Contribution ID: **25** Type: **Oral presentation**

The kaonic atoms research program at DAFNE: from SIDDHARTA to SIDDHARTA-2

Tuesday, 12 September 2017 14:40 (20 minutes)

The interaction of antikaons with nucleons and nuclei in the low-energy regime represents an active research field in hadron physics with still many important open questions. The investigation of light kaonic atoms, in which one electron is replaced by a negatively charged kaon, is a unique tool to provide precise information on this interaction; the energy shift and the broadening of the low-lying states of such atoms, induced by the kaon-nucleus hadronic interaction, can be determined with high precision from the atomic X-ray spectroscopy, and this experimental method provides unique information to understand the low energy kaon-nucleus interaction at the production threshold. The lightest atomic systems, like the kaonic hydrogen and the kaonic deuterium deliver, in a model-independent way, the isospin-dependent kaon-nucleon scattering lengths. The most precise kaonic hydrogen measurement to-date, together with an exploratory measurement of kaonic deuterium, were carried out in 2009 at the DAFNE collider, by the SIDDHARTA collaboration at the electron-positron collider DAFNE of LNF-INFN, combining the excellent quality kaon beam delivered by the collider with new experimental techniques, as fast and very precise X ray detectors, like the Silicon Drift Detectors. The SIDDHARTA result triggered new theoretical work, which achieved major progress in the understanding of the low-energy strong interaction with strangeness reflected by the antikaon-nucleon scattering lengths calculated with the antikaon-proton amplitudes constrained by the SIDDHARTA data. The most important open question is the experimental determination of the hadronic energy shift and width of kaonic deuterium; presently, a major upgrade of the setup, SIDDHARTA-2, is being realized to reach this goal. In this talk, the SIDDHARTA-2 experiment, together with the most recent experimental results and the future projects of X-ray spectroscopy of light kaonic atoms are presented.

Primary author: Dr SCORDO, Alessandro (LNF-INFN)

Presenter: Dr SCORDO, Alessandro (LNF-INFN)

Session Classification: Parallel P3 & P4

Track Classification: Kaon-nucleon and kaon-nucleus interaction