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Precision Spectroscopy of Low-Lying States in Muonic Boron with MMC Detectors

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The spectroscopy of light muonic atoms offers a powerful tool for probing nuclear structure with high precision. By studying X-ray transitions, particularly low-lying states such as the 2p–1s transitions, it is possible to extract absolute nuclear charge radii with high accuracy.
However, measuring these transitions for low-Z nuclei in the 20–150 keV energy range remains challenging, primarily due to the limited energy resolution of conventional solid-state detectors. These measurements are essential for improving theoretical models, validating predictions of bound-state QED, and exploring physics beyond the SM.
To overcome these limitations, the QUARTET collaboration employs metallic magnetic calorimeters (MMC) to perform high-precision X-ray spectroscopy of muonic atoms. This presentation will describes the spectroscopy methods developed for light muonic atoms, details the experimental setup, and presents preliminary results for muonic boron obtained with MMC detectors.

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