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Typ: Talk

New Concept of Testing Strong-Field QED Via X-Ray Spectroscopy of Antiprotonic Atoms at CERN

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The advent of quantum sensing x-ray microcalorimeters such as Transition Edge Sensors (TESs) [1] has created exciting new opportunities to push the limits of precision physics in the hard x-ray domain. Thanks to the factor of 50 improvement in energy resolution offered by TESs over high-purity germanium [2, 3], and their high efficiency compared to crystal spectrometers [4], anti-protonic atom x-ray spectroscopy has entered a new era compared to the previous generation of experiments. The PAX project (anti-Protonic Atom X-ray spectroscopy) will employ a next-generation TES detector for spectroscopy of transitions between circular Rydberg states in antiprotonic atoms to establish new benchmarks for bound-state QED at field strengths well beyond the Schwinger limit with a precision of 10^{-5} in the few hundred keV regime [5]. Details of the PAX experiment at the CERN's ELENA facility [6,7] and preliminary results from the test beam conducted in 2025 including unique challenges for detector development related to annihilation and electromagnetic background will be discussed.

References

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