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Heavy Flavour Electron azimuthal anisotropy v_2 from 2- and 4-particle correlations in Au+Au collisions at $\sqrt{s_{NN}} = 200, 62$ and 39 GeV at STAR

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Heavy quarks (charm and bottom) are produced early in the collisions and therefore are important probes of the hot and dense matter created in the reactions at RHIC energies. Electrons from semileptonic decays of heavy flavour mesons (so called non-photonic electrons, NPE) are the most feasible tool so far for studying heavy quarks in-medium interactions. NPE azimuthal anisotropy, v_2 , is of particular interest because it provides additional means to discriminate between models which describe heavy quark in-medium interactions.

In this presentation we will report the v_2 measurements using 2- and 4-particle correlations, $v_2\{2\}$ and $v_2\{4\}$, at $\sqrt{s_{NN}} = 200, 62$ and 39 GeV at STAR. Non-photonic electrons in this study are identified using three main STAR subsystems: Time Projection Chamber, Time of Flight Detector and Barrel Electromagnetic Calorimeter. $v_2\{2\}$ and $v_2\{4\}$ have different sensitivity to the flow fluctuations and so called nonflow (correlations not related to the reaction plane) - there is a positive contribution of fluctuation and nonflow to the $v_2\{2\}$ while, in the case of $v_2\{4\}$, nonflow is negligible and the effect of fluctuations is negative. Therefore $v_2\{2\}$ and $v_2\{4\}$ provide an upper and lower limit on the average azimuthal anisotropy of non-photonic electrons. Moreover, bottom/charm production ratio at lower energies is expected to be reduced compared to $\sqrt{s_{NN}} = 200$ GeV, therefore low p_T NPE azimuthal anisotropy at $\sqrt{s_{NN}} = 62$ and 39 GeV would reflect charm v_2 better than at $\sqrt{s_{NN}} = 200$ GeV.

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