45. Monte Carlo Particle Numbering Scheme

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The Monte Carlo particle numbering scheme presented here is intended to facilitate interfacing between matrix-element generators, event generators, detector simulators, and analysis packages used in particle physics, and is widely accepted as the "industry standard".

The numbering scheme was introduced in 1988 [1], and has since been revised and expanded in the light of new information on hadronic resonances, and to encompass as yet undiscovered and hypothetical particles. The scheme was substantially updated and extended in 2012. Encodings have since been added for generic dark matter and for tetra- and penta-quark states; the 2026 update further refines the tetra/penta-quark schemes, and reserves ranges for user-specified states and PDG-node indexing. Further revisions and/or extensions of the numbering scheme are anticipated.

The general form for most particles is a 7-digit number:

$$\pm n\, n_r\, n_L\, n_{q_1}\, n_{q_2}\, n_{q_3}\, n_J \ .$$

This encodes information about the particle's spin, flavor content, and internal quantum numbers. A 9–digit extension is used specifically for tetra- and penta-quark states, and a distinct 10-digit scheme is used for encoding (hyper)nuclear states. The details are as follows:

1. Particles are given positive numbers, antiparticles negative numbers. The PDG convention for mesons is used, so that K^+ and B^+ are particles.
2. Quarks and leptons are numbered consecutively starting from 1 and 11 respectively; to do this they are first ordered by family and within families by weak isospin.
3. In composite quark systems (diquarks, mesons, and baryons) $n_{q_{1-3}}$ are quark numbers used to specify the quark content, while the rightmost digit $n_J = 2J + 1$ gives the system's spin (except for the K^0_S and K^0_L). The scheme does not cover particles of spin $J > 4$.
4. Diquarks have 4-digit numbers with $n_{q_1} \geq n_{q_2}$ and $n_{q_3} = 0$.
5. The numbering of mesons is guided by the non-relativistic (L–S decoupled) quark model, as listed in Tables 15.2, 15.3, and 15.4.
   (a) The numbers specifying the meson's quark content conform to the convention $n_{q_1} = 0$ and $n_{q_2} \geq n_{q_3}$. The special case K^0_L is the sole exception to this rule.
   (b) The quark numbers of flavorless, light (u, d, s) mesons are: 11 for the member of the isotriplet $(\pi^0, \rho^0, \ldots)$, 22 for the lighter isosinglet $(\eta, \omega, \ldots)$, and 33 for the heavier isosinglet $(\eta', \phi, \ldots)$. Since isosinglet mesons are often large mixtures of $u\bar{u} + d\bar{d}$ and $s\bar{s}$ states, 22 and 33 are assigned by mass and do not necessarily specify the dominant quark composition.
   (c) The special numbers 310 and 130 are given to the K^0_S and K^0_L respectively.
   (d) The fifth digit n_L is reserved to distinguish mesons of the same total (J) but different spin (S) and orbital (L) angular momentum quantum numbers. For $J > 0$ the numbers are: $(L, S) = (J-1, 1)$ $n_L = 0$, $(J, 0)$ $n_L = 1$, $(J, 1)$ $n_L = 2$ and $(J+1, 1)$ $n_L = 3$. For the exceptional case $J = 0$ the numbers are $(0, 0)$ $n_L = 0$ and $(1, 1)$ $n_L = 1$ (*i.e.* $n_L = L$). See Table 45.1.
   (e) If a set of physical mesons correspond to a (non-negligible) mixture of basis states, differing in their internal quantum numbers, then the lightest physical state gets the

smallest basis state number. For example the $K_1(1270)$ is numbered 10313 (1^1P_1 K_{1B}) and the $K_1(1400)$ is numbered 20313 (1^3P_1 K_{1A}), using $n^{(2s+1)}L_J$ spectroscopic notation.

(f) The sixth digit n_r is used to label mesons radially excited above the ground state.

Table 45.1: Meson numbering logic. Here qq stands for $n_{q2}\,n_{q3}$.

	$L=J-1,\ S=1$			$L=J,\ S=0$			$L=J,\ S=1$			$L=J+1,\ S=1$		
J	code	J^{PC}	L	code	J^{PC}	L	code	J^{PC}	L	code	J^{PC}	L
0	—	—	—	$00qq1$	0^{-+}	0	—	—	—	$10qq1$	0^{++}	1
1	$00qq3$	1^{--}	0	$10qq3$	1^{+-}	1	$20qq3$	1^{++}	1	$30qq3$	1^{--}	2
2	$00qq5$	2^{++}	1	$10qq5$	2^{-+}	2	$20qq5$	2^{--}	2	$30qq5$	2^{++}	3
3	$00qq7$	3^{--}	2	$10qq7$	3^{+-}	3	$20qq7$	3^{++}	3	$30qq7$	3^{--}	4
4	$00qq9$	4^{++}	3	$10qq9$	4^{-+}	4	$20qq9$	4^{--}	4	$30qq9$	4^{++}	5

(g) Numbers have been assigned for complete $n_r = 0$ S- and P-wave multiplets, even where states remain to be identified.

(h) In some instances assignments within the $q\bar{q}$ meson model are only tentative; here best guess assignments are made.

(i) Many states appearing in the Meson Listings are not yet assigned within the $q\bar{q}$ model. Here $n_{q_{2-3}}$ and n_J are assigned according to the state's likely flavors and spin; all such unassigned light isoscalar states are given the flavor code 22. Within these groups $n_L = 0, 1, 2, \ldots$ is used to distinguish states of increasing mass. These states are flagged using $n = 9$. It is to be expected that these numbers will evolve as the nature of the states are elucidated. Codes are assigned to most mesons that are listed in the one-page table at the end of the Meson Summary Table as long as they have a preferred or established spin. Additional heavy meson states expected from heavy quark spectroscopy are also assigned codes.

6. The numbering of baryons is again guided by the non-relativistic quark model, see Table 15.6. This numbering scheme is illustrated through a few examples in Table 45.2.

(a) The numbers specifying a baryon's quark content are generally ordered $n_{q_1} \geq n_{q_2} \geq n_{q_3}$.

(b) Two states exist for $J = 1/2$ baryons containing 3 distinct quark flavours. In the lighter state the light quarks are in an antisymmetric ($J = 0$) configuration, while for the heavier state they are in a symmetric ($J = 1$) configuration. In this situation n_{q_2} and n_{q_3} are reversed for the lighter state, so that the smaller number corresponds to the lighter baryon. For example, $uds \to \{\Lambda = 3122, \Sigma^0 = 3212\}$, the $udc = \{\Xi_c^+, \Xi_c^{\prime +}\}$ and $scb = \{\Omega_{bc}^0, \Omega_{bc}^{\prime 0}\}$ baryon pairs, and equivalents in those families.

(c) For excited baryons a scheme is adopted, where the n_r label is used to denote the excitation bands in the harmonic oscillator model, see Sec. 15.5. Using the notation employed there, n_r is given by the N-index of the D_N band identifier.

(d) Further degeneracies of excited hadron multiplets with the same excitation number n_r and spin J are lifted by labelling such multiplets with the n_L index according to their mass, as given by its N or Δ-equivalent.

(e) In such excited multiplets extra singlets may occur, the $\Lambda(1520)$ being a prominent example. In such cases the ordering is reversed such that the heaviest quark label is pushed to the last position: $n_{q_3} > n_{q_1} > n_{q_2}$.

Table 45.2: Some examples of octet (top) and decuplet (bottom) members for the numbering scheme for excited baryons. Here qqq stands for $n_{q_1} n_{q_2} n_{q_3}$. See the text for the definition of the notation. The numbers in parenthesis correspond to the mass of the baryons. The states marked as (?) are not experimentally confirmed.

J^P	(D, L_N^P)	$n_r n_L n_{q_1} n_{q_2} n_{q_3} n_J$	N	Λ_8	Σ	Ξ	Λ_1
	Octet		211,221	312	311,321,322	331,332	213
$1/2^+$	$(\mathbf{56}, \mathbf{0}_0^+)$	$00qqq2$	(939)	(1116)	(1193)	(1318)	—
$1/2^+$	$(\mathbf{56}, \mathbf{0}_2^+)$	$20qqq2$	(1440)	(1600)	(1660)	(1690)	—
$1/2^+$	$(\mathbf{70}, \mathbf{0}_2^+)$	$21qqq2$	(1710)	(1810)	(1880)	(?)	(?)
$1/2^-$	$(\mathbf{70}, \mathbf{1}_1^-)$	$10qqq2$	(1535)	(1670)	(1620)	(1750)	(1405)
J^P	(D, L_N^P)	$n_r n_L n_{q_1} n_{q_2} n_{q_3} n_J$	Δ		Σ	Ξ	Ω
	Decuplet		111,211,221,222		311,321,322	331,332	333
$3/2^+$	$(\mathbf{56}, \mathbf{0}_0^+)$	$00qqq4$	(1232)		(1385)	(1530)	(1672)
$3/2^+$	$(\mathbf{56}, \mathbf{0}_2^+)$	$20qqq4$	(1600)		(1690)	(?)	(?)
$1/2^-$	$(\mathbf{70}, \mathbf{1}_1^-)$	$11qqq2$	(1620)		(1750)	(?)	(?)
$3/2^-$	$(\mathbf{70}, \mathbf{1}_1^-)$	$12qqq4$	(1700)		(?)	(?)	(?)

7. The gluon, when considered as a gauge boson, has code number 21. In codes for glueballs, however, 9 is used to allow a notation in close analogy with that of hadrons.
8. The pomeron and odderon trajectories and a generic reggeon trajectory of states in QCD are assigned codes 990, 9990, and 110 respectively, where the final 0 indicates the indeterminate nature of the spin, and the other digits reflect the expected "valence" flavor content. We do not attempt a complete classification of all reggeon trajectories, since there is currently no need to distinguish a specific such trajectory from its lowest-lying member.
9. Two-digit numbers in the range 21–30 are provided for the Standard Model gauge and Higgs bosons.
10. Codes 81–100 are reserved for generator-specific pseudoparticles and concepts not corresponding to physical states. Codes 901–930, 1901–1930, 2901–2930, and 3901–3930 are for additional components of Standard Model parton distribution functions: the latter three ranges are intended to distinguish left/right/longitudinal components. Codes 998 and 999 are reserved for GEANT tracking purposes.
11. The search for physics beyond the Standard Model is an active area, so these codes are also standardized as far as possible.
    (a) A standard fourth generation of fermions is included by analogy with the first three.
    (b) The graviton and the boson content of a two-Higgs-doublet scenario and of additional SU(2)×U(1) groups are found in the range 31–40.
    (c) "One-of-a-kind" exotic particles are assigned numbers in the range 41–80. The subrange 61-80 is reserved for new heavier fermions in generic models, where partners to the SM fermions would have codes offset by 60. If required, however, other assignments could be made.
    (d) Fundamental supersymmetric particles are identified by adding a non-zero n to the particle number. The superpartner of a boson or a left-handed fermion has $n = 1$ while

the superpartner of a right-handed fermion has $n = 2$. When mixing occurs, such as between the winos and charged Higgsinos to give charginos, or between left and right sfermions, the lighter physical state is given the smaller basis-state number.

(e) Technicolor states have $n = 3$, with technifermions treated like ordinary fermions. States which are ordinary color singlets have $n_r = 0$. Color octets have $n_r = 1$. If a state has non-trivial quantum numbers under the top-color groups numbers are specified by tech,ij, where i and j are 1 or 2. n_L is then $2i + j$. The coloron, V_8, is a heavy gluon color octet and thus is 3100021.

(f) Excited (composite) quarks and leptons are identified by setting $n = 4$ and $n_r = 0$.

(g) Within several scenarios of new physics, it is possible to have colored particles sufficiently long-lived for color-singlet hadronic states to form around them. In the context of supersymmetric scenarios, these states are called R-hadrons, since they carry odd R-parity. R-hadron codes, defined here, should be viewed as templates for corresponding codes also in other scenarios, for any long-lived particle that is either an unflavored color octet or a flavored color triplet. The R-hadron code is obtained by combining the SUSY particle code with a code for the light degrees of freedom, with as many intermediate zeros removed from the former as required to make place for the latter at the end. (To exemplify, a sparticle $n00000n_{\tilde{q}}$ combined with quarks q_1 and q_2 obtains code $n00n_{\tilde{q}}n_{q_1}n_{q_2}n_J$.) Specifically, the new-particle spin decouples in the limit of large masses, so that the final n_J digit is defined by the spin state of the light-quark system alone. An appropriate number of n_q digits is used to define the ordinary-quark content. As usual, 9 rather than 21 is used to denote a gluon/gluino in composite states. The sign of the hadron agrees with that of the constituent new particle (a color triplet) where there is a distinct new antiparticle, and else is defined as for normal hadrons. Particle names are R with the flavor content as lower index.

(h) A black hole in models with extra dimensions has code 5000040. Kaluza-Klein excitations in models with extra dimensions have $n = 5$ or $n = 6$, to distinquish excitations of left- or right-handed fermions or, in case of mixing, the lighter or heavier state (cf. 11d). The nonzero n_r digit gives the radial excitation number, in scenarios where the level spacings allow these to be distinguished. Should the model also contain supersymmetry, excited SUSY states would be denoted by an $n_r > 0$, with $n = 1$ or 2 as usual. Should some colored states be long-lived enough that hadrons would form around them, the coding strategy of Ref. 11g applies, with the initial two nn_r digits preserved in the combined code.

(i) Magnetic monopoles and dyons are assumed to have one unit of Dirac monopole charge and a variable integer number $n_{q1}n_{q_2}n_{q_3}$ units of electric charge. Codes $411n_{q1}n_{q_2}n_{q_3}0$ are then used when the magnetic and electrical charge sign agree and $412n_{q1}n_{q_2}n_{q_3}0$ when they disagree, with the overall sign of the particle set by the magnetic charge. For now no spin information is provided.

(j) The nature of dark matter (DM) is not known, and therefore a definitive classification would be premature. Candidates from specific BSM scenarios are classified within those ranges, such as 1000022 for the lightest neutralino. Generic fundamental states can be given temporary codes in the range 51–60, with 51, 52 and 53 reserved for spin 0, 1/2 and 1 DM states (this could also include axions). Generic mediators of s-channel DM pair creation of annihilation can be given codes 54 and 55 for spin-0 or 1 respectively. Separate antiparticles, with negative codes, may or may not exist. More elaborate new scenarios should be constructed with $n = 5$ and $n_r = 9$.

(k) Hidden Valley particles have $n = 4$ and $n_r = 9$, and trailing numbers in agreement with their nearest-analog standard particles, as far as possible. Thus 4900021 is the gauge boson g_v of a confining gauge field, $490000 n_{q_v}$ and $490001 n_{\ell_v}$ are fundamental constituents charged or not under this, 4900022 is the γ_v of a non-confining field, and $4900 n_{q_{v1}} n_{q_{v2}} n_J$ a Hidden-Valley meson.

12. Occasionally users and program authors add their own states. These should be flagged by setting $nn_r = 99$, and $n_L = 0$ or 9 for user and program customisations respectively.

    In addition, the $nn_r = 99$ range may be used to provide an alternative classification of states by their PDG "node" identifier[1]. This non-decodeable approach is specifically intended for states with sufficiently tentative quantum numbers that they cannot yet be given unambiguous MC ID codes; where states are listed in the MC ID table at the end of this review, those explicit codes should be strongly preferred. For tentative states, the mapping of PDG nodes to MC custom IDs is as follows:

    991xxxx: S-nodes encoding, includes SM leptons, bosons, some hadrons, and BSM groups

    992xxxx: Q-node encoding, for quarks

    993xxxx: G-node encoding, currently only the gluon

    994xxxx: M-node encoding, for mesons and tetraquarks

    995xxxx: B-node encoding, for baryons and pentaquarks.

    where the xxxx placeholders are zero-padded, i.e. node Q005 maps to ID number 9920005. $n_L = 6$–8 codes are reserved for future expansion of the custom-state scheme.

13. Concerning the non-99 numbers, it may be noted that only quarks, excited quarks, squarks, and diquarks have $n_{q_3} = 0$; only diquarks, baryons, and the odderon have $n_{q_1} \neq 0$; and only mesons, the reggeon, and the pomeron have $n_{q_1} = 0$ and $n_{q_2} \neq 0$. Concerning mesons (not antimesons), if n_{q_1} is odd then it labels a quark and an antiquark if even.

14. Tetra-quark states are specified with 9-digit codes $\pm 1 n_r n_L n_{q_1} n_{q_2} 0 n_{q_3} n_{q_4} n_J$. For the particle $q_1 q_2$ is a diquark and $\bar{q}_3 \bar{q}_4$ an antidiquark, sorted such that $n_{q_1} \geq n_{q_2}$, $n_{q_3} \geq n_{q_4}$, $n_{q_1} \geq n_{q_3}$, and $n_{q_2} \geq n_{q_4}$ if $n_{q_1} = n_{q_3}$. For the antiparticle, given with a negative sign, $\bar{q}_1 \bar{q}_2$ is an antidiquark and $q_3 q_4$ a diquark, with the same sorting except that either $n_{q_1} > n_{q_3}$ or $n_{q_2} > n_{q_4}$ (so that flavour-diagonal states are particles). The n_J number has the same meaning as for ordinary hadrons. The n_r and n_L numbers do not have physical meaning as the non-relativistic quark model and masses (as for baryon disambiguation) are less clear with these novel states; instead, they are to be used as a two-digit indexing, from 00 to 99 and incrementing with new additions to the tables at the end of this section.

15. Penta-quark states are specified with 9-digit codes $\pm 1 n_r n_L n_{q_1} n_{q_2} n_{q_3} n_{q_4} n_{q_5} n_J$, sorted such that $n_{q_1} \geq n_{q_2} \geq n_{q_3} \geq n_{q_4}$. In the particle the first four are quarks and the fifth an antiquark while the opposite holds in the antiparticle, which is given with a negative sign. The n_J number has the same meaning as for ordinary hadrons. The n_r and n_L numbers do not have physical meaning as the non-relativistic quark model and masses (as for baryon disambiguation) are less clear with these novel states; instead, they are to be used as a two-digit indexing, from 00 to 99 and incrementing with new additions to the tables at the end of this section.

16. Nuclear codes are given as 10-digit numbers $\pm 10LZZZAAAI$. For a (hyper)nucleus consisting of n_p protons, n_n neutrons and n_Λ Λ's, $A = n_p + n_n + n_\Lambda$ gives the total baryon number, $Z = n_p$ the total charge and $L = n_\Lambda$ the total number of strange quarks. I gives the isomer

[1] See, e.g. the tail of the URL `https://pdglive.lbl.gov/Particle.action?node=Q005`.

level, with $I = 0$ corresponding to the ground state and $I > 0$ to excitations, see [2], where states denoted m, n, p, q translate to $I =$ 1–4. As examples, the deuteron is 1000010020 and ^{235}U is 1000922350. To avoid ambiguities, nuclear codes should not be applied to a single hadron, like p, n or Λ^0, where quark-contents-based codes already exist.

The following tables give explicit codings for established states listed in the Summary Tables and unestablished states required for MC modelling, following the preceding rules. This list is not exhaustive, and further codes may be used following the rules.

QUARKS	
d	1
u	2
s	3
c	4
b	5
t	6
b'	7
t'	8

LEPTONS	
e^-	11
ν_e	12
μ^-	13
ν_μ	14
τ^-	15
ν_τ	16
τ'^-	17
$\nu_{\tau'}$	18

GAUGE AND HIGGS BOSONS	
g	(9) 21
γ	22
Z^0	23
W^+	24
h^0/H_1^0	25
Z'/Z_2^0	32
Z''/Z_3^0	33
W'/W_2^+	34
H^0/H_2^0	35
A^0/H_3^0	36
H^+	37
H^{++}	38
a^0/H_4^0	40

SPECIAL PARTICLES	
G (graviton)	39
R^0	41
LQ^c	42
DM ($S=0$)	51
DM ($S=\frac{1}{2}$)	52
DM ($S=1$)	53
reggeon	110
pomeron	990
odderon	9990

for MC internal, use 81–100, 901–930, 998-999, 1901–1930, 2901–2930, and 3901–3930;

for custom user-specified physical states, use 9900000–9909999;

for custom program-specified physical states use 9990000–9999999;

for reference to PDG database nodes, for tentative and untabulated states, use 99{1,2,3,4,5}xxxx.

DIQUARKS	
$(dd)_1$	1103
$(ud)_0$	2101
$(ud)_1$	2103
$(uu)_1$	2203
$(sd)_0$	3101
$(sd)_1$	3103
$(su)_0$	3201
$(su)_1$	3203
$(ss)_1$	3303
$(cd)_0$	4101
$(cd)_1$	4103
$(cu)_0$	4201
$(cu)_1$	4203
$(cs)_0$	4301
$(cs)_1$	4303
$(cc)_1$	4403
$(bd)_0$	5101
$(bd)_1$	5103
$(bu)_0$	5201
$(bu)_1$	5203
$(bs)_0$	5301
$(bs)_1$	5303
$(bc)_0$	5401
$(bc)_1$	5403
$(bb)_1$	5503

SUSY PARTICLES	
$\widetilde{d}_L$	1000001
$\widetilde{u}_L$	1000002
$\widetilde{s}_L$	1000003
$\widetilde{c}_L$	1000004
$\widetilde{b}_1$	1000005[a]
$\widetilde{t}_1$	1000006[a]
$\widetilde{e}_L^-$	1000011
$\widetilde{\nu}_{eL}$	1000012
$\widetilde{\mu}_L^-$	1000013
$\widetilde{\nu}_{\mu L}$	1000014
$\widetilde{\tau}_1^-$	1000015[a]
$\widetilde{\nu}_{\tau L}$	1000016
$\widetilde{d}_R$	2000001
$\widetilde{u}_R$	2000002
$\widetilde{s}_R$	2000003
$\widetilde{c}_R$	2000004
$\widetilde{b}_2$	2000005[a]
$\widetilde{t}_2$	2000006[a]
$\widetilde{e}_R^-$	2000011
$\widetilde{\mu}_R^-$	2000013
$\widetilde{\tau}_2^-$	2000015[a]
$\widetilde{g}$	1000021
$\widetilde{\chi}_1^0$	1000022[b]
$\widetilde{\chi}_2^0$	1000023[b]
$\widetilde{\chi}_1^+$	1000024[b]
$\widetilde{\chi}_3^0$	1000025[b]
$\widetilde{\chi}_4^0$	1000035[b]
$\widetilde{\chi}_2^+$	1000037[b]
$\widetilde{G}$	1000039

LIGHT $I=1$ MESONS	
π^0	111
π^+	211
$a_0(980)^0$	9000111
$a_0(980)^+$	9000211
$\pi(1300)^0$	100111
$\pi(1300)^+$	100211
$a_0(1450)^0$	10111
$a_0(1450)^+$	10211
$\pi(1800)^0$	9010111
$\pi(1800)^+$	9010211
$\rho(770)^0$	113
$\rho(770)^+$	213
$b_1(1235)^0$	10113
$b_1(1235)^+$	10213
$a_1(1260)^0$	20113
$a_1(1260)^+$	20213
$\pi_1(1400)^0$	9000113
$\pi_1(1400)^+$	9000213
$\rho(1450)^0$	100113
$\rho(1450)^+$	100213
$\pi_1(1600)^0$	9010113
$\pi_1(1600)^+$	9010213
$a_1(1640)^0$	9020113
$a_1(1640)^+$	9020213
$\rho(1700)^0$	30113
$\rho(1700)^+$	30213
$\rho(1900)^0$	9030113
$\rho(1900)^+$	9030213
$\rho(2150)^0$	9040113
$\rho(2150)^+$	9040213
$a_2(1320)^0$	115
$a_2(1320)^+$	215
$\pi_2(1670)^0$	10115
$\pi_2(1670)^+$	10215
$\pi_2(1880)^0$	**110115**
$\pi_2(1880)^+$	**110215**
$a_2(1700)^0$	9000115
$a_2(1700)^+$	9000215
$\pi_2(2100)^0$	9010115
$\pi_2(2100)^+$	9010215
$\rho_3(1690)^0$	117
$\rho_3(1690)^+$	217
$\rho_3(1990)^0$	9000117
$\rho_3(1990)^+$	9000217
$\rho_3(2250)^0$	9010117
$\rho_3(2250)^+$	9010217
$a_4(1970)^0$	119
$a_4(1970)^+$	219

LIGHT $I=0$ MESONS ($u\bar{u}$, $d\bar{d}$, $s\bar{s}$ admixtures)	
η	221
$\eta'(958)$	331
$f_0(500)$	9000221
$f_0(980)$	9010221
$\eta(1295)$	100221
$f_0(1370)$	10221
$\eta(1405)$	9020221
$\eta(1475)$	100331
$f_0(1500)$	9030221
$f_0(1710)$	10331
$\eta(1760)$	9040221
$f_0(2020)$	9050221
$f_0(2100)$	9060221
$f_0(2200)$	9070221
$\eta(2225)$	9080221
$\omega(782)$	223
$\phi(1020)$	333
$h_1(1170)$	10223
$f_1(1285)$	20223
$h_1(1415)$	10333
$f_1(1420)$	20333
$\omega(1420)$	100223
$f_1(1510)$	9000223
$h_1(1595)$	9010223
$\omega(1650)$	30223
$\phi(1680)$	100333
$\phi(2170)$	**230333**
$f_2(1270)$	225
$f_2(1430)$	9000225
$f_2'(1525)$	335
$f_2(1565)$	9010225
$f_2(1640)$	9020225
$\eta_2(1645)$	10225
$f_2(1810)$	9030225
$\eta_2(1870)$	10335
$f_2(1910)$	9040225
$f_2(1950)$	9050225
$f_2(2010)$	9060225
$f_2(2150)$	9070225
$f_2(2300)$	9080225
$f_2(2340)$	9090225
$\omega_3(1670)$	227
$\phi_3(1850)$	337
$f_4(2050)$	229
$f_J(2220)$	9000229
$f_4(2300)$	9010229

STRANGE MESONS	
K_L^0	130
K_S^0	310
K^0	311
K^+	321
$K_0^*(700)^0$	9000311
$K_0^*(700)^+$	9000321
$K_0^*(1430)^0$	10311
$K_0^*(1430)^+$	10321
$K(1460)^0$	100311
$K(1460)^+$	100321
$K(1830)^0$	9010311
$K(1830)^+$	9010321
$K_0^*(1950)^0$	9020311
$K_0^*(1950)^+$	9020321
$K^*(892)^0$	313
$K^*(892)^+$	323
$K_1(1270)^0$	10313
$K_1(1270)^+$	10323
$K_1(1400)^0$	20313
$K_1(1400)^+$	20323
$K^*(1410)^0$	100313
$K^*(1410)^+$	100323
$K_1(1650)^0$	9000313
$K_1(1650)^+$	9000323
$K^*(1680)^0$	30313
$K^*(1680)^+$	30323
$K_2^*(1430)^0$	315
$K_2^*(1430)^+$	325
$K_2(1580)^0$	9000315
$K_2(1580)^+$	9000325
$K_2(1770)^0$	10315
$K_2(1770)^+$	10325
$K_2(1820)^0$	20315
$K_2(1820)^+$	20325
$K_2^*(1980)^0$	9010315
$K_2^*(1980)^+$	9010325
$K_2(2250)^0$	9020315
$K_2(2250)^+$	9020325
$K_3^*(1780)^0$	317
$K_3^*(1780)^+$	327
$K_3(2320)^0$	9010317
$K_3(2320)^+$	9010327
$K_4^*(2045)^0$	319
$K_4^*(2045)^+$	329
$K_4(2500)^0$	9000319
$K_4(2500)^+$	9000329

CHARMED MESONS	
D^+	411
D^0	421
$D_0^*(2300)^+$	10411
$D_0^*(2300)^0$	10421
$D^*(2010)^+$	413
$D^*(2007)^0$	423
$D_1(2420)^+$	10413
$D_1(2420)^0$	10423
$(D_1(H)^+$	20413)
$D_1(2430)^0$	20423
$D_2^*(2460)^+$	415
$D_2^*(2460)^0$	425
D_s^+	431
$D_{s0}^*(2317)^+$	10431
D_s^{*+}	433
$D_{s1}(2536)^+$	10433
$D_{s1}(2460)^+$	20433
$D_{s1}^*(2700)^+$	**100433**
$D_{s2}^*(2573)^+$	435
$D_3^*(2750)^+$	**417**
$D_3^*(2750)^0$	**427**
$D_{s3}^*(2860)^+$	**437**

$c\bar{c}$ MESONS	
$\eta_c(1S)$	441
$\chi_{c0}(1P)$	10441
$\chi_{c0}(3915)$	**110441**
$\eta_c(2S)$	100441
$J/\psi(1S)$	443
$h_c(1P)$	10443
$\chi_{c1}(1P)$	20443
$\chi_{c1}(3872)$	**120443**
$\chi_{c1}(4140)$	**220443**
$\chi_{c1}(4274)$	**320443**
$\psi(2S)$	100443
$\psi(4040)$	**200443**
$\psi(4230)$	**300443**
$\psi(4360)$	**400443**
$\psi(4415)$	**500443**
$\psi(4660)$	**600443**
$\psi(3770)$	30443
$\psi(4160)$	**130443**
$\chi_{c2}(1P)$	445
$\chi_{c2}(3930)$	100445
$\psi_2(3823)$	**20445**
$\psi_3(3842)$	**447**

BOTTOM MESONS	
B^0	511
B^+	521
$(B_0^{*0}$	10511)
$(B_0^{*+}$	10521)
B^{*0}	513
B^{*+}	523
$B_1(5721)^0$	10513
$B_1(5721)^+$	10523
$(B_1(H)^0$	20513)
$(B_1(H)^+$	20523)
$B_2^*(5747)^0$	515
$B_2^*(5747)^+$	525
B_s^0	531
$(B_{s0}^{*0}$	10531)
B_s^{*0}	533
$B_{s1}(5830)^0$	10533
$(B_{s1}(H)^0$	20533)
$B_{s2}^*(5840)^0$	535
B_c^+	541
$(B_{c0}^{*+}$	10541)
$B_c(2S)^+$	**100541**
$[B_c^{*+}$	543]
$(B_{c1}(L)^+$	10543)
$(B_{c1}(H)^+$	20543)
$[B_{c2}^{*+}$	545]

$b\bar{b}$ MESONS	
$\eta_b(1S)$	551
$\chi_{b0}(1P)$	10551
$\eta_b(2S)$	100551
$\chi_{b0}(2P)$	110551
$\eta_b(3S)$	200551
$\chi_{b0}(3P)$	210551
$\Upsilon(1S)$	553
$h_b(1P)$	10553
$\chi_{b1}(1P)$	20553
$\Upsilon_1(1D)$	30553
$\Upsilon(2S)$	100553
$h_b(2P)$	110553
$\chi_{b1}(2P)$	120553
$\Upsilon_1(2D)$	130553
$\Upsilon(3S)$	200553
$h_b(3P)$	210553
$\chi_{b1}(3P)$	220553
$\Upsilon(4S)$	300553
$\Upsilon(10860)$	9000553

$\Upsilon(11020)$	9010553
$\chi_{b2}(1P)$	555
$\eta_{b2}(1D)$	10555
$\Upsilon_2(1D)$	20555
$\chi_{b2}(2P)$	100555
$\eta_{b2}(2D)$	110555
$\Upsilon_2(2D)$	120555
$\chi_{b2}(3P)$	200555
$\Upsilon_3(1D)$	557
$\Upsilon_3(2D)$	100557

LIGHT BARYONS

p	2212
n	2112
Δ^{++}	2224
Δ^{+}	2214
Δ^{0}	2114
Δ^{-}	1114

STRANGE BARYONS

Λ	3122
Σ^{+}	3222
Σ^{0}	3212
Σ^{-}	3112
Σ^{*+}	3224[c]
Σ^{*0}	3214[c]
Σ^{*-}	3114[c]
Ξ^{0}	3322
Ξ^{-}	3312
Ξ^{*0}	3324[c]
Ξ^{*-}	3314[c]
Ω^{-}	3334

CHARMED BARYONS

Λ_c^{+}	4122
Σ_c^{++}	4222
Σ_c^{+}	4212
Σ_c^{0}	4112
Σ_c^{*++}	4224
Σ_c^{*+}	4214
Σ_c^{*0}	4114
Ξ_c^{+}	4232
Ξ_c^{0}	4132
$\Xi_c^{\prime +}$	4322
$\Xi_c^{\prime 0}$	4312
Ξ_c^{*+}	4324
Ξ_c^{*0}	4314
Ω_c^{0}	4332
Ω_c^{*0}	4334
Ξ_{cc}^{+}	4412
Ξ_{cc}^{++}	4422
Ξ_{cc}^{*+}	4414
Ξ_{cc}^{*++}	4424
Ω_{cc}^{+}	4432
Ω_{cc}^{*+}	4434
Ω_{ccc}^{++}	4444

BOTTOM BARYONS

Λ_b^{0}	5122
Σ_b^{-}	5112
Σ_b^{0}	5212
Σ_b^{+}	5222
Σ_b^{*-}	5114
Σ_b^{*0}	5214
Σ_b^{*+}	5224
Ξ_b^{-}	5132
Ξ_b^{0}	5232
$\Xi_b^{\prime -}$	5312
$\Xi_b^{\prime 0}$	5322
Ξ_b^{*-}	5314
Ξ_b^{*0}	5324
Ω_b^{-}	5332
Ω_b^{*-}	5334
Ξ_{bc}^{0}	5142
Ξ_{bc}^{+}	5242
$\Xi_{bc}^{\prime 0}$	5412
$\Xi_{bc}^{\prime +}$	5422
Ξ_{bc}^{*0}	5414
Ξ_{bc}^{*+}	5424
Ω_{bc}^{0}	5342
$\Omega_{bc}^{\prime 0}$	5432
Ω_{bc}^{*0}	5434
Ω_{bcc}^{+}	5442
Ω_{bcc}^{*+}	5444
Ξ_{bb}^{-}	5512
Ξ_{bb}^{0}	5522
Ξ_{bb}^{*-}	5514
Ξ_{bb}^{*0}	5524
Ω_{bb}^{-}	5532
Ω_{bb}^{*-}	5534
Ω_{bbc}^{0}	5542
Ω_{bbc}^{*0}	5544
Ω_{bbb}^{-}	5554

TETRA-QUARKS

$T_{c\bar{c}1}(3900)^{+}$	100420413
$T_{c\bar{c}1}(3900)^{0}$	100410413
$T_{c\bar{c}1}(4430)^{+}$	101420413
$T_{c\bar{c}1}(4430)^{0}$	101410413
$T_{b\bar{b}1}(10610)^{+}$	100520513
$T_{b\bar{b}1}(10610)^{0}$	100510513
$T_{b\bar{b}1}(10650)^{+}$	101520513
$T_{b\bar{b}1}(10650)^{0}$	101510513

Notes to the tables:

1) Numbers or names in **bold face** are new or have changed since the 2024 *Review*. Entries in square brackets are necessary multiplet states for consistent MC hadronisation models, which do not currently have experimentally evidenced entries in the RPP listings. Entries in parentheses do not currently have experimentally evidenced entries in the RPP listings.
2) All previously listed pentaquark states have been removed from the MC ID tables in the 2026 update due to not being considered experimentally established in the Summary Tables (Θ^{+} [100221132] and Φ^{--} [100331122]).

a) Particularly in the third generation, the left and right sfermion states may mix, as shown. The lighter mixed state is given the smaller number.

b) The physical $\widetilde{\chi}$ states are admixtures of the pure $\widetilde{\gamma}$, $\widetilde{Z}^0$, $\widetilde{W}^+$, $\widetilde{H}_1^0$, $\widetilde{H}_2^0$, and $\widetilde{H}^+$ states.

c) Σ^* and Ξ^* are alternate names for $\Sigma(1385)$ and $\Xi(1530)$.

References

[1] G. P. Yost *et al.* (Particle Data Group), Phys. Lett. **B204**, 1 (1988).

[2] G. Audi *et al.*, Nucl. Phys. **A729**, 3 (2003).