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Study of di-electron asymmetry in Au+Au collisions at RHIC-PHENIX

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Creation of a strong magnetic field in non-central heavy-ion collisions is predicted by several models. The field can reach as high as 10^{14} teslas at RHIC. Some interesting effects in a strong magnetic field are discussed by theories but the field is yet to be directly detected experimentally. Direct (virtual) photons are good candidates for a probe of the field detection, because they are not affected by the strong interaction.

According to theoretical calculation using vacuum polarization tensor in external magnetic field, virtual photon decay probability depends on the field direction [1]. This phenomenon causes di-electron asymmetry with respect to the reaction plane and the strength of the asymmetry depends on collision centrality because the strength of the magnetic field changes over centrality. We look for the strong magnetic field effect via virtual photon decay by taking advantage of an excellent electron-identification capability in PHENIX. In this presentation, we will report the current status of di-electron asymmetry analysis.

[1] K. Ishikawa et. al., Int. J. Mod. Phys. A28 (2013) 1350100

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