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J/ψ and $\psi(2S)$ measurements in $p+p$ collisions at $\sqrt{s} = 200$ and 500 GeV in the STAR experiment

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The J/ψ production mechanism in elementary particle collisions is not yet exactly known. For many years measurements of the J/ψ cross-section have been used to test different J/ψ production models. While many models can describe relatively well the experimental data on the J/ψ cross-section in $p + p$ collisions, they have different predictions for the J/ψ polarization. Therefore, measurements of the J/ψ polarization may allow to discriminate among different models and provide new insight into the J/ψ production mechanism.

In this talk, results on the J/ψ cross-section at $\sqrt{s} = 200$ and 500 GeV and the J/ψ polarization at $\sqrt{s} = 200$ measured via the dielectron decay channel at mid-rapidity in $p + p$ collisions in the STAR experiment will be discussed. We will also report a status of the J/ψ polarization analysis and the first $\psi(2S)$ measurement at $\sqrt{s} = 500$ GeV. Moreover, prospects of charmonia measurements with the newly upgraded STAR detector will be reported.

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