



Contribution ID: 33

Type: **not specified**

Kaonic atoms measurements with SIDDHARTA-2 at the DAFNE collider

The low-energy QCD, the theory within the Standard Model describing the strong interaction, is still missing fundamental experimental results to achieve a breakthrough in its understanding. Among these experimental results, kaonic atoms X-ray spectroscopy represents a unique laboratory for the study of the antikaon-nucleon/nuclei interaction at threshold energy, with important consequences going from particle and nuclear physics to astrophysics (neutron stars and their equation of state).

Combining the excellent quality of the low-energy kaon beam delivered by the DAΦNE collider in Frascati (Italy) with new experimental techniques, as fast and very precise X-ray detectors, like the Silicon Drift Detectors, the SIDDHARTA collaboration performed unprecedented measurements in the low-energy strangeness sector and is presently running the SIDDHARTA-2 experiment for the challenging kaonic atoms measurements, such as kaonic deuterium first measurement.

I will introduce the scientific case, the experiment and the results concerning various measurements of kaonic atoms, such as helium-4 and neon. Finally, I will outline the prospects for the ongoing kaonic deuterium measurement and our future plans.

The experiments at the DAΦNE collider represents a unique opportunity in the world to, finally, unlock the secrets of the QCD in the strangeness sector and contribute to better understand the role of strangeness in the Universe, from nuclei to the stars.

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