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Charm v_2 is more hydrodynamic than light quark v_2

Azimuthal anisotropy v_2 is a useful tool for the study of the properties of the quark-gluon plasma (QGP). Recent studies with parton transport models suggest, however, that the majority of light quark v_2 comes from the anisotropic escape of partons, not hydrodynamic flow [1-4]. Heavy quarks, produced by hard scatterings at early times in relativistic heavy ion collisions, are regarded as an excellent probe of the QGP. Is charm quark v_2 mainly from anisotropic escape or hydrodynamics? In this talk we try to address this question using a multi-phase transport (AMPT) model, which has been very successful in describing experimental data for the bulk matter [5]. We follow the entire evolution history of charm quarks in AMPT and study the development of charm v_2 in heavy ion collisions as well as small system collisions at both RHIC and LHC energies. We find the common escape mechanism to be at work for both charm and light quark v_2. However, in contrast to naive expectations, the charm v_2 appears to be more sensitive to hydrodynamics than light quark's v_2. We then use a simple Monte Carlo simulation to shed insights on the results. Our finding thus highlights the importance of heavy quark flow in the study of the QGP.

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Preferred Track

Collective Dynamics

Collaboration

Not applicable

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