Contribution ID: **93** Type: **Poster**

The performance for the TeV photon measurement of the LHCf upgraded detector using Gd2SiO5 (GSO) scintillators.

The Large Hadron Collider forward (LHCf) experiment is motivated to understand the hadronic interaction relevant to the cosmic-ray air shower development.
LHCf is the only experiment which measure γ and π^0 spectra in the very forward region (η>8.4), so called "zero-degree" region, at the LHC.
The LHCf detectors were compact sampling and imaging calorimeter installed in the gaps of the pipes $\pm$140 m away from the interaction point 1.
Since the energy flux is large in this region, the irradiation dose-rate of the calorimeter reaches 30 Gy/nb^{-1} at 13 TeV collisions.
Before starting Run 2, we have upgraded the detectors with GSO scintillator which is known as one of the most radiation-hard scintillators.
Also we developed the shower imaging hodoscope layers with 1mm pitch GSO bars for the calorimeters.
So far the performance for the γ-ray measurement has been confirmed in SPS. The energy resolution of 3 % and the position resolution of less than 200 μm were obtained using 50-250GeV of electron beams.
On 10-13th June 2015, LHCf has completed the 13TeV operation successfully.
We succeeded to measure the neutral particles, including TeV γ and π^0, in the very forward region.
The reconstructed π^0 mass resolution was 5%.
In this paper we will focus on the performance of photon measurement such as
linearity of the energy scale, photon-hadron separation, stability during the operation and so on.

Primary authors: BERTI, Eugenio (Universita e INFN, Firenze (IT)); MAKINO, Yuya (Nagoya University (JP))

Co-authors: TRICOMI, Alessia (Universita e INFN, Catania (IT)); TIBERIO, Alessio (Universita e INFN, Firenze (IT)); PERROT, Anne-Laure (CERN); MATSUBAYASHI, Eri (Nagoya University (JP)); CASTELLINI, Guido (Dipartimento di Fisica); MENJO, Hiroaki (Nagoya University (JP)); KASAHARA, Katsuaki (Waseda University (JP)); YOSHIDA, Kenji (Shibaura Institute of Technology (JP)); MASUDA, Kimiaki (STEL, Nagoya University); D'ALESSANDRO, Lel (Universita e INFN, Firenze (IT)); BONECHI, Lorenzo (Universita e INFN, Firenze (IT)); UENO, Mana (Nagoya University); DEL PRETE, Marina (Universita e INFN, Firenze (IT)); BONGI, Massimo (Universita e INFN, Firenze (IT)); HAGUENAUER, Maurice (Ecole Polytechnique Federale de Lausanne (CH)); SAKURAI, Nobuyuki (Nagoya University (JP)); ADRIANI, Oscar (Universita e INFN, Firenze (IT)); PAPINI, Paolo (INFN sezione di Firenze); ZHOU, Qidong (Nagoya University (JP)); ZHOU, Qidong (S); DALESSANDRO, Raffaello (Universita e INFN, Firenze (IT)); RICCIARINI, Sergio Bruno (Universita e INFN, Firenze (IT)); RICCIARINI, Sergio Bruno (INFN); TORII, Shoji (Waseda University (JP)); TAMURA, Tadahisa (Kanagawa University (JP)); IWATA, Taiki (Waseda University (JP)); SAKO, Takashi (Nagoya University (JP)); SUZUKI, Takuya (Waseda University (JP)); TURNER, William C (Lawrence Berkeley Laboratory); MURAKI, Yasushi (Solar-Terrestrial Environment Laboratory, Nagoya University); MURAKI, Yasushi (STE-laboratory, Nagoya University (JP)); ITO, Yoshitaka (Nagoya University (JP)); SHIMIZU, Yuki (JAXA); MATSUBARA, Yutaka (Nagoya University); OKUNO, Yuuki (Nagoya University)

Presenter: MAKINO, Yuya (Nagoya University (JP))

Track Classification: Scintillating Detectors