International Conference on Technology and Instrumentation in Particle Physics 2017(TIPP2017)

Contribution ID: **213** Type: **oral**

A Si-PAD and Tungsten based electromagnetic calorimeter for the forward direct photon measurement at LHC

Tuesday, 23 May 2017 14:36 (18 minutes)

In central heavy ion collisions at very high energy such as at LHC at CERN, one can create a matter of high energy density and high temperature in which quarks and gluon can move freely beyond the boundary of hadrons, called Quark Gluon Plasma (QGP). One of the unanswered questions for on the creation process of QGP is the initial state of nuleons. According to the QCD, the gluon density in small-x region ($= 10^{-3} \sim 10^{-5}$) saturates, and such state, referred to Color Glass Condensate (CGC), is consider to be an initial condition of heavy ion collisions. Despite the extensive experimental studies, there is no clear evidence of the creation of CGC so far. By the measurements of direct photon in the forward direction, one can access the CGC picture more clearly compared to hadrons, and obtain a clear picture of initial condition of heavy ion collisions at high energies.

In the ALICE experiment at LHC, there is an upgrade plan to construct a Forward Calorimeter (FoCal). The FoCal-E is an electromagnetic calorimeter of FoCal for the direct photon measurement at LHC in the small-x, which covers $3.3 < \eta < 5.3$. FoCal-E consists of a low granularity layers (LGL) and a high granularity layers (HGL). A LGL module is composed by tungsten layers and silicon PAD (Photo Avalanche Diode) layers, which has 8×8 PADs (1×1 cm^2 per PAD). this measures the energy of electromagnetic showers. A HGL module is composed by MAPS (Monolithic Active Pixel Sensors, 30×30 μm^2 per pixel) layers which have high position resolution to discriminate between decay photons and direct photons.

In this presentation, we discuss the results on LGL from the 2015/2016 test beam experiment at CERN PS and SPS. The energy resolution, linearity, and shower profiles are shown, and those are compared to the simulation results. We also show the performance of the integrate system, i.e. combined LGL and HGL detectors, as a straw-man design of FoCal- E prototype from 2016 test beam data.

Primary author: KAWAMURA, Yota (U)

Co-author: FOR THE ALICE FOCAL COLLABORATION, - (-)

Presenter: KAWAMURA, Yota (U)

Session Classification: R1-Calorimeters(3)

Track Classification: Calorimeters