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Elliptic flow of electrons from heavy-flavor decays in 54.4 and 27 GeV Au+Au collisions from the STAR experiment at RHIC

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Measurements of heavy-flavor hadron production and elliptic flow (v_2) provide unique and indispensable information for understanding the properties of the quark-gluon plasma. Recent STAR measurements indicate that in Au+Au collisions at $\sqrt{s_{\rm NN}} = 200$ GeV D^0 mesons develop large v_2 similarly as light-favor hadrons, implying that charm quarks interact strongly with the thermalized medium at the top RHIC energy. Interestingly, at lower collision energies the electrons from heavy-flavor decays seem to exhibit much lower v_2, unlike the light-flavor hadrons. However, the precision of the previous results from STAR at $\sqrt{s_{\rm NN}}$ = 62.4 and 39 GeV did not allow for firm conclusions.

Thanks to the large data samples recorded by STAR in 2017 and 2018, we are now able to perform more precise measurements of the v_2 of electrons from heavy-flavor decays in Au+Au collisions at $\sqrt{s_{\rm NN}} = 54.4$ and 27 GeV. The collected data sample at $\sqrt{s_{\rm NN}}$ = 54.4 GeV and 27 GeV are more than 10 times larger than those at $\sqrt{s_{\rm NN}}$ = 62.4 and 39 GeV respectively, used in the previous STAR analysis. In this talk, we will present the new results from the STAR experiment on the v_2 of electrons from heavy-flavor decays, at $\sqrt{s_{\rm NN}}$ = 54.4 and 27 GeV, as a function of electron transverse momentum. We will also discuss physics implications of these results by comparing to theoretical model calculations.

Collaboration (if applicable)

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Track

Heavy Flavor and Quarkonia

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Primary author: STAR COLLABORATION

Presenter: Ms JI, Yuanjing (University of Science and Technology of China)

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