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The High Energy cosmic Radiation Detector

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The High Energy cosmic Radiation Detector (HERD) is one of the leading projects among future space-borne instruments. It will be installed onboard the Chinese Space Station (CSS) thanks to a collaborative effort among Chinese and European institutions.

HERD core is a 3D calorimeter (~55 X0, 3II), forming an octagonal prism. Five calorimeter sides will be surrounded by 3 subdetectors, in the order from the innermost: Fiber Tracker (FiT), Plastic Scintillator Detector (PSD) and Silicon Charge Detector (SCD). Finally, a Transition Radiation Detector (TRD) is instrumented on one of its lateral faces, for energy calibration in the TeV scale.

Enabling SiPM technologies for space application allows to push the design requirements and enhances the detection features. HERD is, thus, uniquely configured to accept particles from both its top and four lateral sides. Thanks to its pioneering design, HERD shows an order of magnitude increase in geometric acceptance compared to current generation experiments. This will allow for: precise measurements of Cosmic Ray (CR) energy spectra and mass composition up to the highest achievable energies in space (~ few PeV), gamma ray astronomy and transient studies, along with indirect searches for Dark Matter particles.

Collaboration

HERD collaboration

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