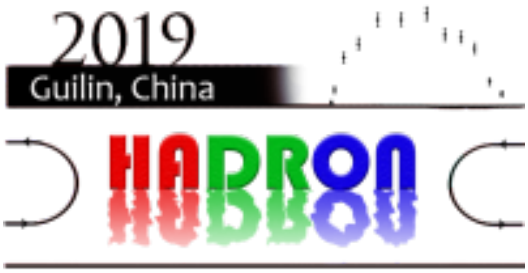

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Status and perspectives for low energy kaon-nucleon interaction studies at DAFNE collider: from SIDDHARTA to SIDDHARTA-2

Tuesday, 20 August 2019 09:15 (20 minutes)

The study of the antikaon-nucleon system at very low energies plays a key role in the understanding of the strong interaction between hadrons in the strangeness sector. The information provided by the low energy kaon-nucleon interaction is accessible through the study of kaonic atoms. The lightest atomic systems, namely the kaonic hydrogen and the kaonic deuterium, provide the isospin dependent kaon-nucleon scattering lengths by measuring the X-rays emitted during their de-excitation to the 1s level. Until now, the most precise kaonic hydrogen measurement and an exploratory measurement of kaonic deuterium were carried out at the DAFNE collider by the SIDDHARTA collaboration, 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. Today, the most important experimental information missing in the field of the low-energy antikaon-nucleon interactions is the experimental determination of the hadronic energy shift and width of kaonic deuterium and will be measured by the new SIDDHARTA-2 experiment, which just finished the installation in DAFNE and is ready to start the data taking campaign. The experimental challenge of the kaonic deuterium measurement is the very small x-rays yield, the even larger width (compared to kaonic hydrogen) and the difficulty to perform x-rays spectroscopy with weak signals in the high radiation environment of DAFNE. It is, therefore, crucial to develop a new large area X-rays detector system to optimize the signal and to control and improve the signal-to-background ratio by gaining in solid angle, increasing the timing capability and as well implementing an additional charge particle tracking veto systems.
In the talk, I shall review the kaonic atoms measurements performed by SIDDHARTA, the status and plans of SIDDHARTA-2 and future perspectives to measure other kaonic atom systems at the DAFNE collider.

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