Measurements of $J/\psi$ polarization in p+p collisions at STAR

SI-WEI LUO, Univ of Illinois - Chicago, STAR COLLABORATION — Measurements of $J/\psi$ production cross section and polarization can help understand $J/\psi$ production mechanism in hadron collisions and distinguish among different models. $J/\psi$ polarization could be characterized by the $\lambda_\theta$, $\lambda_\phi$ and $\lambda_{inv}$ polarization parameters, where $\lambda_\theta$ and $\lambda_\phi$ are coefficients of positron polar and azimuthal angle distribution in the $J/\psi$ rest frame with respect to a chosen polarization axis, while $\lambda_{inv}$ is a frame-independent variable calculable from $\lambda_\theta$ and $\lambda_\phi$. $J/\psi$ polarization parameters $\lambda_\theta$, $\lambda_\phi$ and $\lambda_{inv}$ in both helicity and Collins-Soper frames have been extracted from the STAR 2011 data in p+p collisions at $\sqrt{s} = 500$ GeV, while only $\lambda_\theta$ in the helicity frame has been extracted from the STAR 2009 data in p+p collisions at $\sqrt{s} = 200$ GeV. In this talk, we will present a new analysis to study $J/\psi$ polarization using the STAR 2012 data to extract $\lambda_\theta$, $\lambda_\phi$ and $\lambda_{inv}$ in both the helicity and Collins-Soper frames in p+p collisions at $\sqrt{s} = 200$ GeV.