Antikaon absorption in the nuclear medium: the role of hadron self-energies and implications for kaonic atoms

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Content

The description of the low-energy K^--nuclear interaction based solely on a chiral coupled-channel meson-baryon interaction model that reproduces the strong energy shifts and widths in kaonic atoms has been challenging for a long time. Recently, we developed a microscopic model for the K^-N and K^-NN potentials in the nuclear medium [1], constructed from chiral K^-N scattering amplitudes derived within the Barcelona model [2]. The model included the in-medium modification of the chiral amplitudes due to the Pauli principle and led to substantial improvement of the kaonic atom data description [3]. The incorporation of all hadron self-energies (Y, N, K^-, π) into the chiral amplitudes, as well as into the microscopic K^-NN model, resulted in a total K^--nuclear potential capable of reproducing 65 data points on energy shifts and widths with χ^2/d.p.=1.4. Furthermore, the calculated branching ratios for mesonic and non-mesonic absorption channels in kaonic carbon and kaonic neon are in good agreement with available data.

Reference

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Field of Research: Interactions of mesons and baryons with strangeness

Experiment / Theory: Theory

Contribution Type: Invited talk