Contribution ID: **1036** Type: **Parallel Talk**

The Crilin Calorimeter: an alternative solution for the Muon Collider barrel

Friday, 8 July 2022 15:45 (15 minutes)

The Crilin (CRystal calorImeter with Longitudinal INformation) calorimeter is a semi- homogeneous calorimeter based on Lead Fluoride (PbF_2) Crystals readout by surface-mount UV-extended Silicon Photomultipliers (SiPMs). It is a proposed solution for the electromagnetic calorimeter of the Muon Collider. In a Muon Collider, the timing could be used to remove signals produced by beam-induced background, asynchronous with respect to the bunch crossing. The calorimeter energy resolution is also fundamental to measure the kinematic properties of jets. Moreover, the calorimeter should operate in a very harsh radiation environment, withstanding yearly a neutron flux of 10^{14} n_{1MeV} /cm^2 and a dose of 100 krad. The proposed Crilin calorimeter is characterized by a modular architecture base on stackable submodules composed of matrices of PbF_2 crystals, with each crystal readout by 2 series of UV-extended SiPMs. To evaluate the effect of this high radiation environment on the PbF_2, two crystals have been irradiated both with photons and neutrons to study the changes in their transmittance. The results of this study will be presented as well as the first results obtained from a test with electron beam ranging from 20 up to 120 GeV performed at CERN in August 2021 with a small-scale prototype with 2 crystals and 4 amplification channels will be reported. During 2021 an intense effort has been made to improve the performance of the electronics. The evolution of this R&D study, that allowed obtaining a time resolution σ_t<20 ns, will also be presented.

In-person participation

Yes

Primary authors: SAPUTI, Alessandro (Istituto Nazionale di Fisica Nucleare); CURATOLO, Camilla (Istituto Nazionale di Fisica Nucleare); CERAVOLO, Sergio (LNF); PAESANI, Daniele (INFN Laboratori Nazionali di Frascati); TAGNANI, Diego (ROMA3); LUCCHESI, Donatella (Istituto Nazionale di Fisica Nucleare); DIOCIAIUTI, Eleonora (Istituto Nazionale di Fisica Nucleare); DI MECO, Elisa (Istituto Nazionale di Fisica Nucleare); SARRA, Ivano (INFN Laboratori Nazionali di Frascati); SESTINI, Lorenzo (Istituto Nazionale di Fisica Nucleare); PASTRONE, Nadia (Istituto Nazionale di Fisica Nucleare)

Presenter: DIOCIAIUTI, Eleonora (Istituto Nazionale di Fisica Nucleare)

Session Classification: Detectors for Future Facilities, R&D, novel techniques

Track Classification: Detectors for Future Facilities, R&D, novel techniques