1383.7	$\frac{3}{2}^+$	1	0
	Σ^{*-}	dds	-1	1387.2	$\frac{3}{2}^+$	1	-1
	Ξ^0	uss	0	1314.86	$\frac{1}{2}^+$	$\frac{1}{2}$	$+\frac{1}{2}$
	Ξ^-	dss	-1	1321.71	$\frac{1}{2}^+$	$\frac{1}{2}$	$-\frac{1}{2}$
	Ξ^{*0}	uss	0	1531.80	$\frac{3}{2}^+$	$\frac{1}{2}$	$+\frac{1}{2}$
	Ξ^{*-}	dss	-1	1535.0	$\frac{3}{2}^+$	$\frac{1}{2}$	$-\frac{1}{2}$
	Ω^-	sss	-1	1672.45	$\frac{3}{2}^+$	0	0
	Λ_c^+	udc	+1	2286.46	$\frac{1}{2}^+$	0	0
	Σ_c^{++}	uuc	+2	2453.97	$\frac{1}{2}^+$	1	+1
	Σ_c^+	udc	+1	2452.9	$\frac{1}{2}^+$	1	0
	Σ_c^0	ddc	0	2453.75	$\frac{1}{2}^+$	1	-1
	Ξ_c^+	usc	+1	2467.71	$\frac{1}{2}^+$	$\frac{1}{2}$	$+\frac{1}{2}$
	Ξ_c^0	dsc	0	2470.44	$\frac{1}{2}^+$	$\frac{1}{2}$	$-\frac{1}{2}$
	Ω_c^0	ssc	0	2695.2	$\frac{1}{2}^+$	0	0
Mesons (Quark + antiquark)	π^+	$u\bar{d}$	+1	139.57	0^-	1	+1
	π^0	$\frac{u\bar{u} - d\bar{d}}{\sqrt{2}}$	0	134.98	0^{-+}	1	0
	K^+	$u\bar{s}$	+1	493.68	0^-	$\frac{1}{2}$	$+\frac{1}{2}$
	K^-	$\bar{u}s$	-1	493.68	0^-	$\frac{1}{2}$	$-\frac{1}{2}$
	K^0	$d\bar{s}$	0	497.61	0^-	$\frac{1}{2}$	$-\frac{1}{2}$
	$\bar{K}^0$	$\bar{d}s$	0	497.61	0^-	$\frac{1}{2}$	$+\frac{1}{2}$
	η	$\frac{u\bar{u} + d\bar{d} - 2s\bar{s}}{\sqrt{6}}$	0	547.86	0^{-+}	0	0
	η'	$\frac{u\bar{u} + d\bar{d} + s\bar{s}}{\sqrt{3}}$	0	957.78	0^{-+}	0	0
	ϕ	$s\bar{s}$	0	1019.46	1^{--}	0	0
	D^+	$c\bar{d}$	+1	1869.66	0^-	$\frac{1}{2}$	$+\frac{1}{2}$
	D^0	$c\bar{u}$	0	1864.84	0^-	$\frac{1}{2}$	$-\frac{1}{2}$
	D_s^+	$c\bar{s}$	+1	1968.34	0^-	0	0
	η_c	$c\bar{c}$	0	2983.9	0^{-+}	0	0
	J/ψ	$c\bar{c}$	0	3096.90	1^{--}	0	0

Table 1: Quark composition, mass, quantum numbers $J^{P(C)}$ and isospin of hadrons with u, d, s, c quarks