Contribution ID: **46** Type: **"Rapid fire" talk**

Double-readout crystal calorimetry for IDEA

Tuesday 18 March 2025 11:35 (5 minutes)

The IDEA apparatus, a proposed experiment for the future FCCee accelerator, recently incorporated a novel electromagnetic calorimeter into its baseline design. This calorimeter aims at improving the energy reconstruction for neutral particles to 3 % at 1 GeV, while simultaneously enabling particle-flow algorithms through fine segmentation.
Designed to fit inside the magnet coil, the crystal calorimeter will be composed of two scintillating crystal layers with approximate thicknesses of 6 X0 and 18 X0 . The required transverse cell size of 1-1.5cm, requires SiPM-based readout. It will complement the sampling hadronic calorimeter located outside the magnet and it will include a simultaneous measurement of Cherenkov fraction in the shower for the back layer, to maintain the double-readout capabilities of the whole calorimeter system.
INFN, in collaboration with the Calvision consortium in the USA, is actively involved in the proof of principle of such calorimeter with the sections of Milano Bicocca, Napoli and Perugia.
This contribution presents some results from the 2024 test beam, where PWO, BGO and BSO crystals were exposed to a 10-100 GeV electron beam at CERN H6 beamline. The primary objective was to demonstrate the double readout technique using SiPMs.
The single crystal under test was mounted on a rotation stage to exploit the directionality of the Cherenkov photons; we explored both optical and waveform template techniques for the identification, finally proving we can separate them from the scintillation.
A larger prototype, capable of shower containment is currently under development within the MAXICC prin project as part of the DRD6 collaboration and will be tested in beam in the fall.

Author: FRANCESCONI, Marco (Istituto Nazionale di Fisica Nucleare)

Presenter: FRANCESCONI, Marco (Istituto Nazionale di Fisica Nucleare)

Session Classification: Calorimetry

Track Classification: Calorimetry