Transition Magnetic moments for $\Delta \to p$ transition in asymmetric nuclear matter

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Abstract

In the present work we calculate the transition magnetic moments for the radiative decays of Δ baryon to *proton* ($\Delta \to p$) in isospin asymmetric strange hadronic medium at finite temperature using chiral $SU(3)$ quark mean field model. Within the framework of chiral $SU(3)$ mean field model, the properties of baryons in strange isospin asymmetric medium are modified through the exchange of scalar fields (σ, ζ and δ) and vector fields (ω, ρ and ϕ). The isospin asymmetry of medium is taken into account via scalar-isovector field δ and vector iso-vector field ρ. We calculate the in-medium masses of quarks, *proton* and Δ baryon in asymmetric strange matter within the chiral SU(3) quark mean field model and use these as input in the chiral constituent quark (χCQM) model to calculate the in-medium transition magnetic moments for $\Delta \to p$ transition for different values of isospin asymmetry and strangeness fraction of hot and dense medium. For calculating the magnetic moments of baryons, contributions of valence quarks, quark sea and orbital angular momentum of quark sea are considered in these calculations.

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