Differential cross section for $\gamma d \to \omega d$ using CLAS at Jefferson Lab

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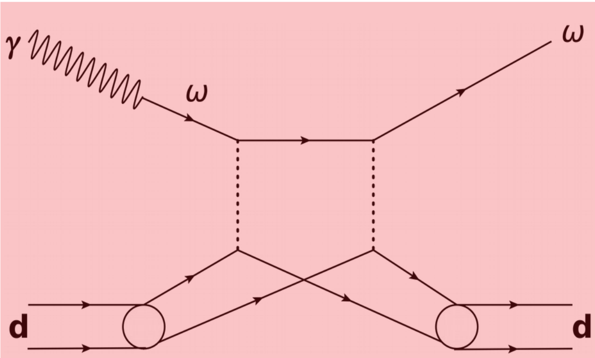
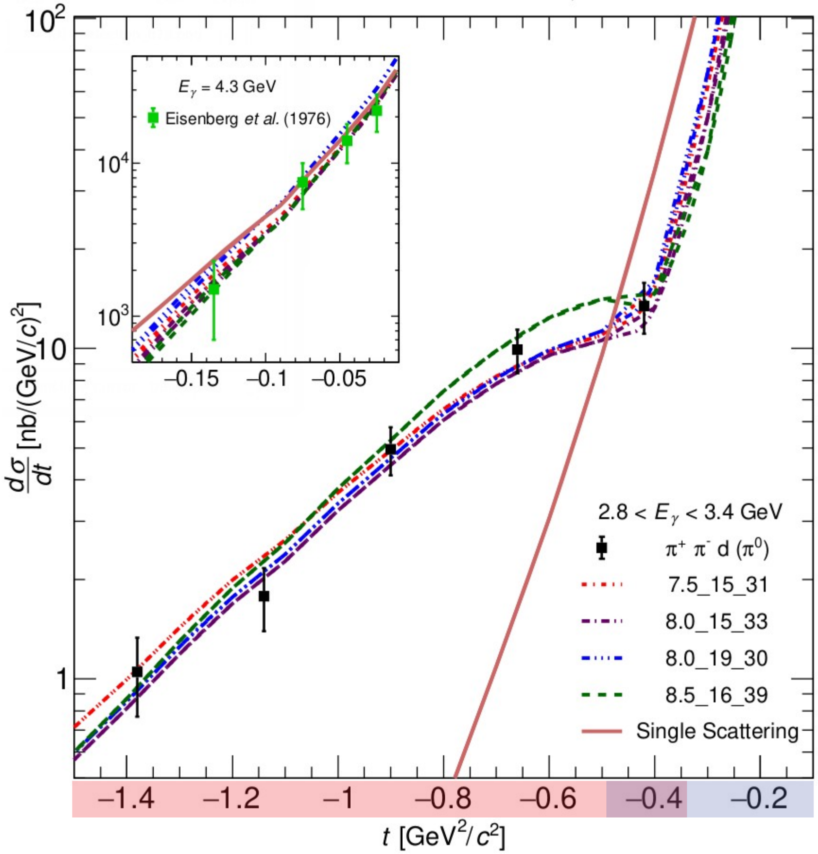


Double scattering

Probability increases at higher $|t|$

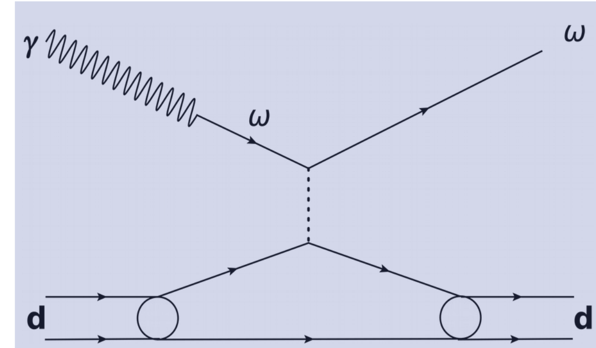
At higher momentum transfer, secondary scattering diagrams, where the ω is produced off one nucleon and scatters from the second enable both nucleons to remain bound as a deuteron in the final state. These diagrams provide an opportunity to extract the total scattering cross section, $\sigma_{\omega N}$, from comparisons of data and calculations.



First high statistics world data for the reaction: $\gamma d \to \omega d$.

The differential cross section at large $|t|$ shows contributions from double scattering.

For E_γ = [2.8, 3.4] GeV, the data is consistent with $\sigma_{\omega N}$ within 30–40 mb.



Single scattering

Dominant at lower $|t|$

Natural parity exchange in the t-channel, usually described by Pomeron exchange is expected to dominate at low momentum transfer.

A three-parameter model based on rescattering within the framework of the Vector Meson Dominance allows to determine a range of $\sigma_{\omega N}$ by a fit to the experimental data.