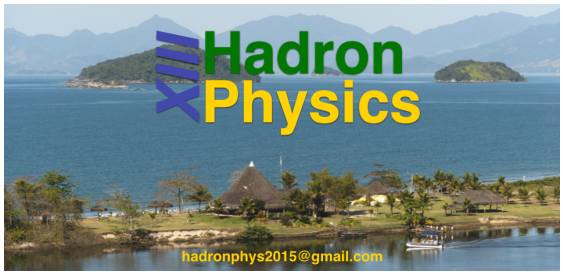

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Effects of time evolution and fluctuating initial conditions on heavy flavor electron R_{AA} in event-by-event relativistic hydrodynamics

Central Au+Au collisions at RHIC exhibit a strong particle suppression when compared to p+p collisions. Anisotropic flow is also observed in experiments. The particle suppression is usually associated with jet quenching or energy loss of partons inside the quark-gluon-plasma (QGP) where the anisotropic flow might be due to lumps of high-density inside the medium. These fluctuations in initial conditions can cause considerable quark suppression at early stages of the collision evolution, furthermore the QGP dynamics might cause these high-density spots to expand differently from the rest of the plasma which can affect higher harmonic orders of anisotropic flow such as v_3.

In this work we aim to investigate the effects caused by the medium formed in heavy ion collisions on the heavy quark dynamics using a 2D+1 Lagrangian ideal hydrodynamic code which is based on the Smoothed Particle Hydrodynamics (SPH) algorithm, following an event-by-event paradigm. We use an energy loss parametrization on top of the evolving space-time energy density distributions to propagate the quark inside the medium until it reaches the freeze-out temperature where they fragment and hadronize. The resulting mesons are forced to decay giving us the final electron p_{T} distribution that can be compared with experimental data of electron spectrum R_{AA} and v_2. The simulations are run for different centrality classes for both RHIC and LHC collision energies.

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