Chiral magnetic effect search in p+Au, d+Au and Au+Au collisions at RHIC

JIE ZHAO, Purdue University, STAR COLLABORATION — The chiral magnetic effect (CME) is a fundamental property of QCD. A major background source for CME measurements is the intrinsic particle correlations (such as resonances/jets decay) coupled with the azimuthal elliptical anisotropy $v_2$. In heavy-ion collisions, the magnetic field direction and event plane azimuthal angle $\Psi_2$ are correlated, thus the CME and the $v_2$-induced background are entangled. In small system p+Au and d+Au collisions, the $\Psi_2$ is mostly due to geometry fluctuations, and thus magnetic field direction and $\Psi_2$ are uncorrelated. The correlation measurements in small system collisions with respect to $\Psi_2$ are only sensitive to $v_2$-induced background while any CME is averaged to zero. In this talk, we will present the STAR measurements of two-particle correlations with respect to $\Psi_2$ in p+Au, d+Au and Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. These results are analyzed as a function of particle multiplicity to shed light on the background contaminations of the CME measurements in heavy-ion collisions. We will also report results from a new analysis approach as a function of the particle pair invariant mass in order to suppress non-CME related physics backgrounds.

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