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The properties of heavy flavor hadrons from multi-body Dirac equations in vacuum and finite-temperature

Summary

We systematically solve the two-and three-body Dirac equations for heavy flavor hadrons. By spherical harmonic oscillator expansion of the baryon wave function, we calculate the baryon mass, mean radius, total angular momentum and parity for ground and excited states. With a universal set of quark mass and coupling parameters for both mesons and baryons, the calculated hadron masses agree well with the experimental data, with relative difference <2.5% for mesons and <6.3% for baryons. We further extent the multi- body Dirac equation framework to study HF hadron behavior in finite temperature, especially, we compute the dissociation temperature and the production rate of HF baryons in heavy ion collisions.

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