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Toward pulsed production of antihydrogen and test of the Weak Equivalence Principle for antimatter

Monday, July 17, 2023 10:00 AM (30 minutes)

The AEgIS (Antimatter Experiment: Gravity, Interferometry, Spectroscopy) is one of the experiments at the Antiproton Decelerator (AD) complex at CERN.

It is working toward probing the Weak Equivalence Principle for antimatter by measuring the influence of gravity on a horizontal flight path of neutral antihydrogen atoms. The pulsed beam of antihydrogen is achieved by means of the charge-exchange reaction between Rydberg positronium atoms and antiprotons provided by the AD. To achieve the pulsed characteristic of the beam, the Rydberg positronium and the exchange reaction are induced by consecutive shots of different lasers with nanosecond precision.

Since the demonstration of the production scheme of \overline{H} in 2018, the experiment underwent an extensive optimization. The upgrade consists of the newly constructed production trap, updated positronium converter, installation of a new laser system and the complete rebuilding of the experimental control system. With everything in place, the experiment is moving toward complete automation of its operations. This allows us to utilize better the antiprotons provided by the recently commissioned ELENA (Extra Low ENergy Antiproton) decelerator at the AD.

The experiment was commissioned during the last antiproton campaign, held in the Autumn of 2022. The collaboration plans re-establishing antihydrogen production with a higher flux by several orders of magnitude thanks to ELENA and the upgrades.

This presentation overviews the current $AE\overline{gIS}$ setup and results obtained last year together with a brief explanation of the goals of the experiment.

Is this abstract from experiment?

Yes

Name of experiment and experimental site

AEgIS

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

No

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