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HGCROC v2 readout chip characterization and radiation tolerance for FoCal E-pad detector in ALICE

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The Forward Calorimeter (FoCal) detector is scheduled for installing in the ALICE experiment for the LHC-Run4 upgrade (2029-2032).
The FoCal consists of the FoCal-E (Electromagnetic Calorimeter) and the FoCal-H (Hadronic Calorimeter).
The FoCal-E is a detector based on a Si sensor and tungsten to measure direct photons at forward rapidity.

For the readout, each Si pad hosts the HGCROC2 Application-Specific Integrated Circuit (ASIC) originally developed by the OMEGA group for the CMS High Granularity Calorimeter (HGCal).

The FoCal-E has two subsystems, pad and pixel. The FoCal-E pad detector plans to use about 2,000 PCBs containing Si pads and HGCROC chips.
Therefore, it's very important to evaluate the performance of a large number of HGCROC chips and to understand their variability.

This poster summarizes the characteristics, performance variability, and radiation tolerance of the HGCROC v2 chips.
Furthermore, we will discuss the perspective of HGCROC v3 chip for the final FoCal-E pad production and readout scheme.

Category

Experiment

Collaboration

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