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Novel CZT Detectors for Kaonic Atoms Spectroscopy

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Kaonic atom spectroscopy provides key observables for investigating low-energy strong interactions in strange systems. In this presentation, I present an overview of the SIDDHARTA-2 collaboration's activities in the field of kaonic atoms, with a particular focus on the development of a new Cadmium-Zinc-Telluride (CZT) detector system for the study of intermediate-mass kaonic atoms.

This novel detection system, applied for the first time in fundamental physics research at a collider, is designed to extend the energy range accessible to the experiment in kaonic atom spectroscopy to hundreds of keV. The firsts tests demonstrated that the detector's energy resolution, efficient background rejection, and good timing performance make it ideal for performing kaonic atom measurements.

During the first data taking at the DAΦNE collider, the collaboration successfully measured kaonic fluorine, aluminum, lead and copper transitions, demonstrating the valuability of such a detector in kaonic atoms studies, in view of new applications at DAΦNE and at J-PARC.

The ultimate goal of these developments is to refine our understanding of kaon-multinucleon low-energy strong interactions by providing high-precision measurements of intermediate-mass kaonic atoms.

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