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Open Strange Mesons in (magnetized) nuclear matter

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We investigate the mass modifications of open strange mesons (vector K^* and axial vector K_1) in (magnetized) isospin asymmetric nuclear matter using Quantum Chromodynamics sum rule (QCDSR) approach. The in-medium decay widths of $K^* \to K\pi$ and $K_1 \to K^*\pi$ are studied from the mass modifications of K_1, K^* and K mesons, using a light quark-antiquark pair creation model, namely the $^3P_0$ model. The in-medium decay width for $K_1 \to K^*\pi$ is compared with the decay widths calculated using a phenomenological Lagrangian, derived from a chiral SU(3) model. The effects of magnetic fields are also studied on the mass and the partial decay width of the vector K^* meson decaying to $K\pi$. Within the QCD sum rule approach, the medium effects on the masses of the open strange mesons are calculated through the light quark condensates and the gluon condensates in the hadronic medium. The quark condensates are calculated from the medium modifications of the scalar fields (σ, ζ, and δ) in the mean field approximation within a chiral SU(3) model, while the scalar gluon condensate is obtained from the medium modification of a scalar dilaton field (χ), which is introduced within the model to imitate the scale invariance breaking of QCD.

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