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Heavy flavor production and interactions in the medium

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Measurements of high-pt hadron production in high energy collisions of heavy nuclei at the Relativistic Heavy Ion Collider (RHIC) have revealed strong suppression of the single-particle inclusive yield compared to elementary p+p collisions. The suppression is commonly thought to arise from partonic energy loss in dense matter due to induced gluon radiation, with its magnitude depending strongly on the color charge density of the medium. However, the sensitivity of light partons to the actual density of the medium is limited due to surface bias effects that lead to saturation of the suppression with density. Charm and bottom quarks are produced dominantly through initial high partonic interactions. Gluon radiation in a forward cone is suppressed for heavy quarks at moderate energy (dead cone effect). This reduces their medium-induced energy loss making heavy flavor, in principle, more sensitive to the properties of the medium. Measurements of heavy quark (charm and bottom) production therefore provide more stringent tests of the partonic energy loss mechanisms. Heavy flavor production at RHIC is studied via the measurement of D mesons and electrons from semileptonic decays of charm and bottom mesons. In this talk I review the experimental results from 200 GeV p+p, d+Au, and Au+Au collisions and discuss their implications on our understanding of the matter created at RHIC.