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CPT and Lorentz invariance tests by hydrogen and deuterium hyperfine spectroscopy and implications for ASACUSA's antihydrogen programme

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Hyperfine structure measurements on antihydrogen can provide sensitive tests of CPT invariance. The ASACUSA collaboration proposed such a measurement on a beam of antihydrogen at the antiproton decelerator of CERN. Supporting matter experiments are of high relevance in antihydrogen research to benchmark spectroscopy equipment and methods. In addition, dedicated measurements on hydrogen and deuterium can put new or improved constraints on coefficients of the so-called standard model extension even without comparison to antihydrogen.

We have constructed an atom beam setup for Rabi spectroscopy and performed such measurements for hydrogen at CERN and for deuterium at the Laboratoire Aimé Cotton, Université Paris-Saclay. The analyses of which have been concluded recently and we can give a preview on the results we are about to publish. Finally, the relevance for antihydrogen spectroscopy will be discussed.

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