

Strange Exotic Atoms: precision frontiers in fundamental interaction studies

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Strange exotic atoms, in which a kaon (or a Sigma minus) replaces an electron in orbit, offer a precision window into low-energy QCD, high-precision QED and possible new physics studies. Recent advances at DAΦNE (SIDDHARTA-2) and J-PARC are enabling high-accuracy X-ray spectroscopy of kaonic atoms, such as hydrogen, deuterium, and of many other light-to-heavy exotic atoms. Proposals as EXKALIBUR, based on next-generation SDDs, on fast-timing CZT detectors, on high-precision HPGe, as well as TES detection systems used in Japan (for example for muonic atoms) open the path to sub-eV precision and a broader program on strange atomic systems. This contribution outlines future opportunities and a partway towards coordinated strategies at DAΦNE and J-PARC, highlighting their complementary roles in advancing the physics of fundamental interactions studies with strange exotic atoms.

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