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Measurement of the ground-state hyperfine splitting of antihydrogen at CERN

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The ASACUSA collaboration at the Antiproton Decelerator of CERN is planning to measure the ground- state hyperfine splitting of antihydrogen using an atomic beam line. The setup consists of a cusp trap as a source of partially polarized antihydrogen atoms emitted toward a radiofrequency spin-flip cavity. A superconducting sextupole magnet serves as spin analyser before the detection of the atoms is an antihydrogen detector.
Monte Carlo simulations show that the antihydrogen ground-state hyperfine splitting can be determined in a beam at a relative precision of ˜ 10ˆ(−7).
Antihydrogen is the simplest atom consisting entirely of antimatter. Since its matter counterpart is one of the most precisely measured atoms in physics, a comparison of antihydrogen and hydrogen at the 10ˆ(−7) level would already offer one of the most sensitive tests of CPT symmetry.
My talk will discuss the theoretical background and present the latest developments in the setup as well as the coming years program to achieve the above mentioned precision.

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