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Precision measurements of the (anti)proton mass and magnetic moment by the BASE collaboration

Wednesday 12 June 2019 11:00 (30 minutes)

The measurement of the masses and magnetic moments of the antiproton and the proton is a sensitive test of CPT invariance and the determination of fundamental constants. In our experiments we store and detect a single (anti)proton in cryogenic Penning traps with storage times longer than one year. We have performed the most precise comparison of the proton and antiproton charge-to-mass ratios with 11 significant digits in measurements of their cyclotron frequencies. The proton and antiproton magnetic moments (g-factors) are measured by detection of spinflip quantum jumps via the continuous Stern-Gerlach effect in a Penning trap observing tiny differences in the axial frequency of the trapped particles. With our trap set-ups in Mainz and at CERN we determined the antiproton and proton g-factors with a fractional precision on the ppb-level and better.

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