FoCal: a highly granular digital calorimeter

Tuesday, 19 February 2019 14:25 (20 minutes)

In light of the upgrade program of the ALICE detector a calorimeter at forward rapidities (FoCal) is being considered. This detector would measure photons, electrons, positrons and jets for rapidities eta > 3 offering a wealth of physics possibilities.

Its main focus is on measurements related to the structure of nucleons and nuclei at very low Bjorken-x and possible effects of gluon saturation.

The FoCal electromagnetic calorimeter must be able to discriminate decay photons from direct photons at very high energy, which requires extremely high granularity.

A dedicated R&D program is ongoing to develop the technology needed for such a high-granularity device. Within this program we have constructed a unique prototype of a digital electromagnetic calorimeter based on CMOS monolithic active pixel sensors (MAPS).

This prototype has demonstrated the unique capabilities of such a highly granular digital calorimeter, providing unique shower profile measurements and good linearity and energy resolution. The prototype calorimeter was based on the MIMOSA chip, which is however not fast enough for application in a full detector at LHC. As a next step, the ALPIDE chip developed for the ALICE Inner Tracker Upgrade is being investigated for performance with high occupancy. We will present results from the current prototype, the performance of the ALPIDE and plans for the next prototype.

Primary author:  VAN DER KOLK, Naomi (Nikhef National institute for subatomic physics (NL))
Presenter:      VAN DER KOLK, Naomi (Nikhef National institute for subatomic physics (NL))
Session Classification:  Calorimeter
Track Classification:  Calorimeters