

# Ultra-low heating rates for high precision measurements on antiprotons

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The observed baryon asymmetry in our universe challenges the Standard Model of particle physics and motivates sensitive tests of CPT invariance. Inspired by this, the BASE experiment at CERN compares the fundamental properties of antiprotons and protons with high precision using an ultra-low noise cryogenic multi-Penning trap apparatus.

One particular challenge is imposed by electric-field noise that fundamentally affects the spin-state detection fidelity in magnetic moment measurements. Recently, we reported on the first heating rate determination in a cryogenic Penning trap [1], the measured electric field noise is more than 100 times better than in room temperature Penning traps and more than 1000 times lower as in Paul traps. In this contribution, recent experimental developments and future measurement prospects will be discussed.

[1] M. J. Borchert et al., Phys. Rev. Lett. 122, 043201 (2019)

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