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New Advances in Muonic Atom Spectroscopy

Wednesday 10 September 2025 15:00 (30 minutes)

Muonic atom spectroscopy is a well-established technique to measure absolute nuclear charge radii with exceptional precision, successfully utilized for nuclei throughout the entire nuclear chart –from protons and the lightest elements to medium-mass, heavy and radioactive isotopes. These precise measurements serve as critical benchmarks for ab initio nuclear theory, important input in atomic spectroscopy for high-precision QED tests, as well as the extraction of fundamental constants.

This presentation provides an overview of the muonic atom spectroscopy landscape at the Paul Scherrer Institute (PSI) and the variety of scientific questions explored within the area. A special focus will be placed on the latest advancements initiated by the QUARTET collaboration, which employs metallic magnetic calorimeters (MMCs) to access the low-Z region from lithium to neon. This latest advancement facilitates high-resolution x-ray spectroscopy of light muonic atoms, bridging a longstanding technological gap and opening up new prospects for precision studies at the intersection of atomic and nuclear physics.

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