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# Toward a hyperfine splitting measurement of antihydrogen

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The formation of antihydrogen opens a new avenue toward precise matter-antimatter symmetry studies through atomic spectroscopy techniques. The ASACUSA collaboration is pursuing an experiment to measure the ground-state hyperfine splitting of antihydrogen in a polarized beam [1]. For hydrogen this transition has been measured in a beam and with a maser reaching a relative precision of 4 × 10e−8 [2] and 10e−12 [3], respectively.

Recently, the first observation of antihydrogen atoms arriving 2.7m downstream of the formation region in a field-free environment has been reported [4]. During the subsequent shutdown of CERN, a source of cold polarized hydrogen atoms was built and experiments were performed to characterize the spectroscopy apparatus with a hydrogen beam. Now the complete apparatus for antihydrogen spectroscopy has been assembled and operated during a short experimental run.

The latest status of the antihydrogen hyperfine splitting experiment will be presented including the results of the hydrogen beam experiment, which confirm the high precision and accuracy of our recently developed spectroscopy apparatus. With this device ground state hyperfine spectroscopy at a fractional precision on the few ppb level has been demonstrated very recently.

## additional information

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