Contribution ID: **271** Type: **Talk**

High-granularity crystal calorimeter developments for future Higgs factories

Tuesday 18 February 2025 14:50 (20 minutes)

Precision measurements of the Higgs, W/Z bosons at future lepton colliders require the calorimetry system to achieve unprecedented jet performance. Among Higgs factories, the Circular Electron Positron Collider (CEPC) can provide an early option. The CEPC calorimeter working group has proposed a new electromagnetic calorimeter based on finely segmented scintillating crystals to be compatible with the particle-flow paradigm and also to achieve an optimal EM energy resolution of better than $3\,\%/\sqrt{E(GeV)}$ with the homogeneous structure. As a major design, the calorimeter consists of multiple longitudinal layers of long crystal bars that are individually read out by silicon photomultipliers. In every two adjacent layers, crystal bars are in an orthogonal arrangement to gain an effective transverse granularity at the level of $1 \times 1\ cm^2$. Extensive R&D efforts have been carried out to develop a first crystal calorimeter physics prototype and to evaluate the physics performance with a new particle-flow algorithm dedicated to the long-bar configuration. The crystal calorimeter prototype was exposed at testbeam facilities to evaluate the electromagnetic shower performance and to address a few critical issues on system integration. This contribution will introduce the crystal calorimeter design optimisations and latest performance studies in simulation. Highlights of the crystal calorimeter prototype development and preliminary beamtest results will also be presented.

Primary experiment

DRD6

Author: LIU, Yong (Institute of High Energy Physics, Chinese Academy of Sciences)

Co-authors: YANG, Haijun (Shanghai Jiao Tong University (CN)); LIU, Jianbei (University of Science and Technology of China (CN)); Prof. CHEN, Junfeng (Shanghai Institute of Ceramics, Chinese Academy of Sciences)

Presenter: LIU, Yong (Institute of High Energy Physics, Chinese Academy of Sciences)

Session Classification: Calorimetry

Track Classification: Calorimeters