

Spectroscopy of kaonic atoms at DAFNE and J-PARC

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Collaboration

SIDDHARTA

Abstract content

The interaction of antikaons (K^-) with nucleons and nuclei in the low-energy regime represents a very active research field in hadron physics. A unique and rather direct experimental access to the antikaon-nucleon scattering lengths is provided by precision X-ray spectroscopy of transitions in low-lying states in the lightest kaonic atoms (i.e. kaonic hydrogen and deuterium). In the SIDDHARTA experiment at the electron-positron collider DAFNE of LNF-INFN we measured the most precise values of the strong interaction observables in kaonic hydrogen. The strong interaction on the $1s$ ground state of the electromagnetically bound K - p atom causes an energy shift and broadening of the $1s$ state. SIDDHARTA will extend the spectroscopy to kaonic deuterium to get access to the antikaon-neutron interaction and thus the isospin dependent scattering lengths. At J-PARC a kaon beam is used in a complementary experiment with a different setup for spectroscopy of kaonic deuterium atoms. The talk will give an overview of the of the upcoming experiments SIDDHARTA and the complementary experiment at J-PARC. Furthermore, the implications of the experiments for the theory of low-energy strong interaction with strangeness will be discussed.

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