Debye Screening and Dissociation of a Moving Heavy Meson in a Quark-Gluon Plasma

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Abstract

We consider the lifetime of quarkonium, moving with velocity v through a quark-gluon plasma at temperature T. An explicit, configuration-space expression is found for the screened interaction between the quarks constituting the meson. This potential is non-spherical, but axially symmetric about the direction of v. We solve the Schrodinger equation for the relative motion of the quarks in this potential, and use the bound-state eigenfunction as the initial state for the dissociation of the meson due to the absorption of a thermal gluon. The meson lifetime is thus determined as a function of v and T, and conclusions are drawn concerning the possiblity of detection of the meson in a high-energy heavy-nucleus collision.

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