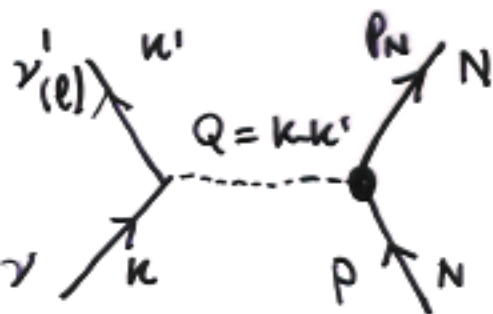


NC (and CC) γ -NUCLEON ELASTIC CROSS SECTION



$$M_{fi} = i \frac{G}{\sqrt{2}} N_k N_{k'} \bar{U}(k') \gamma_\mu (1 \mp \gamma_5) U(k) * \\ * \langle p_N | M_{NC}^\mu | p \rangle$$

$$N_k = \sqrt{\frac{1}{2V k_0}}, \quad N_{k'} = \sqrt{\frac{1}{2V k'_0}}, \quad G = \begin{cases} G_F & \text{NC} \\ G_F |V_{ud}| & \text{CC} \end{cases}$$

$$d\sigma = \frac{G^2 (2\pi)}{k_0 p_0} \int (2\pi)^3 \delta^{(4)}(k - k' + p - p_N) \underbrace{\eta_{\mu\nu} W^{\mu\nu}}_{\substack{\text{same "structure" as in eN scattering}}} \frac{d^3 k'}{k'_0 (2\pi)^3} \frac{d^3 p_N}{E_N (2\pi)^3}$$

$$\eta_{\mu\nu} = \frac{1}{8} \sum_{\lambda\lambda'} \bar{U}_\lambda(k) \gamma_\mu (1 \mp \gamma_5) U_{\lambda'}(k) \bar{U}_{\lambda'}(k') \gamma_\nu (1 \mp \gamma_5) U_\lambda(k)$$

$$= \underbrace{k_\mu k'_\nu - g_{\mu\nu} k \cdot k' + k'_\mu k_\nu}_{\substack{\text{symmetric part, same as in eN scattering (} m_e=0 \text{)}}} \pm i \epsilon_{\mu\nu\rho\sigma} k^\rho k'^\sigma$$

additional term $\rightarrow$ similar to polarized eN scattering

$$W^{\mu\nu} = p_0 p'_0 V^2 \frac{1}{2} \sum_{ss'} \frac{1}{2V p_0} \frac{1}{2V p'_0} [\bar{U}(p_N s') \Gamma^\mu U(p, s)] [\bar{U}(p_N s') \Gamma^\nu U(p, s)]$$