

Properties of the $T_{cc}(3875)$ and its heavy-quark spin partner in nuclear matter

Thursday, 22 June 2023 17:15 (20 minutes)

We discuss the modification of the properties of the tetraquark-like $T_{cc}^+(3875)$ in dense nuclear matter. We consider the T_{cc}^+ in vacuum as a purely molecular isoscalar ($D^0 D^{*+}/D^+ D^{*0}$) bound state in S -wave, generated from a heavy-quark symmetry leading-order interaction between the charmed mesons. We compute the D and D^* spectral functions embedded in a nuclear medium and use them to determine the corresponding T_{cc}^+ self energy and spectral function. We find important modifications of the DD^* scattering amplitude and of the pole position of the T_{cc}^+ exotic state already for $\rho_0/2$, with ρ_0 the normal nuclear density. We also discuss the dependence of these results on the DD^* molecular component in the T_{cc}^+ wave-function. Finally, we perform a similar analysis for the isoscalar $J^P = 1^+$ heavy-quark spin symmetry partner of the T_{cc}^+ (T_{cc}^{*+}) by considering the $D^{*0} D^{*+}$ scattering T -matrix.

Collaboration

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Session Classification: Parallel session A2