Contribution ID: **132** Type: **oral**

Future searches for antimatter in cosmic-rays with magnetic spectrometers

Wednesday, 27 July 2022 17:45 (15 minutes)

The last decade has been marked by significant progress in searches for antimatter in cosmic-rays. The unexpected abundance of positrons in the energy interval 10-200 GeV, reported by the PAMELA collaboration in 2009 and later confirmed and measured up to 1 TeV by AMS-02, remains unexplained, with nearby astrophysical sources and Dark Matter annihilation invoked as possible explanations. Even more puzzling is the observation of about 1 anti-helium isotope per year, reported by the AMS-02 collaboration, because no antihelia from secondary production are expected to be observed by AMS-02, even in 1 century of operation.
These results are not conclusive and bring out two interrelated needs. First, to improve the quality of observations, both extending the energy range and increasing statistics. Second, to provide independent measurements of phenomena which could deeply reform our comprehension of the Universe. To meet them, new experiments are needed, featuring long-life large-acceptance high-field spectrometers, a technological challenge with few equals.
In this work I will summarize all findings about antimatter by PAMELA and AMS-02.
Afterwards, I will describe ALADInO, one of the most interesting proposals for next generation antimatter experiments, showing its scientific potential, its sensitivity and projected results. The focus will be on recent laboratory results on space-compliant high-temperature superconducting coils (HDMS project) and low-power monolithic active pixel sensors (HEPD project), paving the way towards a dedicated lightweight pathfinder mission focused on antinuclei (LAMP).

Primary author: IUPPA, Roberto (University of Trento)

Presenter: IUPPA, Roberto (University of Trento)

Session Classification: Parallel 2

Track Classification: INSTR