XIII International Conference
on New Frontiers in Physics
26 Aug – 4 Sep 2024, OAC, Kolymbari, Crete, Greece

Contribution ID: **19**   Type: **Talk**

New perspectives from record-high numbers of trapped antiprotons in the AEgIS experiment

Monday 26 August 2024 17:40 (25 minutes)

The AEgIS (Antimatter Experiment: Gravity, Interferometry, Spectroscopy) collaboration uses antiprotons from CERN's Antiproton Decelerator (AD)/Extra Low ENergy Antiproton decelerator (ELENA) complex to produce bound antimatter systems, with a focus on neutral antihydrogen and positronium atoms, and perform experiments on their properties to draw conclusions on fundamental concepts such as CPT symmetry and the Weak Equivalence Principle.

Following extensive upgrades, including the design and implementation of a novel experimental control system and several significant hardware modifications, AEgIS has successfully developed a procedure to routinely accumulate record numbers of well above tens of millions of cold antiprotons in one of their Penning-Malmberg traps in 2023. In addition to enabling more efficient antihydrogen production for precision studies, this achievement opens the door to a vast variety of research areas, including for example the formation and study of antiprotonic atoms and antiproton spectroscopy experiments, as well as applications in areas such as dark matter investigations.

This contribution gives an overview over the recent achievements in AEgIS, focusing on the antiproton accumulation, and outlines the progress towards precision gravity measurements on antihydrogen and more exotic physics goals involving antiprotons.

Is this an abstract from experimental collaboration?

Yes

Name of experiment and experimental site

AEgIS, Antiproton Decelerator, CERN

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

No

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Session Classification: Cosmology, Astrophysics, Gravity, Mathematical Physics