Contribution ID: **115** Type: **Parallel**

Kaonic Atoms at the DAΦNE collider beyond SIDDHARTA-2: future perspectives

Friday, 23 June 2023 17:30 (20 minutes)

Kaonic atoms are exotic atoms formed when a negatively charged kaon (K^-), stopped in a target, is captured by the atomic system, replacing the electron in a highly excited level. The captured K^- starts an electromagnetic cascade down to the more internal levels of the atom. Approaching the innermost levels of the exotic atom, the kaon-nucleons strong interaction produces an energy shift and width of the atomic levels. These energy shifts and widths are measured by the SIDDHARTA collaboration with dedicated high-precision x-ray spectroscopy and a comparison with the purely electromagnetic values calculated with the QED. The x-ray spectroscopy on kaonic atoms provide a direct measure of the effects of the strong kaon-nucleons interaction at low energies, thus being a fundamental data source for the development of theoretical models. These models are used to derive: Kaon-Nucleon (KN) interaction at threshold, KNN interaction at threshold, Nuclear density distributions, Possible existence of kaon condensates, Kaon mass, Kaonic atoms cascade models and E2 nuclear resonance effects. Except for some selected recent measurements at DAFNE and JPARC, the whole knowledge on kaonic atoms dates back to 1970s - 1980s. Many of these old measurements were affected by big uncertaintes and hard incompatibilities. Moreover, many kaonic atoms measurements are not yet performed. The SIDDHARTA collaboration is planning a new series of measurements beyond the SIDDHARTA-2 experiment as for example the revisiting K^- mass, first measurement of unmeasured kaonic atoms, nuclear resonance effects in kaonic atoms and so on. Purposes, perspectives of these measurements, together with the description of setups and technologies implied, will be reviewed.

Collaboration

SIDDHARTA-2

Primary author: DE PAOLIS, Luca (LNF-INFN)

Presenter: DE PAOLIS, Luca (LNF-INFN)

Session Classification: Parallel session C4