Contribution ID: **214**   Type: **Parallel talk**

The HERD experiment: new frontiers in detection of high energy cosmic rays

Monday 28 August 2023 15:45 (15 minutes)

The HERD (High Energy cosmic-Radiation Detector) experiment is a future space based experiment for the direct detection of high energy cosmic rays. It will be installed on the Chinese Space Station in 2026. The detector is based on a 3D, homogeneous, isotropic, deep and finely segmented calorimeter, surrounded by multiple sub-detectors for charge, timing and track measurement. Thanks to its innovative geometry the detector will be capable to detect particles from all directions, having a large geometric acceptance. This, together with a good energy resolution, will provide the detector an effective geometric factor about one order of magnitude larger than that of current space experiments for protons and electrons detection. Thanks to this feature, the HERD experiment will measure cosmic rays proton flux up to 1 PeV, performing the first direct measurement of the cosmic ray knee region. In addition, HERD will measure electron+positron flux up to tens of TeV, and will search for possible indirect signals of dark matter and local sources of electrons and positrons. These energy limits, for protons and electrons, will be more than one order of magnitude higher than that of the current space experiments. Moreover, measuring high energy photons HERD will search for sources of high energy cosmic rays and for indirect signals of dark matter.

In this talk we want to introduce the HERD experiment, with its innovative features, and the potential of its future measurements.

Submitted on behalf of a Collaboration?

Yes

Primary author: Dr BETTI, Pietro (Department of Physics and Astronomy, University of Florence and INFN sezione di Firenze)

Co-authors: TIBERIO, Alessio (Università degli Studi di Firenze and INFN, Firenze, Italy); VANNUCCINI, Elena; BERTI, Eugenio (Universita e INFN, Firenze (IT)); D'ALESSANDRO, Lel (Universita e INFN, Firenze (IT)); PACINI, Lorenzo (INFN, Firenze (IT)); MORI, Nicola (INFN Florence); STARODUBTSEV, Oleksandr (Universita e INFN, Firenze (IT)); PAPINI, Paolo (INFN); BOTTAI, Sergio (Universita e INFN, Firenze (IT)); ADRIANI, oscar

Presenter: Dr BETTI, Pietro (Department of Physics and Astronomy, University of Florence and INFN sezione di Firenze)

Session Classification: High-energy astrophysics and cosmic rays

Track Classification: High-energy astrophysics and cosmic rays