

Garching Maier-Leibnitz-Kolloquium

Donnerstag, 26.10.2023, 16¹⁵ Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

Dr. Markus Wiesinger

(MPI f. Kernphysik, Heidelberg)

Sympathetic Laser-Cooling of a Single Proton for High-precision Comparison of the Fundamental Properties of Protons and Antiprotons in BASE

The Baryon Anti-baryon Symmetry Experiment (BASE) collaboration operates cryogenic Penning trap experiments in Mainz, Hannover, and at CERN dedicated to high-precision measurements of the mass [1], magnetic moment [2,3], and other properties of the proton and antiproton. These measurements provide precise tests of the CPT symmetry, tests of the weak equivalence principle, and explore beyond the Standard Model physics (e.g setting limits on the interaction of antiprotons with axion-like particles [4]). At the Mainz experiment we have recently succeeded in sympathetically cooling a single proton with laser-cooled ${}^9\text{Be}^+$ ions stored in a separate Penning trap. In this experiment the coupling between both ion species is mediated by image currents induced in a common RLC circuit [5]. This talk will give an overview of the activities of the BASE collaboration with an emphasis on the sympathetic cooling experiments carried out in Mainz.

- [1] M.J. Borchert et al. Nature 601, 35 (2022)
- [2] G. Schneider et al. Science 358, 1081 (2017)
- [3] C. Smorra et al. Nature 550, 371 (2017)
- [4] C. Smorra et al. Nature 575, 310 (2019)
- [5] M. Bohman et al. Nature 596, 514 (2021)

Hybrid online access via ZOOM:

<https://lmu-munich.zoom.us/j/98457332925?pwd=TWc3V1JkSHpyOTBPQVlMelhuNnZ1dz09>

Meeting ID: 984 5733 2925

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