



Contribution ID: 92

Type: **not specified**

Front-end electronics of the High Granularity Electromagnetic Forward Calorimeter (FoCal-E) at ALICE

Wednesday, November 20, 2024 2:05 PM (15 minutes)

FoCal, a high-granularity forward calorimeter, is one of the ALICE detector upgrade projects for Run 4 at the CERN LHC, scheduled to collect data starting in 2029, after the Long Shutdown 3. The calorimeter has two main subsystems: a highly granular silicon-tungsten electromagnetic calorimeter (FoCal-E), and a conventional sampling hadronic calorimeter (FoCal-H). FoCal is designed to cover a pseudo-rapidity between 3.4 and 5.8.

The electromagnetic calorimeter comprises 20 layers of tungsten absorbers interleaved with silicon detectors. Out of those active layers, 18 have a granularity of 1 cm² and they consist of silicon pads read out by the HGCROC, the read-out chip developed for the Compact Muon Solenoid (CMS) High Granularity Calorimeter. The read-out chip allows the measurement of the amplitude of the signal, together with the time-of-arrival and time-over-threshold.

The remaining 2 layers consist of high granularity 30x30 μm² monolithic sensors (ALPIDE) developed for the ALICE inner tracker.

The pad layers measure the shower energy and profile, while the pixel layers enable two-photon separation down to a few millimeters, to discriminate between isolated photons and merged showers of photon pairs generated by the decay of neutral pions. The total silicon sensor area for FoCal-E is about 12 m² with about 150K individual pad channels and about 4 thousand pixel sensors.

In this contribution, we will discuss the development of the front-end electronics and the main results of the test beam campaigns, with a special focus on the electromagnetic calorimeter.

Primary author: MINAFRA, Nicola (The University of Kansas)

Presenter: MINAFRA, Nicola (The University of Kansas)

Session Classification: RDC 04 - Readout and ASICs Parallel Session

Track Classification: RDC Parallel Sessions: RDC4: Readout and ASICs