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Kaonic atoms with SIDDHARTA-2 at the DAFNE collider

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The study of the quantum chromodynamics (QCD) is the main motivation for the exotic hadronic atom experiments. Among the exotic atom, the kaonic atom spectroscopy plays a key role for the understanding of the low-energy QCD in the strangeness sector, by allowing to directly access the antikaon-nucleus ($\bar{K}N$) interaction at threshold. Currently, the lack of experimental inputs prevents the improvement and development of theoretical models, in particular the measurement of kaonic deuterium is the missing element to extract the isospin dependent $\bar{K}N$ scattering lengths.

In this framework, the SIDDHARTA-2 experiment at INFN-LNF DAΦNE collider is carrying on its data taking campaign, aiming at performing the first measurement of kaonic deuterium X-ray transition to the fundamental level. To achieve this challenging goal the experimental apparatus is equipped with 384 state-of-the-art Silicon Drift Detectors (SDDs), distributed around its cryogenic gaseous target, and several trigger and veto systems for background reduction.

The scientific case, the SIDDHARTA-2 experimental apparatus as well as the results obtained during the first phase of the experiment will be presented.

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