Charm Elliptic Flow at RHIC

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Using a multiphase transport (AMPT) model, we have studied charm elliptic flow in heavy ion collisions at the Relativistic Heavy Ion Collider [1]. Assuming that the cross section for charm quark scattering with light quarks is the same as that between light quarks, we find that both charm and light quark elliptic flows are sensitive to the value of the cross section. As shown in left window of Fig.1, the elliptic flow of charm quarks is smaller than that of light quarks at low transverse momentum but approaches the latter at high transverse momentum as a result of their large masses. Similar features are seen in the elliptic flow of charmed mesons as well as that of the electrons from their semileptonic decays when charmed mesons are produced from quark coalescence during hadronization of the partonic matter. To describe the large electron elliptic flow observed in experimental data requires a charm quark scattering cross section that is much larger than that given by the perturbative QCD as shown in right window of Fig.1.

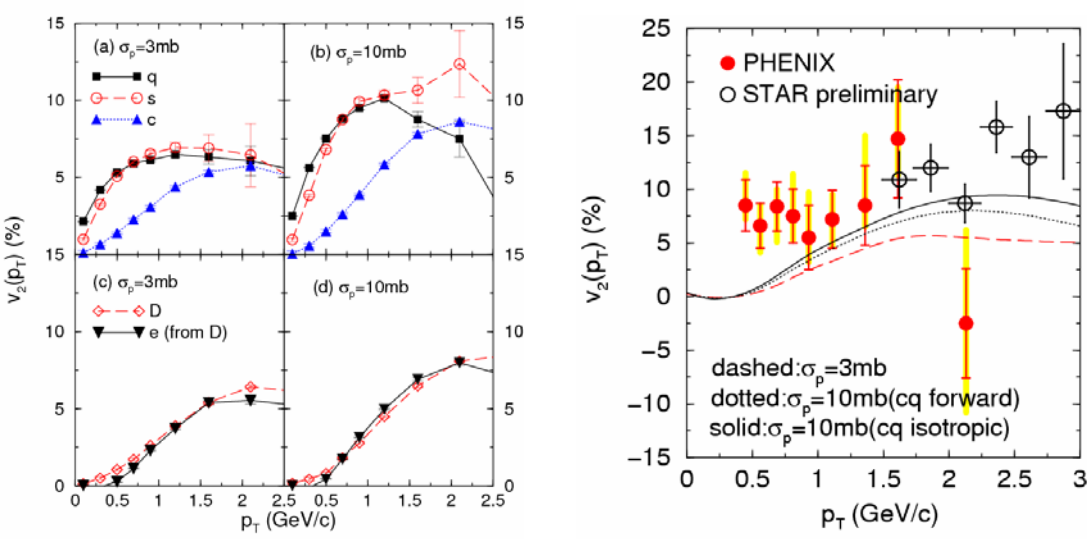

Figure 1. Left: Elliptic flows of light, strange, and charm quarks, D mesons, and their decay electrons in minimum-bias Au + Au collisions at $s^{½}_{NN}$ = 200 GeV for parton cross sections of 3 and 10 mb. Right: Elliptic flow of electrons from charmed meson decays for different parton scattering cross sections of 3 (dashed curve) and 10 (dotted curve) mb with forward peaking angular distribution as well as 10 mb with isotropic angular distribution (solid curve).

[1] B. Zhang, L.W. Chen, and C.M. Ko, Phys. Rev. C **72**, 024906 (2005).