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Novel CZT Detectors for kaonic atoms spectroscopy

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Kaonic atoms spectroscopy provides essential observables for investigating low-energy strong interactions in systems with strangeness. I shall present an overview of the SIDDHARTA-2 collaboration's efforts in this field, with a particular focus on the development and first use of a novel Cadmium-Zinc-Telluride (CZT) detector system for studying intermediate-mass kaonic atoms.
This innovative detection system, applied for the first time in fundamental physics research at a collider, extends the accessible energy range of kaonic atoms spectroscopy to the hundreds of keV. Initial tests have demonstrated that its excellent energy resolution, efficient background rejection, and precise timing capabilities make it highly suitable for exotic atom measurements.
During the first data-taking campaign at the DAΦNE collider in Italy, the collaboration successfully measured kaonic fluorine and kaonic aluminium transitions, highlighting the detector's potential for advancing kaonic atom studies. These results pave the way for further applications at DAΦNE and J-PARC in Japan.
Ultimately, these developments aim to refine our understanding of kaon-multinucleon low-energy strong interactions by enabling high-precision measurements of intermediate-mass kaonic atoms.

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