

Abstract Submitted
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Laser cooled anions as a sympathetic coolant JULIAN FESEL, CERN, AEGIS COLLABORATION — Several ongoing experiments at CERN aim at testing the CPT theorem and the weak equivalence principle using antimatter, among them the AEGIS experiment. For the latter, antiprotons inside a Penning trap interacting with Rydberg positronium form antihydrogen, which will then be used for precision measurements. The achievable sensitivity of these measurements is determined by the antihydrogen temperature which, for this production scheme, is determined by the temperature of the antiprotons. We are investigating the use of laser-cooled anionic molecules to sympathetically cool antiprotons confined in the same trapping potential. A test setup to produce cold ground state C²⁻ molecules is currently being commissioned. This setup will be presented, together with a theoretical study on the feasibility of several laser cooling schemes, including one using the AC-Stark shift. Laser cooling of anions — which has so far never been achieved — would also enable the sympathetic cooling of any other negatively charged species, opening new opportunities in a variety of research areas.

Julian Fesel
CERN

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