Nuclear modification factors, directed and elliptic flow of electrons from open heavy flavor decays in Au+Au collisions from STAR

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Measurements of nuclear modification factors (R_{AA}) and elliptic flow (v_2) for open heavy flavor hadrons are essential probes of the Quark Gluon Plasma produced in heavy-ion collisions. Single electrons from semileptonic decays are an excellent channel to study open heavy flavor due to their large branching fractions and triggering possibilities. Additionally, semileptonic c-hadron decays can provide a complimentary measurement of charm hadron directed flow (v_1).

In this talk we will present the analyses of single electrons from semileptonic b- and c-hadron decays at mid-rapidity in $\sqrt{s_{NN}} = 200$, 54.4, and 27 GeV Au+Au collisions. The data at $\sqrt{s_{NN}} = 200$ GeV incorporate the Heavy Flavor Tracker which enables the topological separation of electrons originating from b- and c-hadron decays. We will report the first STAR measurements at $\sqrt{s_{NN}} = 200$ GeV of v_2 for bottom-decayed electrons as a function of p_{T} and v_1 for charm-decayed electrons as a function of electron rapidity. Additionally, improved measurements of R_{AA} and a new measurement of the double ratio of R_{CP} between bottom- and charm-decayed electrons will be presented as a function of p_{T} and centrality. We will also present the measurement of non-photonic electron v_2 in $\sqrt{s_{NN}} = 54.4$ and 27 GeV data, collected during the 2017 and 2018 RHIC runs. These data samples contain roughly an order of magnitude more statistics than the previous STAR analysis at $\sqrt{s_{NN}} = 62.4$ GeV, which allows a more precise measurement of v_2 for electrons from heavy flavor hadron decays at lower energies. Our data will be compared to theoretical models and implications will be discussed.