DISSOCIATION OF QUARKONIUM IN COLLISIONAL QUARK-GLUON PLASMA

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Quark-gluon plasma (QGP) is the state of highly dense matter at extreme temperatures, which consists of strong-interacting quarks and gluons governed by quantum chromodynamics (QCD). Production of QGP can be achieved in relativistic heavy ions collision experiments such as CERN SPS and BNL RHIC. One of the main signals of quark-gluon plasma formation in heavy ion collisions is suppression of quarkonium [1]. Quarkonium is a meson composed of heavy quark-antiquark pair of the same flavor, namely charm and bottom quark. They are usually referred to as mesons. Heavy quark systems are of particular interest because they form very compact bound states compared to ordinary matter baryons and mesons so that they survive the QGP phase transition, whereas the latter ones undergo deconfinement due to Debye screening length. As the temperature and density of matter increase the mesons also dissociate. Bound states can be studied using effective confined potential in the framework of a non-relativistic model [2].

The ground state energies and radii for charmonium and bottomonium were calculated using the numerical method for solving the Schroedinger equation with potential modified for dynamical screening cases [3]. The potential is described by the dielectric function for QGP [4,5], which takes into account pair interaction by the Bhatnagar-Gross-Krook collision operator. The production of quarkonia suppresses at the specific values of the screening radius, which is calculated in this work [6].

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