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Attaining the PeV frontier of the cosmic ray spectrum in space with HERD

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The High Energy cosmic-Radiation Detection facility (HERD) is a calorimetric experiment planned to be launched in 2027. It will be operational for at least 10 years onboard the China's Space Station. With HERD we will measure the energy spectrum of cosmic protons and heavier nuclei from 30 GeV to, for the first time in space, a few PeV. We will search for annihilation and decay products of dark matter both in the energy spectrum and anisotropy of electrons and positrons from 10 GeV to 100 TeV and in the energy spectrum of gamma rays, and we will survey the gamma-ray sky from 100 MeV. The five HERD subdetectors, the calorimeter (CALO), the scintillating fiber tracker (FIT), the plastic scintillator detector (PSD), the silicon charge detector (SCD) and the transition radiation detector (TRD), are currently under development. In this talk, I will present the science perspectives of HERD and its contribution to the multimessenger astronomy, as well as the performance of the subdetector prototypes assessed in several laboratory and beam tests.

Summary

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