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【431】Towards laser cooling of negative molecular ions

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The AEgIS experiment aims at measuring the gravitational acceleration of antihydrogen ($\bar{H}$). A key limitation is the $\bar{H}$ temperature because the thermal motion blurs the $\bar{H}$ free-fall trajectories. Sympathetic cooling of antiprotons by co-trapped laser-cooled negative ions would enable synthesis of $\bar{H}$ at mK temperatures – three to four orders of magnitude below the currently achieved ones. Laser cooling of anions, however, has not yet been achieved. We aim at realizing Doppler laser cooling of C_2^- ions. We have produced, mass-selected and trapped C_2^-. Currently, the capture efficiency of the trap and the lifetime of trapped C_2^- ions are improved and in-beam spectroscopic studies of C_2^- are prepared.

Authors: GERMANN, Matthias (CERN); PARNEFJORD GUSTAFSSON, Fredrik Olof Andre (CERN); DOSER, Michael (CERN)

Presenter: GERMANN, Matthias (CERN)

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