

LEO STODOLSKY – DESY, 1967

Happy 80th Birthday, Leo!

HADRONLIKE BEHAVIOR OF γ, ν -NUCLEAR CROSS SECTIONS*

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We explain how high-energy photon- or neutrino-nucleus reactions can exhibit an A dependence like that expected from a strongly interacting particle. The condition for this is a relation among the nucleon amplitudes implying that the total photon cross section on the nucleon is equal to a certain sum over forward vector-meson production amplitudes. This relation is compatible with presently available data.

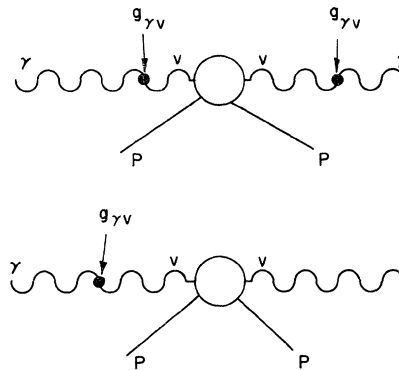
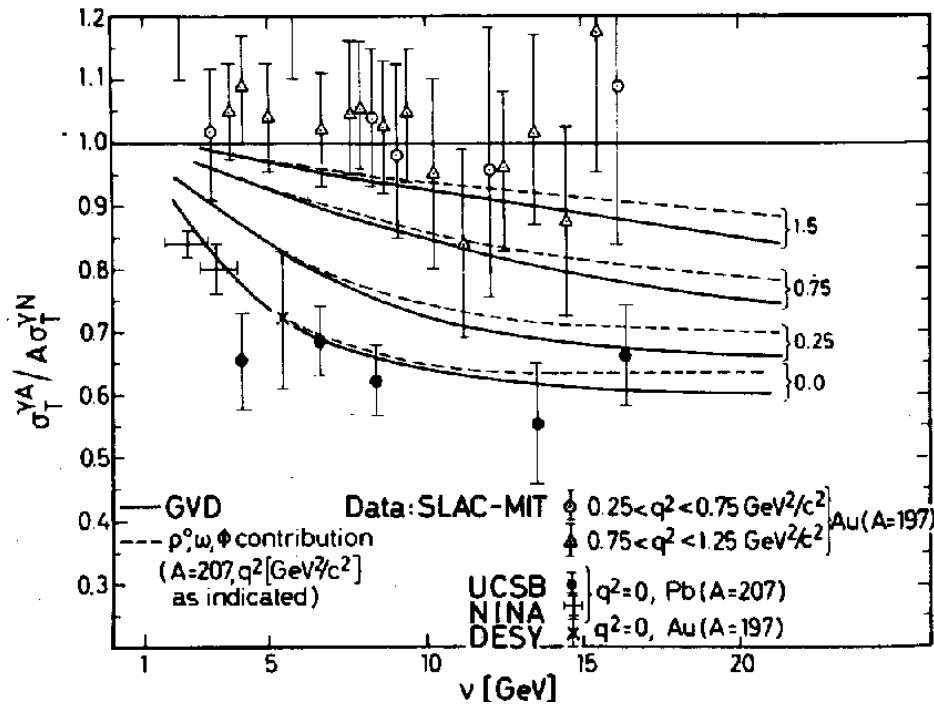


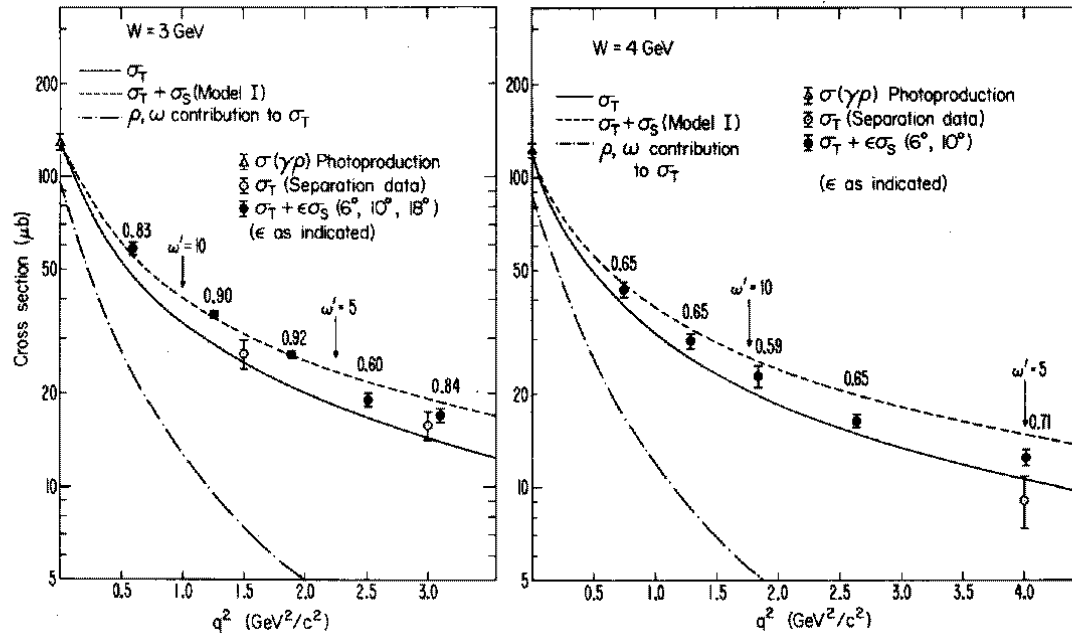
FIG. 2. Diagram for "rho-photon analogy" in $\gamma + p \rightarrow \gamma + p$ and $\gamma + p \rightarrow (\text{vector meson}) + p$.

$$\sigma_{\text{total}}(\gamma + p) = \left[g_{\gamma\rho}^2 \frac{d\sigma^{0^\circ}(\gamma \rightarrow \rho)}{d\Omega} \left(\frac{4\pi}{K} \right)^2 \right]^{1/2} + \left[g_{\gamma\omega'}^2 \frac{d\sigma^{0^\circ}(\gamma \rightarrow \omega')}{d\Omega} \left(\frac{4\pi}{K} \right)^2 \right]^{1/2} + \left[g_{\gamma\phi'}^2 \frac{d\sigma^{0^\circ}(\gamma \rightarrow \phi')}{d\Omega} \left(\frac{4\pi}{K} \right)^2 \right]^{1/2}. \quad (5)$$



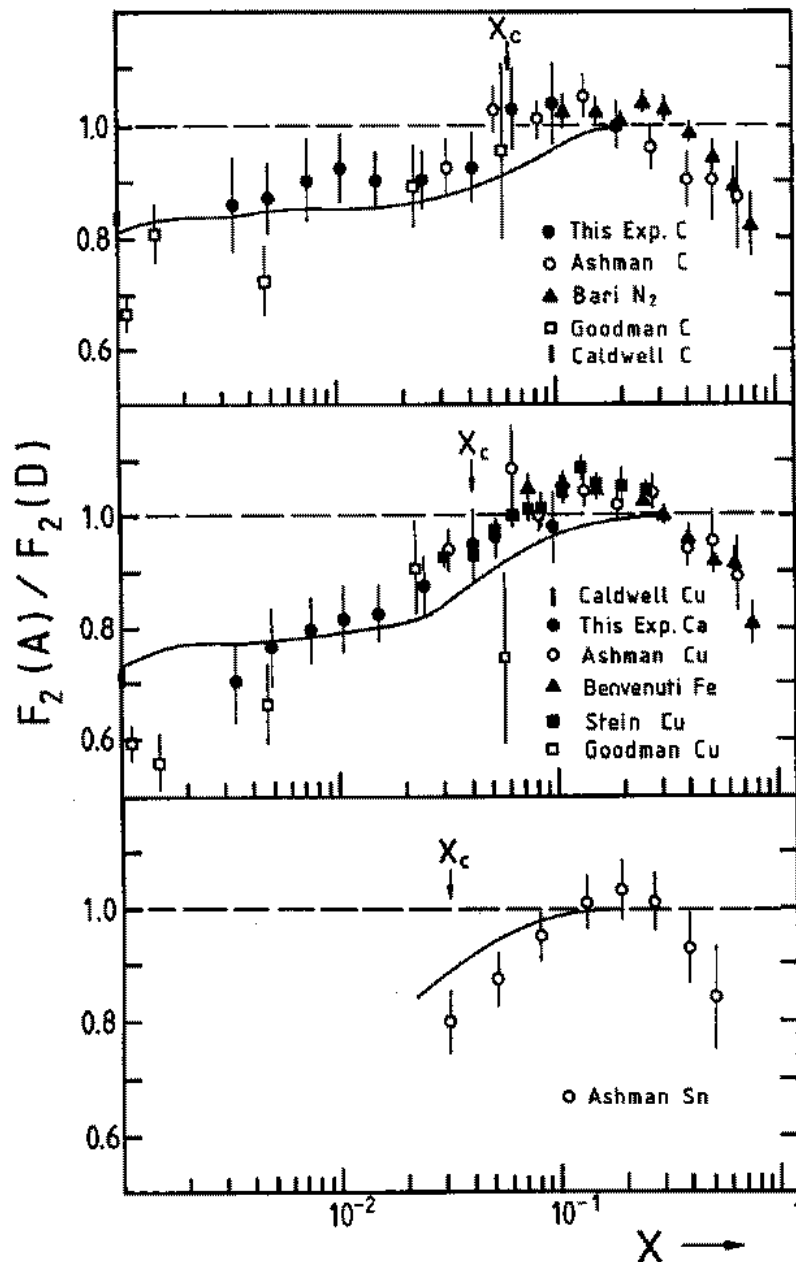
1969 to 1973:
Shadowing in Photoproduction.

Generalized Vector Dominance 1972



$$\rho_0, \omega, \phi + V, \quad M_V^2 \gg M_{\rho, \omega, \phi}^2$$

Prediction of shadowing in DIS, $Q^2 \gg M_{\rho, \omega, \phi}^2$



**Shadowing in DIS, $Q^2 \cong 10\text{GeV}^2$
EMC-NMC Collaboration 1989**

Experimental result requires:

- (i) $M_V^2 \gg M_{\rho,\omega,\phi}^2$
- (ii) Diffractive Production
- (iii) Hadronic Interaction

HERA 1992: RAP-GAP-Events

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Dieter Schildknecht