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The DAMPE silicon tungsten tracker

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The DARK Matter Particle Explorer is a spaceborne astroparticle physics experiment, programmed for launch on December 2015. It is one of the five satellites of the Chinese Academy of Science (CAS) "Strategic Pioneer Research Program in Space Science" program.

DAMPE will identify possible dark matter signatures by detecting electrons and photons in the 5 GeV –10 TeV energy range. It will also measure the flux of nuclei up to 100 TeV, for the study of the high energy CR origin and propagation mechanisms. DAMPE is composed of four sub-detectors: a plastic strip scintillator, a silicon-tungsten tracker-converter (STK), a BGO imaging calorimeter and a neutron detector.

The STK is composed of six tracking planes of 2 orthogonal layers of single-sided microstrip detectors, for a total detector surface of ca. 7 m². Three 1mm-thick layers of tungsten are interleaved with the tracking planes for the photon conversion.

Two models of the STK have been produced, one for the space qualification tests (EQM), and one for the space mission (FM). The EQM has been assembled and tested in 2014, while the FM has been assembled and acceptance tested from January to June 2015.

The STK has been extensively tested for space qualification. Numerous beam tests at CERN have been done to study particle detection at silicon module level, and at full detector level. To complete the knowledge on the detector performance, simulation studies are conducted.

The assembly, space qualification and characterization tests of the STK, as well as the status of simulation studies of the silicon detectors will be presented.

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