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Heavy flavor quenching and flow from low to high transverse momenta

While perturbative QCD can explain the color, mass and energy dependences of parton energy loss and jet quenching at large transverse momentum ($p_T > 6 - 8$ GeV) in heavy-ion collisions [1], a simultaneous description of heavy flavor suppression factor R_{AA} and v_2 still remains a challenge at low and intermediate p_T due to non-perturbative effects. In this work [2], we solve this challenge by implementing a generalized in-medium Cornell-type potential combining with the screening of both short-range color Coulomb and long-range confining interactions to the elastic scattering interaction kernel between heavy quarks and QGP medium. Using our new approach, we obtain a satisfactory description of the nuclear modification factors and azimuthal anisotropy for heavy flavor hadrons. Our result shows that while the short-range Coulomb interaction is more dominant for heavy flavor quenching and flow at high p_T , the long-range confining interaction plays important roles in explaining heavy flavor R_{AA} and v_2 at low and intermediate p_T .

[1] W.-J. Xing, S. Cao, G.-Y. Qin, H. Xing, Phys.Lett.B 805 (2020) 135424.

[2] W.-J. Xing, G.-Y. Qin, S. Cao, in preparation.

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