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Antikaon in the nuclear medium and the role of K^- multinucleon interactions

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We report on our very recent self-consistent calculations of K^--nuclear quasi-bound states [1]. Relevant K^- optical potentials were developed within several chiral meson-baryon coupled-channel interaction models [2-5]. The applied models yield quite different K^- binding energies and widths [6]. Then, the K^- multinucleon interactions were incorporated by a phenomenological optical potential introduced recently to achieve good fits to kaonic atom data [7].

Our calculations show that the effect of K^- multinucleon interactions on K^- widths in nuclei is decisive. The resulting widths are considerably larger than corresponding binding energies. Moreover, when the density dependence of the K^- multinucleon interactions derived in the fits of kaonic atoms is extended to the nuclear interior, the only two models acceptable after imposing as additional constraint the single-nucleon fraction of K^- absorption at rest do not yield any kaonic nuclear bound state in majority of considered nuclei.

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