

# Exclusive production of vector mesons at high energies: from photon-proton to proton-proton and nucleus-nucleus collisions

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Photoproduction of vector mesons has been studied since the 1960ies and was instrumental in establishing the hadronic structure of the photon and the concept of vector-meson dominance. More recently our knowledge on vector meson photoproduction has been furthered by experiments at the HERA accelerator. Total cross sections as well as a number of kinematical distributions have been measured from light to heavy vector mesons. These experiments have been a testbed of ideas on the production mechanism, the QCD Pomeron exchange. In particular in varying the mass of the vector meson we can study the Pomeron exchange from the soft to the perturbatively hard regimes. The production mechanism also contains information on the quark-antiquark wave function of the produced meson.

High energy protons or ions are the source of a flux of Weizsäcker-Williams photons, which can be utilized to study the photoproduction of vector mesons also at the Tevatron and LHC colliders. We discuss how information on the small- $x$  gluon distribution in protons in nuclei can be obtained. Besides this intrinsic interest in vector meson production, a precise knowledge thereof is also necessary for odderon searches. In this regard, we discuss also transverse momentum distributions including absorption effects.

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