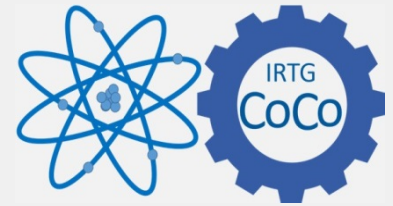


IRTG-Seminar



Dr. Sebastian Gerber

CERN, Geneva, Switzerland

“Testing Antimatter Gravity”

Antimatter experiments conducted at the Antiproton Decelerator (AD) at CERN address the fundamental questions why primordial antimatter is not observed in the present Universe. The weak equivalent principle (WEP) can be tested measuring the gravitational acceleration of antihydrogen atoms in the Earth’s gravitational field that are horizontally emitted from a Penning trap. The antihydrogen atoms can be produced via resonant charge exchange of Rydberg positronium and antiprotons at temperatures potentially determined by the recoil limit of the constituents

To prepare an ensemble of cold antihydrogen with a narrow velocity spread we plan to extend the existing electron cooling mechanism of antiprotons by laser-cooling techniques of negative C₂- molecules in a Penning trap in order to sympathetically cool antiprotons to the mK regime.

The generation of cold antihydrogen atoms can ultimately also be used for precision spectroscopy experiments of electromagnetic interaction as a test of CPT symmetry.

In this presentation the status of the AEGIS experiment at CERN and the feasibility of sympathetic cooling using photo-detachment and AC Stark Sisyphus cooling of C₂- will be reviewed.

**Tuesday, May 09, 2017, 1:00 p.m., HS II,
Physics high rise, Hermann-Herder-Str. 3**