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The HERD space mission

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The High Energy cosmic-Radiation Detection (HERD) space mission is now being designed, as a result of an international collaboration

among several chinese and european institutions, to make cosmic ray (CR) direct measurements at the highest possible energies with current technologies.

HERD primary scientific goals include precise measurements of the energy spectra of CR individual species up to few PeV, reaching the knee of the all-particle spectrum, and study electrons and photon of spectra from GeV up to tens of TeV, also contributing to multi-messenger observations together with other satellites and ground-based experiments.

In order to reach these goals HERD is configured to accept incident particles from its top and the four lateral sides. The baseline design includes covering the top and fours sides with: the Silicon Charge Detector (SCD), for incident particle trajectory and charge measurement, the Plastic Scintillator Detector (PSD), for photon tagging and precise charge measurement, and a scintillating Fiber Tracker (FIT).

The core of the facility is made by a LYSO crystal calorimeter (CALO) that with its 3 interaction lengths and 55 radiation lengths will allow the measurement of incident gamma-rays, electrons and cosmic ray nuclei with unprecedented resolution and 3D reconstruction. In addition, on one side a Transition Radiation detector (TRD) will be installed for on-orbit calibration of the CALO.

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