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Glauber scattering for photo-nuclear reactions of light vector mesons with the Regge amplitude for the subnuclear process

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We study photoproduction of light vector mesons, ρ^0, ω, and ϕ in nuclei by utilizing the Glauber scattering theory for photo-nuclear interactions. Avoiding ad hoc parameterizations of the scattering amplitude and the cross section frequently assumed in the conventional Glauber theory, the subnuclear processes, including vector meson photoproduction $\gamma N \to V N$ and subsequent elastic scattering $V N \to V N$ off nucleons, are described by the Reggeized meson exchange within the framework of the eikonal integral for the nuclear process.

Current theoretical calculations reproduce experimental results to a good degree, revealing that Pomeron exchange becomes dominant over the meson exchange in the energy region above the resonances, namely at $E_\gamma \geq 3$ GeV, and that the transverse component of the nuclear cross section gives the contribution much larger than the longitudinal one by a factor of 10^4. The application to the analysis of nuclear transparencies in the electromagnetic production of mesons in nuclei is presented, with the role of the shadowing discussed.

Consent

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