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## 21. Calibration for the SAMPA ASIC in HERD transition radiation detector front-end electronics

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The High Energy cosmic-Radiation Detection facility (HERD) is a part of the Chinese Cosmic Lighthouse Program in China's Space Station, which will be launched in 2027. HERD is expected to work 10 years in orbit and will indirectly detect dark matter, measure cosmic rays and observe high-energy gamma rays. As a sub-detector of HERD, the transition radiation detector's (TRD) main scientific goal is to calibrate the electromagnetic Calorimeter (CALO) at the TeV energy range, improve the measurement accuracy of the CALO, and detect astronomical phenomena of high-energy gamma rays. The front-end readout electronic (FEE) of the prototype of TRD uses four SAMPA ASICs for 128 signals of anode, realizing a high-speed, low-power, and high-reliability data acquisition system. In this work, we completed the calibrations of the gain and shaping time in the unsupported modes of SAMPA to achieve adjustable dynamic range on orbit. The effect of the different fitting algorithm on the test results is also discussed under different modes of operation.

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