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Quarkonium and Thermodynamical Properties in a Baryon-Rich Anisotropic Medium of QGP

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We investigate the in-medium properties of heavy quarkonia by studying the medium modified heavy-quark potential in a hot and dense QCD medium under finite baryonic chemical potential (μb) and anisotropy (ξ). The real and imaginary components of the potential are computed using a static gluon propagator within the quasiparticle model framework. The real part is employed to solve the Schrödinger equation for binding energy and mass spectra, while the imaginary part provides the thermal width. Dissociation temperature is determined using thermal width criteria. Additionally, thermodynamic properties of the QGP, such as pressure, energy density, and speed of sound, are calculated. Our study offers insight into quarkonia behavior and QGP properties in a more realistic anisotropic and baryon-rich environment.

Keywords: -Quark-Gluon Plasma (QGP), Anisotropy (ξ), Baryonic Chemical Potential (μb), Medium Modified Cornell Potential, Quasi-particle Debye mass.

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