

Thermo/mechanical design for embedding ALPIDE pixel sensor chip in a High-Energy Particle Detector space module

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The High-Energy Particle Detector (HEPD) module is designed to measure the pitch angle and energy of electrons and protons fluxes trapped in the Earth Magnetosphere with energies 3-100 MeV and 30-300 MeV respectively. In view of the launch of CSES-02 satellite, an interesting option for improving the HEPD is to endow the tracking module with ALPIDE monolithic active pixel, specifically developed for the ITS upgrade of ALICE experiment at CERN.

In this work we present the project of a modular and compact particle tracker made of 5 turrets, making use of 150 pixel sensors equipped with Hybrid Integrated Circuit (HIC) and supported by Carbon Fiber Reinforced Plastics (CFRPs) staves housed in an aluminium case.

All envisaged solutions have been validated with an intense campaign of qualification tests, concerning vibrations and thermal stresses. The HEPD-02 tracker project foreruns the massive usage of CFRPs for space initiatives both of scientific and exploratory nature.

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No, this is an entirely new submission.

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