When proton, target and residual nucleus are unpolarized

$$\frac{d\sigma^{h}}{d\vec{p}_0'\, d\vec{p}_1'} = K\left\{ 2\epsilon_L f_{00} + f_{11} + \left[\epsilon_L(1+\epsilon)\right]^{1/2} f_{01}\cos\alpha + \epsilon f_{1-1}\cos 2\alpha + h\left[\epsilon_L(1-\epsilon)\right]^{1/2} f_{01}'\sin\alpha \right\}$$

$f_{00} = W^{00}$ $\quad f_{11} = W^{xx} + W^{yy}$ $\quad f_{01} = -2\sqrt{2}\,\mathrm{Re}\,W^{0x}$ $\quad f_{1-1} = W^{yy} - W^{xx}$

$f_{01}' = -2\sqrt{2}\,\mathrm{Im}\,W^{0x}$

For a polarized particle with $\boxed{s = 1/2}$

$$\rho_{\lambda\lambda'} = \frac{1}{2}\left(1 + \vec{P}\cdot\vec{\sigma}\right)$$

$\vec{P}$ = vector polarization, σ are Pauli matrices

The $(\vec{e}, e'\vec{p})$ cross section

$$\frac{d\sigma^{h,s'}}{d\vec{p}_0'\, d\vec{p}_1'} = K\left\{\left[2\epsilon_L f_{00} + f_{11} + \sqrt{\epsilon_L(1+\epsilon)}\left(f_{01}\cos\alpha + \bar{f}_{01}\sin\alpha\right) - \epsilon\left(f_{1-1}\cos 2\alpha + \bar{f}_{1-1}\sin 2\alpha\right)\right] + h\left[\sqrt{(1-\epsilon^2)}\, f_{11}' + \sqrt{\epsilon_L(1-\epsilon)}\left(f_{01}'\sin\alpha + \bar{f}_{01}'\cos\alpha\right)\right]\right\}$$

$$f_{\lambda\lambda'} = h^{u}_{\lambda\lambda'} + \vec{\sigma}\cdot\vec{h}_{\lambda\lambda'}$$

h^{u}_{00} $\quad h^{u}_{11}$ $\quad h^{u}_{01}$ $\quad h^{u}_{1-1}$ $\quad h'^{u}_{01}$ $\qquad$ 5 spin independent structure functions

$\vec{\sigma}\cdot\vec{h}_{\lambda\lambda'}$ can be projected into a basis

$\hat{L} \parallel \vec{p}_1'$ $\qquad \hat{N} = \vec{q}\times\vec{p}_1'$ $\qquad \hat{S} = \hat{N}\times\hat{L}$

define c.o.m. helicity frame