

Kaonic atoms measurements performed by SIDDHARTA-2 collaboration: results and expectations.

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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 measurement that will be performed by the new SIDDHARTA-2 experiment, which just finished the installation in DAFNE and is ready to start a new data taking campaign.

The precise measurement of the shift and width of the 1s level to the purely electromagnetic calculated values, generated by the presence of the strong interaction, through the measurement of the X-ray transitions to this level, in kaonic hydrogen, already performed by the SIDDHARTA collaboration and in kaonic deuterium, underway by SIDDHARTA-2 experiment, will allow the first precise experimental extraction of the isospin dependent antikaon-nucleon scattering lengths, fundamental quantities in understanding low-energy QCD in strangeness sector.

The experimental challenge of the kaonic deuterium measurement is the exceedingly 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 or improve the signal-to-background ratio by gaining in solid angle, increasing the timing capability, and as well implementing additional charge particle tracking veto systems.

An overview of the results obtained with SIDDHARTA-2 in the preparation phase will be presented as well as a description of the apparatus.

Collaboration

SIDDHARTA-2

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