

Design and Thermal Simulation of the Front-end Module for STARLIGHT

Friday, 31 May 2024 08:44 (1 minute)

This paper presents a front-end module simulator for Semiconductor Array detector with Large dynamic range and charge integrating readout (STARLIGHT). STARLIGHT is a universal, hybrid silicon pixel detector with a high frame rate ($\geq 10\text{kHz}$) and is the first charge-integrating surface detector of XFEL in China. The detector will operate in a vacuum environment, and the thermal power per unit area is 5.443mW/mm^2 , which poses a challenge for the heat dissipation of the entire module. In order to verify whether the mechanical and PCB design can meet the heat dissipation requirements of the project, a simulation thermal simulator was initially designed to replace the heat generated by the ASIC by laying copper wires on the PCB during the phase when the ASIC was unavailable. Subsequently, we carried out thermal simulation and test on the whole simulation module, and obtained the results to meet the project requirements. These efforts provide validation and guidance for ensuring the thermal performance of STARLIGHT front-end modules.

Collaboration

Role of Submitter

The presenter will be selected later by the Collaboration

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Session Classification: Electronics and On-Detector Processing - Poster session

Track Classification: T7 - Electronics and On-Detector Processing