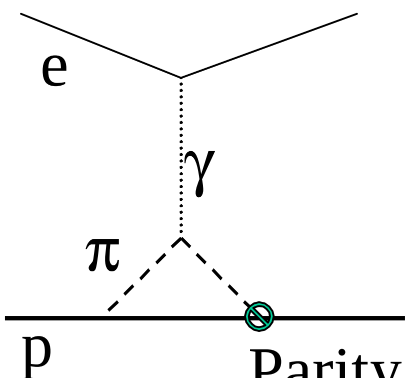
ν-Nucleon Elastic Scattering

- Sensitive to strange quarks in form factors
- $J_\mu = \langle N|G_a\gamma_\mu\gamma_5 + F_1\gamma_\mu + F_2\,\sigma_{\mu\nu}q^\nu|N\rangle$
- EMC polarized DIS → "spin crises" and strange quarks may carry some of proton's spin, Δs
- $G_a(q^2) = g_a\tau_3/(1+q^2/M_a{}^2)^2 + G_a{}^s(q^2)$
- $G_a{}^s(q^2 \rightarrow 0) = \Delta s$
- BNL 735 (1986) measured ν-p cross sec. Error in M_a hindered extraction of $G_a{}^s$
- LSND (Los Alamos) measured ν-p to ν-n ratio but had background problems.

Parity V. Electron Scattering probes vector currents

- HAPPEX (JLAB) forward angle e-p finds $F_1^s(q^2\!=\!0.5\text{GeV}^2)$ is small.
- SAMPLE (MIT BATES) back angle e-p and e-d finds F_2^s consistent with zero and large radiative correc. or anapole moment.



Parity v. πN coupling

•Also large anapole seen in Cs atomic parity nonconservation

Can make definitive (elastic) strange quark measurement

- Control systematic errors and sensitivity to M_a by measuring ratio of neutral current to charged current.
- $R = \sigma(\nu p \rightarrow \nu p) / \sigma(\nu n \rightarrow \mu p)$
- Measuring R to 5% gives Δs to ~ .03 [BNL 735 measured R to 11% averaged over q^2.]
- Also measure R for anti-ν. Combination gives both G_a^s and F_2^s independent of P.V. radiative corrections.