



Contribution ID: 5

Type: Oral

The novel direction detector on board of the second China Seismo-Electromagnetic Satellite.

Thursday, 20 June 2024 12:20 (20 minutes)

In the field of multi-messenger astronomy, the China National Space Administration started a program to study the lithosphere - atmosphere - ionosphere coupling mechanism. The project aims to realize a constellation of satellites to unveil the time correlation between the main earthquake shocks and an increase in the electron flux in the inner Van Allen belt.

For this purpose, a second CSES (China Seismo-Electromagnetic Satellite) will be sent to Space by the end of this year, hosting an High Energy Particle Detector, namely HEPD-02, entirely realized by the Italian Limadou collaboration.

One of the most interesting features of the HEPD, is the direction detector (DD); it consists of monolithic silicon pixel sensors (MAPS), called ALTAI, and represents the first attempt to employ MAPS for particle tracking in Space. The main advantages in using such a technology are the ultra-low material budget, the high spatial resolution and low noise.

The technology is based on the Tower Jazz 180 nm semiconductor manufacturing process investigated for the ALICE (A Large Ion Collider Experiment) ITS upgrade at CERN.

The scientific and mechanical/thermal requirements of the mission will be discussed showing the results of the DD qualification tests, with a particular focus on the control power consumption of MAPS, the trade-off for mechanical support to guarantee a proper thermal control and the DD mechanical stability.

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Session Classification: Innovative Detectors and Data Handling Techniques

Track Classification: Innovative detectors and data handling techniques