Open Heavy Flavor Dynamics in the Hot QCD Created in URHICs

Abstract:
The productions of heavy quarks (HQ) that have a mass quite larger than the temperature reached in ultra-relativistic heavy-ion collisions offer the possibility to have a probe for studying the temperature dependence of the QCD interaction. The observables measured experimentally has significantly challenged the theoretical models toward a self-consistent description of both the HQ nuclear modification factor, $R_{AA}$ and the collective anisotropies $v_n$ in their production. We discuss how the temperature dependence of the heavy quark drag coefficient associated to a Boltzmann dynamics can account for a large part of such a puzzle. Furthermore, it turns out that charm quarks may be an ideal probe of the initial strong magnetic field expected to be of about $10^{19}$ Gauss. Conjointly thanks to their Higgs mass there should be no mixing with the chiral magnetic dynamics. Realistic simulation shows a charm/anti-charm opposite transverse flow at least two order of magnitudes larger than the one of the light hadrons.