Baryons@PDG

2010 edition	2012 edition	2014 edition
Charles Wohl	Charles Wohl	Mike Pennington
Ron Workman	Eberhard Klempt	Charles Wohl (advisory)
	Ron Workman	Volker Burkert
		Eberhard Klempt
		Lothar Tiator
		Ron Workman

Benefits for the N^* community

- smaller (than PDG) group → more flexibility
- larger group (than 2010) → wider range of views represented
- opportunity to expand the baryon coverage (website) to include data, amplitudes, Q^2 dependence, etc.
- the larger PDG site/publication could possibly link to/select material from the N^* site as required for its broader review

Notable changes in the 2012 edition

Notation $L_{2I,\ 2J}$ changed to N, Δ J^P

Baryon Summary Table

This short table gives the name, the quantum numbers (where known), and the status of baryons in the Review. Only the baryons with 3- or 4-star status are included in the main Baryon Summary Table. Due to insufficient data or uncertain interpretation, the other entries in the short table are not established baryons. The names with masses are of baryons that decay strongly. For N, Δ, and Ξ resonances, the πN partial wave is indicated by the symbol $L_{2I,2J}$, where L is the orbital angular momentum (S, P, D, ...), I is the isospin, and J is the total angular momentum. For Λ and Σ resonances, the $\overline{K}N$ partial wave is labeled $L_{I,2J}$. The nucleon is a pole in the P_{11} wave, and similar comments apply to the Λ and Σ.

2010

p	P_{11}	****	$\Delta(1232)$	P_{33}	****	Σ^+	P_{11}	****	Ξ^0	P_{11}	****	Λ_c^+		****
n	P_{11}	****	$\Delta(1600)$	P_{33}	***	Σ^0	P_{11}	****	Ξ^-	P_{11}	****	$\Lambda_c(2595)^+$		***
$N(1440)$	P_{11}	****	$\Delta(1620)$	S_{31}	****	Σ^-	P_{11}	****	$\Xi(1530)$	P_{13}	****	$\Lambda_c(2625)^+$		***
$N(1520)$	D_{13}	****	$\Delta(1700)$	D_{33}	****	$\Sigma(1385)$	P_{13}	****	$\Xi(1620)$		*	$\Lambda_c(2765)^+$		*
$N(1535)$	S_{11}	****	$\Delta(1750)$	P_{31}	*	$\Sigma(1480)$		*	$\Xi(1690)$		***	$\Lambda_c(2880)^+$		***
$N(1650)$	S_{11}	****	$\Delta(1900)$	S_{31}	**	$\Sigma(1560)$		**	$\Xi(1820)$	D_{13}	***	$\Lambda_c(2940)^+$		***
$N(1675)$	D_{15}	****	$\Delta(1905)$	F_{35}	****	$\Sigma(1580)$	D_{13}	*	$\Xi(1950)$		***	$\Sigma_c(2455)$		****
$N(1680)$	F_{15}	****	$\Delta(1910)$	P_{31}	****	$\Sigma(1620)$	S_{11}	**	$\Xi(2030)$		***	$\Sigma_c(2520)$		***

became

2012

p	$1/2^+$	****	$\Delta(1232)$	$3/2^+$	****	Σ^+	$1/2^+$	****	Ξ^0	$1/2^+$	****	Λ_c^+	$1/2^+$	****
n	$1/2^+$	****	$\Delta(1600)$	$3/2^+$	***	Σ^0	$1/2^+$	****	Ξ^-	$1/2^+$	****	$\Lambda_c(2595)^+$	$1/2^-$	***
$N(1440)$	$1/2^+$	****	$\Delta(1620)$	$1/2^-$	****	Σ^-	$1/2^+$	****	$\Xi(1530)$	$3/2^+$	****	$\Lambda_c(2625)^+$	$3/2^-$	***
$N(1520)$	$3/2^-$	****	$\Delta(1700)$	$3/2^-$	****	$\Sigma(1385)$	$3/2^+$	****	$\Xi(1620)$		*	$\Lambda_c(2765)^+$		*
$N(1535)$	$1/2^-$	****	$\Delta(1750)$	$1/2^+$	*	$\Sigma(1480)$		*	$\Xi(1690)$		***	$\Lambda_c(2880)^+$	$5/2^+$	***
$N(1650)$	$1/2^-$	****	$\Delta(1900)$	$1/2^-$	**	$\Sigma(1560)$		**	$\Xi(1820)$	$3/2^-$	***	$\Lambda_c(2940)^+$		***
$N(1675)$	$5/2^-$	****	$\Delta(1905)$	$5/2^+$	****	$\Sigma(1580)$	$3/2^-$	*	$\Xi(1950)$		***	$\Sigma_c(2455)$	$1/2^+$	****
$N(1680)$	$5/2^+$	****	$\Delta(1910)$	$1/2^+$	****	$\Sigma(1620)$	$1/2^-$	**	$\Xi(2030)$	$\geq \frac{5}{2}$?	***	$\Sigma_c(2520)$	$3/2^+$	***

Table 1. The status of the N and Δ resonances. Only those with an overall status of *** or **** are included in the main Baryon Summary Table.

2010

Particle	$L_{2I\cdot 2J}$	Overall status	Status as seen in — $N\pi$	$N\eta$	ΛK	ΣK	$\Delta\pi$	$N\rho$	$N\gamma$
$N(939)$	P_{11}	****							
$N(1440)$	P_{11}	****	****	*			***	*	***
$N(1520)$	D_{13}	****	****	***			****	****	****
$N(1535)$	S_{11}	****	****	****			*	**	***
$N(1650)$	S_{11}	****	****	*	***	**	***	**	***
$N(1675)$	D_{15}	****	****	*	*		****	*	****
$N(1680)$	F_{15}	****	****	*			****	****	****

became

2012

Particle	J^P	Status overall	πN	γN	Status as seen in — $N\eta$	$N\sigma$	$N\omega$	ΛK	ΣK	$N\rho$	$\Delta\pi$
N	$1/2^+$	****									
$N(1440)$	$1/2^+$	****	****	****		***				*	***
$N(1520)$	$3/2^-$	****	****	****	***					***	***
$N(1535)$	$1/2^-$	****	****	****	****					**	*
$N(1650)$	$1/2^-$	****	****	***	***			***	**	**	***
$N(1675)$	$5/2^-$	****	****	***	*			*		*	***
$N(1680)$	$5/2^+$	****	****	****	*	**				***	***

Baryon status table changed to reflect the influence of γN reactions

Changes in the 2014 edition and beyond

For the Note on N and Delta resonances:

Added a short section on the electro-production of mesons

Outlined the minimal error analysis required for new results

Recent activity:

A brief review of the Λ(1405) has been written to address the recent flurry of publications (theory/experiment) reporting a two-pole structure. [*Ulf-G. Meissner and T. Hyodo*]

The group plans to meet at the upcoming ATHOS/PWA8 meeting (GWU) to discuss the star rating system