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Development of nuclear emulsions with 1 micron accuracy for the AEGIS experiment.

The goal of the AEGIS experiment (CERN AD-6) is a test of the Weak Equivalence Principle for antimatter. We will measure the earth's gravitational acceleration g on antihydrogen atoms that have been launched in a horizontal vacuum tube. A position sensitive detector will detect their annihilation at the end of the tube. The goal is to determine g with a 1% accuracy. The University of Bern proposes to use nuclear emulsions with submicron resolution for the detector, which will improve the resolution by an order of magnitude compared to the original AEGIS proposal. The detector has to operate in vacuum, a condition that has not been investigated so far with emulsions, and which is the subject of this RD work. In 2012 we tested emulsion films at 8×10^{-6} mbar and room temperature with 5 MeV antiprotons from CERN's antiproton decelerator. The annihilation vertices could be observed directly on the emulsion surface using the microscope facility available in Bern for the analysis of the OPERA data. We could successfully reconstruct the annihilation vertices with a resolution of 1-2 microns on the impact parameter. Results of the tests will be presented, and plans for future developments will be discussed.

quote your primary experiment

AEGIS

Primary author: Dr KIMURA, Mitsuhiro (Universitaet Bern (CH))

Co-authors: ARIGA, Akitaka (Laboratorium fuer Hochenergiephysik-Universitaet Bern); Prof. EREDITATO, Antonio (Universitaet Bern (CH)); CANALI, Carlo (Universitaet Zuerich (CH)); REGENFUS, Christian (Universitaet Zuerich (CH)); PISTILLO, Ciro (Universitaet Bern (CH)); AMSLER, Claude (Universitaet Bern (CH)); KRESLO, Igor (Universitaet Bern (CH)); Mr ROCHET, Jacky (University of Zurich); Dr STOREY, James (Universitaet Zuerich (CH)); KAWADA, Jiro (Universitaet Bern (CH)); SCAMPOLI, Paola (Universita di Napoli Federico II); BRACCINI, Saverio (Universitaet Bern (CH)); ARIGA, Tomoko (University of Bern)

Presenter: Dr KIMURA, Mitsuhiro (Universitaet Bern (CH))

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