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Microwave spectroscopy of antihydrogen as a test of CPT symmetry

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The goal of the CERN-based ALPHA Collaboration is to examine the properties of the antihydrogen atom at the highest levels of precision possible [1], and thereby place constraints on any differences that might exist between antihydrogen and normal matter counterpart, hydrogen. These comparisons are expected to provide stringent tests of CPT symmetry, which is one of the cornerstones upon which quantum field theory is built. In 2012 we reported on an experiment in which transitions were induced between hyperfine levels of ground state antihydrogen atoms held in a magnetic trap [2]. We have made significant progress with that experiment during the interim, and anticipate that we will soon be able to report a measurement of the hyperfine splitting of the antihydrogen atom. That work, as well as future prospects for precision microwave spectroscopy of antihydrogen, will be described.

[1] ALPHA Collaboration, Nature 541, 506 (2017).

[2] ALPHA Collaboration, Nature 483, 439 (2012).

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