

New precision measurements of the strong interaction in kaonic hydrogen

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The measurement of kaonic hydrogen X-ray transitions by the DEAR collaboration at the electron-positron collider DAΦNE (Frascati, Italy) provided new data for the strong interaction shift ϵ_{1s} and width Γ_{1s} of the 1s state [1]. The repulsive character of the kaon-proton interaction at threshold was confirmed, and compared with former experiments the precision of ϵ_{1s} and Γ_{1s} was improved.

A new experiment planned by the SIDDHARTA (Silicon Drift Detectors for Hadronic Atom Research by Timing Application) collaboration [2] is aiming at a substantially improved precision ϵ_{1s} and Γ_{1s} at the eV level. In this experiment new large area silicon drift detectors (SDDs) will be employed as X-ray detectors providing excellent energy resolution and timing capability, thus allowing the efficient background suppression by using the coincidence between the X-ray and the charged kaon pair from Φ decay. Using this method high precision data on ϵ_{1s} and Γ_{1s} of kaonic hydrogen and kaonic deuterium — first time measurement — are anticipated and the isospin-dependent kaon-nucleon scattering lengths will be extracted with an unprecedented accuracy.

The status of the research on kaonic atoms and an outlook to future experiments at DAΦNE will be presented.

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[1] G. Beer *et al.* (DEAR Collaboration), Phys. Rev. Lett. **94**, 212302 (2005).

[2] <http://www.lnf.infn.it/esperimenti/siddharta/>