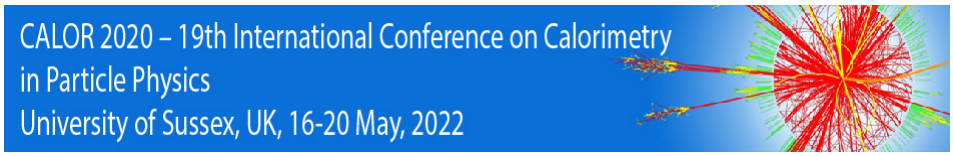

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Development of a novel highly granular hadronic calorimeter with scintillating glass tiles

Based on the particle-flow paradigm, a novel hadronic calorimeter (HCAL) with scintillating glass tiles is proposed to address major challenges from precision measurements of jets at the future lepton colliders, such as the Circular Electron Positron Collider (CEPC). Tiles of high-density scintillating glass, with a high energy sampling fraction, can significantly improve the hadronic energy resolution in the low energy region (typically below 10 GeV for major jet components at Higgs factories). The hadronic energy resolution of single hadrons and the effects of key parameters (e.g. density, doping, intrinsic light yield, energy threshold, etc.) of scintillating glass have been evaluated in the Geant4 full simulation, followed by the physics benchmark studies on the Higgs boson with jets in the final state. R&D efforts of scintillating glass materials are ongoing within a dedicated collaboration since 2021 with an aim to achieve high light yield, high density and low cost. Measurements have been performed for the first batches of scintillating glass samples including the light yield, emission and scintillation spectra, scintillation decay times and cosmic responses. An optical simulation model of a single scintillating glass tile has been established to provide guidance for the development of scintillating glass. Highlights of the expected detector performance and latest scintillating glass developments will be presented in this contribution.

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