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Muonic X-ray spectroscopy at the Paul Sherrer Institute

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Muonic atoms are exotic bound systems consisting of a negative muon and a nucleus. Due to the small Bohr radius of the muon and thus significant overlap of its wave function with the atomic nucleus, this hydrogen-like system forms an excellent laboratory to study nuclear finite size effects.

Laser spectroscopy can determine the energy levels of a muonic atoms with unprecedented precision, and has been applied to hydrogen and helium atoms with great success. The nuclear charge radii of most stable nuclei have been determined using X-ray spectroscopy with high-purity germanium detectors, a method which is currently being extended to long-lived radioactive isotopes. For light nuclei from lithium until oxygen, a new experimental method using metallic magnetic calorimeters is being developed.

I will give an overview of ongoing and planned muonic atoms spectroscopy measurements at the Paul Scherrer Institute.

Primary author(s) : WAUTERS, Frederik (Johannes Gutenberg University Mainz)

Presenter(s) : WAUTERS, Frederik (Johannes Gutenberg University Mainz)

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