Nuclear modification factor of non-photonic electrons in heavy-ion collisions and the heavy-flavor baryon to meson ratio

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The nuclear modification factor R_{AA} of non-photonic electrons in Au+Au collisions at $s_{NN}^{1/2}$ = 200 GeV has been studied by considering the decays of heavy-flavor hadrons produced in a quark coalescence model [1]. Although an enhanced Λ_c/D_0 ratio is predicted by the coalescence model, it is peaked at small transverse momenta (~ 2 GeV) due to the large difference between heavy and light quark masses. As a result, the enhanced Λ_c/D_0 ratio, which is expected to suppress the electron R_{AA} as the branching ratio of Λ_c decay into electrons is smaller than that of D_0, does not lead to additional suppression of the electron R_{AA} at large transverse momenta (> 5 GeV), where the suppression is mainly due to heavy quark energy loss in produced quark-gluon plasma. Also, the enhanced Λ_b/B_0 ratio predicted by the coalescence model has even smaller effect on the non-photonic electron R_{AA} as bottom baryons and mesons have similar branching ratios for semi-leptonic decays into electrons.

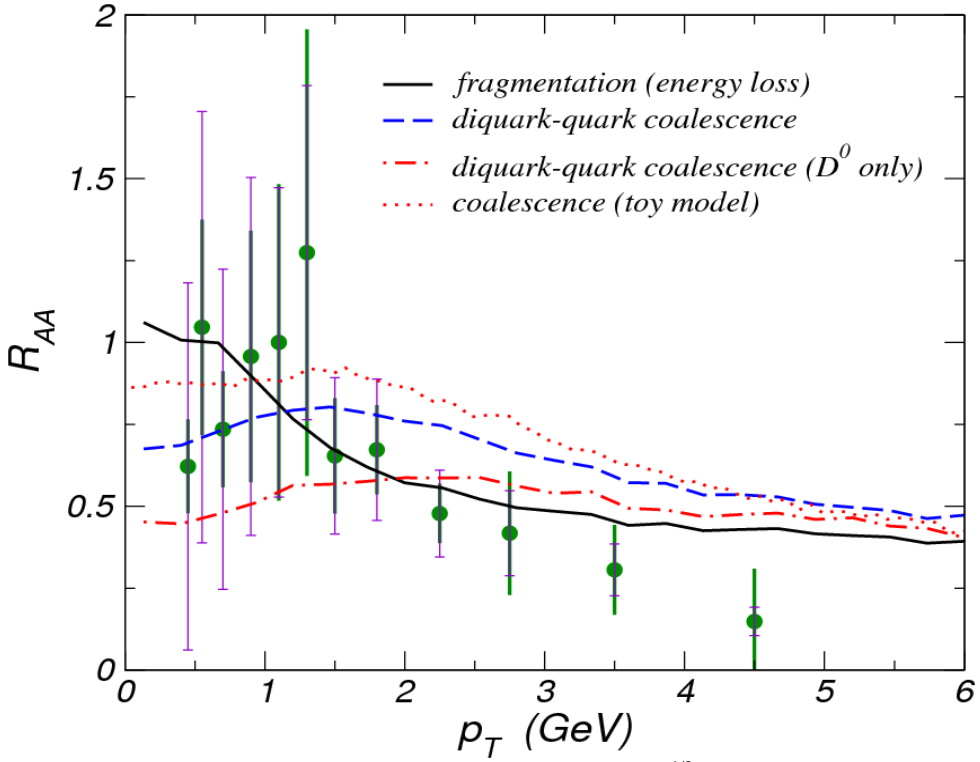

FIG. 1. The electron R_{AA} in central Au+Au collisions at $s_{NN}^{1/2}$ = 200 GeV from charmed hadrons. The solid line includes only fragmentation of charm quarks. The dashed and dot-dashed lines are the results of the three-quark and the diquark-quark coalescence model, respectively, while the dotted line is obtained with D_0 meson only in the diquark-quark coalescence model. The experimental data are from Ref.[2].

[1] Y. Oh and C. M. Ko, arXiv: 0903.4166; Phys. Rev. C (submitted).

[2] A. Adare *et al.*(PHENIX Collaboration), Phys. Rev. Lett. **98**, 162301 (2007).