# Probing strong interaction with kaonic atoms – from DAΦNE to J-PARC

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In light exotic hadronic atoms the Bohr radius is much larger than the typical range of strong interaction formulated in QCD, and the average momentum of the bound hadron is very small. For light atoms, especially for hydrogen atoms, a detectable energy shift of the ground state has been found (with respect to the pure QED value), as well as an observable broadened ground state level, caused by nuclear absorption. By measuring these observables, the s-wave kaon-nucleon scattering lengths at zero energy could be extracted, which are sensitive measures of the chiral and isospin symmetry breaking pattern in QCD. The understanding of the strong interaction between hadrons in the strangeness sector are an important testing ground for chiral SU(3) symmetry due to the large mass of the strange quark, which are studied using non-perturbative coupled-channel techniques based on the chiral SU(3) effective Lagrangians [1, 2].

At the DAΦNE electron positron collider of Laboratori Nazionali di Frascati with SIDDHARTA kaonic atoms with Z=1 and Z=2 were studied with up to now unrivalled precision. The SIDDHARTA experiment used X-ray spectroscopy to determine the strong interaction induced shift and width of the experimentally accessible level: 1s for kaonic hydrogen [3] atoms and 2p for kaonic helium [4].

An overview of the results obtained with SIDDHARTA will be presented as well as a description of the SIDDHARTA apparatus. Finally, using the information gained with SIDDHARTA we propose to measure at J-PARC kaonic deuterium for the first time [5].

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