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J/ψ Forward rapidity azimuthal anisotropy in Au+Au collisions and multiplicity dependence in p+p and p+Au at $\sqrt{s_{NN}}$=200 GeV measured by the PHENIX Experiment

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Nearly twenty $c\bar{c}$ pairs are produced in central Au+Au collisions at the top RHIC energy of $\sqrt{s_{NN}}$ =200 GeV, with the largest yields at mid-rapidity. The enhanced production of charmonium states from combinations of independently produced charm quarks could contribute to the observation that, in Au+Au collisions at RHIC, J/ψ yields are smaller at forward rapidity than at mid-rapidity relative to observations in $p+p$ collisions at the same energy. A signature of such charmonium coalescence could be the presence of J/ψ flow. The PHENIX experiment collected a large sample of J/$\psi \rightarrow \mu^+\mu^-$ decays at the pseudorapidity region of 1.2< η <2.2 in Au+Au collisions during the 2014 and 2016 runs. These data will allow the most precise measurement so far of J/ψ flow component v_2 in a region where the number of charm quark pairs is smaller than at mid-rapidity.

The PHENIX experiment has also a large sample of J/$\psi \rightarrow \mu^+\mu^-$ decays measured at a forward rapidity of 1.2< η <2.2 in p+p and p+Au collisions at $\sqrt{s_{NN}}$=200 GeV. The yields can be measured as a function of the multiplicity determined over a broad range of rapidity, a golden channel for multiparton interaction studies. A comparison between yields observed in p+p and p+Au at the same multiplicity could help explain how the multiparton interactions (in p+p) can affect the measurement of multinucleon interactions (in p+Au), as well as the measured nuclear modification factors, after evaluating the competing effects such as charmonium breakup in co-moving particles. This presentation will show preliminary results of J/ψ azimuthal anisotropy and the status of the J/ψ studies in different event activity categories.

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