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Odderon at the EIC from exclusive production of C-even charmonia

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In this contribution I would like to report on our recent computation [1,2] on exclusive C-even charmonia productions in high-energy electron-proton collisions. The C-even charmonia states serve as a probe of the odderon amplitude in the proton which is an off-forward generalized transverse momentum distribution formed by at least three gluons in a C-odd state. We are motivated by the odderon discovery of the TOTEM and D0 collaborations [3,4] in pp vs ppbar elastic collisions. Our main goal is to investigate the potential for the odderon detection at the future EIC. The computation is based on the Color Glass Condensate framework, where we numerically solve the Balitsky-Kovchegov evolution equation for coupled pomeron-odderon system. Our initial conditions are based on a microscopic quark model computation [5] that is an essential for a proper account of the so-called Donnachie-Landshoff mechanism according to which even a large-|t| scattering would not break up the proton if it involves a three-gluon exchange. Our comprehensive results cover the exclusive production of the eta_c meson [2] and the chi_cJ family (J = 0, 1, 2) [1]. While eta_c was originally suggested already long time ago [6], chi_c was not discussed so far. Due to the large branching ratio to J\Psi+gamma we argue that chi_c should be a more suitable channel for the potential odderon detection at the EIC. In our computation we pay special attention to the interference with the Primakoff process where our model computation fixes the relative phase between the two contributions. We demonstrate how the deviations from the purely Primakoff contribution can be used as a probe of the odderon amplitude in the proton at the EIC. The obtained results can be also used for the odderon searches at the LHC in the UPC mode.

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Primary author: BENIC, Sanjin (University of Zagreb)

Presenter: BENIC, Sanjin (University of Zagreb)

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