Δ BARYONS
($S = 0$, $I = 3/2$)

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

Δ(1232) P_{33}

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

Mass $m = 1230$ to 1234 (≈ 1232) MeV
Full width $\Gamma = 115$ to 125 (≈ 120) MeV
$p_{\text{beam}} = 0.30$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 94.8$ mb

Δ(1232) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	>99 %	227
$N\gamma$	0.54–0.61 %	259
$N\gamma$, helicity=1/2	0.12–0.14 %	259
$N\gamma$, helicity=3/2	0.41–0.47 %	259

Δ(1600) P_{33}

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

Mass $m = 1550$ to 1700 (≈ 1600) MeV
Full width $\Gamma = 250$ to 450 (≈ 350) MeV
$p_{\text{beam}} = 0.87$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 18.6$ mb

Δ(1600) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	10–25 %	512
$N\pi\pi$	75–90 %	473
$\Delta\pi$	40–70 %	301
$N\rho$	<25 %	†
$N(1440)\pi$	10–35 %	74
$N\gamma$	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

$\Delta(1620)\ S_{31}$ $\quad I(J^P) = \frac{3}{2}(\frac{1}{2}^-)$

Mass $m = 1615$ to 1675 (≈ 1620) MeV
Full width $\Gamma = 120$ to 180 (≈ 150) MeV
$p_{\text{beam}} = 0.91$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 17.7$ mb

$\Delta(1620)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	20–30 %	526
$N\pi\pi$	70–80 %	488
$\Delta\pi$	30–60 %	318
$N\rho$	7–25 %	†
$N\gamma$	0.004–0.044 %	538
$N\gamma$, helicity=1/2	0.004–0.044 %	538

$\Delta(1700)\ D_{33}$ $\quad I(J^P) = \frac{3}{2}(\frac{3}{2}^-)$

Mass $m = 1670$ to 1770 (≈ 1700) MeV
Full width $\Gamma = 200$ to 400 (≈ 300) MeV
$p_{\text{beam}} = 1.05$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 14.5$ mb

$\Delta(1700)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	10–20 %	580
$N\pi\pi$	80–90 %	547
$\Delta\pi$	30–60 %	385
$N\rho$	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

$\Delta(1900)\ S_{31}$ $\quad I(J^P) = \frac{3}{2}(\frac{1}{2}^-)$

Mass $m = 1850$ to 1950 (≈ 1900) MeV
Full width $\Gamma = 140$ to 240 (≈ 200) MeV
$p_{\text{beam}} = 1.44$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 9.71$ mb

$\Delta(1900)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	10–30 %	710

$\Delta(1905)\ F_{35}$ $I(J^P) = \frac{3}{2}(\frac{5}{2}^+)$

Mass $m = 1870$ to 1920 (≈ 1905) MeV
Full width $\Gamma = 280$ to 440 (≈ 350) MeV
$p_{\text{beam}} = 1.45$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 9.62$ mb

$\Delta(1905)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	5–15 %	713
$N\pi\pi$	85–95 %	687
$\Delta\pi$	<25 %	542
$N\rho$	>60 %	421
$N\gamma$	0.01–0.03 %	721
$N\gamma$, helicity=1/2	0.0–0.1 %	721
$N\gamma$, helicity=3/2	0.004–0.03 %	721

$\Delta(1910)\ P_{31}$ $I(J^P) = \frac{3}{2}(\frac{1}{2}^+)$

Mass $m = 1870$ to 1920 (≈ 1910) MeV
Full width $\Gamma = 190$ to 270 (≈ 250) MeV
$p_{\text{beam}} = 1.46$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 9.54$ mb

$\Delta(1910)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	15–30 %	716
$N\gamma$	0.0–0.2 %	725
$N\gamma$, helicity=1/2	0.0–0.2 %	725

$\Delta(1920)\ P_{33}$ $I(J^P) = \frac{3}{2}(\frac{3}{2}^+)$

Mass $m = 1900$ to 1970 (≈ 1920) MeV
Full width $\Gamma = 150$ to 300 (≈ 200) MeV
$p_{\text{beam}} = 1.48$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 9.37$ mb

$\Delta(1920)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	5–20 %	722

$\Delta(1930)$ D_{35} $I(J^P) = \frac{3}{2}(\frac{5}{2}^-)$

Mass $m = 1920$ to 1970 (≈ 1930) MeV
Full width $\Gamma = 250$ to 450 (≈ 350) MeV
$p_{\text{beam}} = 1.50$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 9.21$ mb

$\Delta(1930)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	10–20 %	729
$N\gamma$	0.0–0.02 %	737
$N\gamma$, helicity=1/2	0.0–0.01 %	737
$N\gamma$, helicity=3/2	0.0–0.01 %	737

$\Delta(1950)$ F_{37} $I(J^P) = \frac{3}{2}(\frac{7}{2}^+)$

Mass $m = 1940$ to 1960 (≈ 1950) MeV
Full width $\Gamma = 290$ to 350 (≈ 300) MeV
$p_{\text{beam}} = 1.54$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 8.91$ mb

$\Delta(1950)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$N\pi$	35–40 %	741
$N\pi\pi$		716
$\Delta\pi$	20–30 %	574
$N\rho$	<10 %	469
$N\gamma$	0.08–0.13 %	749
$N\gamma$, helicity=1/2	0.03–0.055 %	749
$N\gamma$, helicity=3/2	0.05–0.075 %	749

$\Delta(2420)$ $H_{3,11}$ $I(J^P) = \frac{3}{2}(\frac{11}{2}^+)$

Mass $m = 2300$ to 2500 (≈ 2420) MeV
Full width $\Gamma = 300$ to 500 (≈ 400) MeV
$p_{\text{beam}} = 2.64$ GeV/c $\quad 4\pi\lambda\!\!\!^{-2} = 4.68$ mb

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