Contribution ID: **31** Type: **not specified**

Exclusive photoproduction of $\pi^+\pi^-$ pairs in the tensor-pomeron approach

Wednesday 24 September 2025 11:10 (25 minutes)

We discuss the central exclusive photoproduction of $\pi^+\pi^-$ pairs in diffractive photon-proton and in proton-proton collisions at high energies. We consider the resonant (ρ^0, ω, $f_2(1270)$) and non-resonant (Drell-S\"oding) contributions. Our calculation is based on the tensor-pomeron approach. For the $pp \to pp\pi^+\pi^-$ reaction, we calculate differential cross sections as a function of the two-pion invariant mass. We discuss the important role of the Drell-S\"oding mechanism in shaping the $\rho(770)$ resonance line. Our research is relevant in the context of ALICE, ATLAS, CMS, and LHCb measurements in pp collisions at the LHC, even when the leading protons are not detected and instead only rapidity-gap conditions are checked experimentally. Our results can also serve as basis for the description of coherent $\pi^+\pi^-$ production in ultra-peripheral pA and AA collisions. This approach can be directly applied to the analysis of photoproduction and small-Q^2 electroproduction in ep collisions at high energies. Such data exist from the HERA experiments and will be obtained in the future at the EIC.

The presentation is based on arXiv:2508.06334 [hep-ph].

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Session Classification: Session 10