Δ BARYONS
$(S = 0, I = 3/2)$

$\Delta^{++} = uuu$, $\Delta^{+} = uud$, $\Delta^{0} = udd$, $\Delta^{-} = ddd$

$\Delta(1232)$ P_{33}

$I(J^P) = \frac{3}{2}(\frac{3}{2}^+)$

Breit-Wigner mass (mixed charges) = 1231 to 1233 ($\approx$ 1232) MeV
Breit-Wigner full width (mixed charges) = 116 to 120 ($\approx$ 118) MeV
$p_{\text{beam}} = 0.30$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 94.8$ mb
Re(pole position) = 1209 to 1211 ($\approx$ 1210) MeV
-2Im(pole position) = 98 to 102 ($\approx$ 100) MeV

$\Delta(1232)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	100 %	229
$N\gamma$	0.52–0.60 %	259
$N\gamma$, helicity=1/2	0.11–0.13 %	259
$N\gamma$, helicity=3/2	0.41–0.47 %	259

$\Delta(1600)$ P_{33}

$I(J^P) = \frac{3}{2}(\frac{3}{2}^+)$

Breit-Wigner mass = 1550 to 1700 ($\approx$ 1600) MeV
Breit-Wigner full width = 250 to 450 ($\approx$ 350) MeV
$p_{\text{beam}} = 0.87$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 18.6$ mb
Re(pole position) = 1500 to 1700 ($\approx$ 1600) MeV
-2Im(pole position) = 200 to 400 ($\approx$ 300) MeV

$\Delta(1600)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	10–25 %	513
$N\pi\pi$	75–90 %	477
$\Delta\pi$	40–70 %	303
$N\rho$	$<$25 %	†
$N(1440)\pi$	10–35 %	82
$N\gamma$	0.001–0.02 %	525
$N\gamma$, helicity=1/2	0.0–0.02 %	525
$N\gamma$, helicity=3/2	0.001–0.005 %	525

$\Delta(1620)\ S_{31}$

$I(J^P) = \frac{3}{2}(\frac{1}{2}^-)$

Breit-Wigner mass = 1600 to 1660 (≈ 1630) MeV
Breit-Wigner full width = 135 to 150 (≈ 145) MeV
$p_{\text{beam}} = 0.93$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 17.2$ mb
Re(pole position) = 1590 to 1610 (≈ 1600) MeV
−2Im(pole position) = 115 to 120 (≈ 118) MeV

$\Delta(1620)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	20–30 %	534
$N\pi\pi$	70–80 %	499
$\Delta\pi$	30–60 %	328
$N\rho$	7–25 %	†
$N\gamma$	0.004–0.044 %	545
$N\gamma$, helicity=1/2	0.004–0.044 %	545

$\Delta(1700)\ D_{33}$

$I(J^P) = \frac{3}{2}(\frac{3}{2}^-)$

Breit-Wigner mass = 1670 to 1750 (≈ 1700) MeV
Breit-Wigner full width = 200 to 400 (≈ 300) MeV
$p_{\text{beam}} = 1.05$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 14.5$ mb
Re(pole position) = 1620 to 1680 (≈ 1650) MeV
−2Im(pole position) = 160 to 240 (≈ 200) MeV

$\Delta(1700)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	10–20 %	581
$N\pi\pi$	80–90 %	550
$\Delta\pi$	30–60 %	386
$N\rho$	30–55 %	†
$N\gamma$	0.12–0.26 %	591
$N\gamma$, helicity=1/2	0.08–0.16 %	591
$N\gamma$, helicity=3/2	0.025–0.12 %	591

$\Delta(1905)\ F_{35}$

$I(J^P) = \frac{3}{2}(\frac{5}{2}^+)$

Breit-Wigner mass = 1865 to 1915 (≈ 1890) MeV
Breit-Wigner full width = 270 to 400 (≈ 330) MeV
$p_{\text{beam}} = 1.42$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 9.89$ mb
Re(pole position) = 1825 to 1835 (≈ 1830) MeV
−2Im(pole position) = 265 to 300 (≈ 280) MeV

Δ(1905) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	0.09 to 0.15	704
$N\pi\pi$	85–95 %	680
$\Delta\pi$	$<$25 %	531
$N\rho$	$>$60 %	397
$N\gamma$	0.01–0.03 %	712
$N\gamma$, helicity=1/2	0.0–0.1 %	712
$N\gamma$, helicity=3/2	0.004–0.03 %	712

$\Delta(1910)\ P_{31}$

$I(J^P) = \frac{3}{2}(\frac{1}{2}^+)$

Breit-Wigner mass = 1870 to 1920 ($\approx$ 1910) MeV
Breit-Wigner full width = 190 to 270 ($\approx$ 250) MeV
$p_{\text{beam}} = 1.46$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 9.54$ mb
Re(pole position) = 1830 to 1880 ($\approx$ 1855) MeV
$-$2Im(pole position) = 200 to 500 ($\approx$ 350) MeV

Δ(1910) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	15–30 %	717
$N\gamma$	0.0–0.2 %	725
$N\gamma$, helicity=1/2	0.0–0.2 %	725

$\Delta(1920)\ P_{33}$

$I(J^P) = \frac{3}{2}(\frac{3}{2}^+)$

Breit-Wigner mass = 1900 to 1970 ($\approx$ 1920) MeV
Breit-Wigner full width = 150 to 300 ($\approx$ 200) MeV
$p_{\text{beam}} = 1.48$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 9.37$ mb
Re(pole position) = 1850 to 1950 ($\approx$ 1900) MeV
$-$2Im(pole position) = 200 to 400 ($\approx$ 300) MeV

Δ(1920) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	5–20 %	723
ΣK	(2.10$\pm$0.30) %	431

$\Delta(1930)\ D_{35}$

$I(J^P) = \frac{3}{2}(\frac{5}{2}^-)$

Breit-Wigner mass = 1900 to 2020 ($\approx$ 1960) MeV
Breit-Wigner full width = 220 to 500 ($\approx$ 360) MeV
$p_{\text{beam}} = 1.56$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 8.76$ mb
Re(pole position) = 1840 to 1960 ($\approx$ 1900) MeV
-2Im(pole position) = 175 to 360 ($\approx$ 270) MeV

Δ(1930) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	0.05 to 0.15	748
$N\gamma$	0.0–0.02 %	755
$N\gamma$, helicity=1/2	0.0–0.01 %	755
$N\gamma$, helicity=3/2	0.0–0.01 %	755

$\Delta(1950)\ F_{37}$

$I(J^P) = \frac{3}{2}(\frac{7}{2}^+)$

Breit-Wigner mass = 1915 to 1950 ($\approx$ 1930) MeV
Breit-Wigner full width = 235 to 335 ($\approx$ 285) MeV
$p_{\text{beam}} = 1.50$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 9.21$ mb
Re(pole position) = 1870 to 1890 ($\approx$ 1880) MeV
-2Im(pole position) = 220 to 260 ($\approx$ 240) MeV

Δ(1950) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	0.35 to 0.45	729
$N\pi\pi$		706
$\Delta\pi$	20–30 %	560
$N\rho$	<10 %	442
$N\gamma$	0.08–0.13 %	737
$N\gamma$, helicity=1/2	0.03–0.055 %	737
$N\gamma$, helicity=3/2	0.05–0.075 %	737

$\Delta(2420)\ H_{3,11}$

$I(J^P) = \frac{3}{2}(\frac{11}{2}^+)$

Breit-Wigner mass = 2300 to 2500 ($\approx$ 2420) MeV
Breit-Wigner full width = 300 to 500 ($\approx$ 400) MeV
$p_{\text{beam}} = 2.64$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 4.68$ mb
Re(pole position) = 2260 to 2400 ($\approx$ 2330) MeV
-2Im(pole position) = 350 to 750 ($\approx$ 550) MeV

Δ(2420) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	5–15 %	1023