Resonances of 3/2 spin

$$\frac{d\sigma_T}{d(-\cos\theta_K)} = \frac{FP}{(M_{N^*}^2 - W^2)^2 + (\Gamma_{N^*} M_{N^*})^2} \cdot$$

$$\cdot \Bigg\{ \sum_{\substack{\lambda_\gamma = +1 \\ \lambda_p = 1/2 \\ \lambda_Y = \pm 1/2}} \left(T_{em}^{1/2} \cdot T_h\right)^2 \left[d^{3/2}_{1/2 - \lambda_Y}(\cos\theta_K)\right]^2 +$$

$$+ \sum_{\substack{\lambda_\gamma = +1 \\ \lambda_p = -1/2 \\ \lambda_Y = \pm 1/2}} \left(T_{em}^{3/2}\, T_h\right)^2 \left[d^{3/2}_{3/2 - \lambda_Y}(\cos\theta_K)\right]^2 +$$

$$+ \sum_{\substack{\lambda_\gamma = -1 \\ \lambda_p = 1/2 \\ \lambda_Y = \pm 1/2}} \left(T_{em}^{3/2}\, T_h\right)^2 \left[d^{3/2}_{-3/2 - \lambda_Y}(\cos\theta_K)\right]^2$$

$$+ \sum_{\substack{\lambda_\gamma = -1 \\ \lambda_p = -1/2 \\ \lambda_Y = \pm 1/2}} \left(T_{em}^{1/2}\, T_h\right)^2 \left[d^{3/2}_{-1/2 - \lambda_Y}(\cos\theta_K\right]^2 \Bigg\}$$

$$d^j_{m'm} = d^j_{-m-m'}$$

$$d^j_{m'm} = (-1)^{m-m'} d^j_{mm'}$$

$$\frac{d\sigma_T}{d(-\cos\theta)} = \frac{FP}{(M_{N^*}^2 - W^2)^2 + (\Gamma_{N^*} M_{N^*})^2} \cdot$$

$$\cdot\, 2 \left\{ \sum_{\substack{\lambda_\gamma = +1 \\ \lambda_p = 1/2 \\ \lambda_\eta = \pm 1/2}} \left(T^{1/2}_{em} T_\eta\right)^2 \left[d^{3/2}_{1/2 - \lambda_\eta} (\cos\theta_K)\right]^2 + \right.$$

$$\left. + \sum_{\substack{\lambda_\gamma = -1 \\ \lambda_p = -1/2 \\ \lambda_\eta = \pm 1/2}} \left(T^{3/2}_{em} T_\eta\right)^2 \left[d^{3/2}_{3/2 - \lambda_\eta} (\cos\theta_K)\right]^2 \right\}$$

$=\cdot$

$$= \frac{F P \cdot 2}{(M_{N*}^2 - W^2)^2 + (\Gamma_{N*} M_{N*})^2} \cdot$$

$$\cdot \Big[\left(T_{em}^{1/2} T_4 \right)^2 \Big\{ \frac{(3\cos\theta_K - 1)^2}{4} \cos^2\frac{\theta_K}{2} + \frac{(3\cos\theta_K + 1)^2}{4} \sin^2\frac{\theta_K}{2} \Big\} +$$

$$+ \left(T_{em}^{3/2} T_4 \right)^2 \Big\{ \frac{3}{4}(1+\cos\theta)^2 \sin^2\theta/2 + \frac{3}{4}(1-\cos\theta)^2 \cos^2\theta/2 \Big\} \Big]$$

$$\frac{1}{4}\Big((9\cos^2\theta_K - 6\cos\theta_K + 1)\cos^2\frac{\theta_K}{2} + (9\cos^2\theta_K + 6\cos\theta_K + 1)\sin^2\frac{\theta_K}{2} \Big) =$$

$$= \frac{1}{4}\left[9\cos^2\theta_K + 1 - 6\cos^2\theta_K \right] =$$

$$= \frac{1}{4}\left(3\cos^2\theta_K + 1 \right)$$

$$\frac{3}{4}\left((1+\cos\theta_k)^2 \sin^2\frac{\theta_k}{2} + (1-\cos\theta_k)^2 \cos^2\frac{\theta_k}{2} \right) =$$

$$= \frac{3}{4}\Big[(1+2\cos\theta_k + \cos^2\theta_k)\sin^2\frac{\theta_k}{2} + $$
$$+ (1-2\cos\theta_k + \cos^2\theta_k)\cos^2\frac{\theta_k}{2}\Big] =$$
$$= \frac{3}{4}\left[1+\cos^2\theta_k - 2\cos^2\theta_k\right] =$$
$$= \frac{3}{4}\left[1-\cos^2\theta_k\right] = \frac{3}{4}\sin^2\theta_k$$

$$\frac{d\sigma}{d(-\cos\theta_k)} = \frac{FP \cdot 2}{(M_{N^*}^2 - W^2)^2 + (\Gamma_{N^*} M_{N^*})^2} \cdot$$
$$\cdot \left\{ (T_{em}^{1/2} T_h)^2 \frac{1}{4}(3\cos^2\theta_k + 1) + (T_{em}^{3/2} T_h)^2 \cdot \right.$$
$$\left. \cdot \frac{3}{4}\sin^2\theta_k \right\}$$

$3/2$

$$\frac{d\sigma}{d(-\cos\theta_K)} = \frac{\cancel{4\pi\alpha}}{4K_L \cancel{M_N}}\,\frac{1}{\cancel{2}}\,\frac{1}{\cancel{2}}\,\frac{\cancel{q_K}}{\cancel{2\pi}\,4W}\cdot\frac{\cancel{2}}{(M_{N*}^2-W^2)^2+(\Gamma_{N*}M_{N*})^2}$$

$$\cdot\,\frac{\cancel{W^2}}{\cancel{M_{N*}^2}}\,\frac{\overset{4}{\cancel{8}}\cancel{M_N}M_2\,q_{\gamma 2}^2}{q_\gamma\,\cancel{4\pi\alpha}}\cdot\frac{4(\cancel{2\pi})(2J_{N*}+1)M_{N*}^2\,\Gamma_\gamma}{\cancel{q_K}}\,\cdot$$

$$\cdot\left\{A_{1/2}^2\cdot\frac{1}{4}(3\cos^2\theta_K+1)+A_{3/2}^2\,\frac{3}{4}\sin^2\theta_K\right\}$$

$$\frac{d\sigma}{d(-\cos\theta_K)} = \frac{\Gamma_\gamma W\,4\,q_{\gamma 2}^2(2J_{N*}+1)M_{N*}}{4K_L q_\gamma}\,\frac{1}{(M_{N*}^2-W^2)^2+(\Gamma_{N*}M_{N*})^2}$$

$$\cdot\left\{A_{1/2}^2\,\frac{1}{4}(3\cos^2\theta_K+1)+A_{3/2}^2\,\frac{3}{4}\sin^2\theta_K\right\}$$

$$W = M_{N*}$$

$$\frac{d\sigma}{d(-\cos\theta_K)} = \frac{\Gamma_\gamma W q_{\gamma 2}^2(2J_{N*}+1)M_{N*}}{K_L q_\gamma}\,\frac{1}{(\Gamma_{N*}M_{N*})^2}\{\ \}$$

$$= \frac{W q_{\gamma 2}^2(2J_{N*}+1)\,\Gamma_\gamma}{K_L q_\gamma \Gamma_{N*}^2 M_{N*}}\left\{A_{1/2}^2\cdot\frac{1}{4}(3\cos^2\theta_K+1)\right.$$

$$\left.+A_{3/2}^2\,\frac{3}{4}\sin^2\theta_K\right\}$$