Study of the J/ψ photoproduction with tagged forward proton in $p+p$ collisions at STAR

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We present the first measurement of the exclusive J/ψ photoproduction in proton-proton collisions at $\sqrt{s} = 510\,\mathrm{GeV}$ by the STAR experiment. Interesting physics aspect of the presented measurement is a possibility to obtain transverse momentum of exchanged photon, which is important in constraining the kinematics of the reaction. The unique Roman Pot detector system is utilized to measure forward-propagating protons from the diffractive interactions where one or both protons survive the collisions. This permits the calculation of missing transverse momentum in the collision. Conservation of momentum governing the collision dynamics allows us to equate this to the transverse momentum of the virtual photon from the interaction. The J/ψ is identified via its decay channel to electron-positron pairs in the STAR central barrel detectors. We report on preliminary STAR results of J/ψ photoproduction with use of Roman Pot detectors in proton-proton collisions at $\sqrt{s} = 510$ GeV.