

## A multi-directional particle detector on HXMT

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The hard X-ray Modulation Telescope(HXMT) launched on June 15, 2017 is the first special space science experiment project in China. HXMT operates in a low earth orbit with an altitude of 550km and an inclination of 43 degrees. The radiation of high-energy charged particles is an important environmental factor threatening the satellite and on-board payloads. Among them the background of the main detector (high energy detector which energy spectrum is 20~250keV) that the high-energy proton interacts with its material and the satellite material may affect the observation sensitivity of the telescope, and a large number of electrons and the secondary effects of electrons can also affect the working state of the main detector. The complex spatial distribution and dynamic changes of high energy charged particles are revealed by the results of the radiation environment detection of space charged particles carried out by low orbit satellites such as SAMPEX, NOAA and FY-1 in China. As the first orbit to carry out scientific exploration, HXMT satellite has not yet measured charged particle observation data.

As one of the payloads of the satellite, the newly developed multi-directional particle detector carries out the wide energy spectrum detection of high-energy electrons(0.2MeV~1.5MeV) and protons(3MeV~150MeV) in orbit space and the particle flux measurement from 16 directions covering 180 degrees. These observation data will provide more accurate dynamic data of orbital space particle radiation environment for the safe operation of HXMT satellite in orbit and the realization of scientific objectives, and also provide detailed data for future space environment modeling and in-depth space environment research.

Keywords: HXMT, Particle detector , Multi-directional detector