

Performance in electron beams of a tungsten-CeF₃ prototype for radiation-resistant high-energy physics calorimetry

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The High-Luminosity phase of the Large Hadron Collider at CERN (HL-LHC) poses stringent requirements on calorimeter performance in terms of resolution, pileup resilience and radiation hardness. A tungsten-CeF₃ sampling calorimeter is a possible option for the upgrade of current LHC detectors and for future HEP experiments.

A prototype of the calorimeter has been built and exposed to high energy electrons at the CERN SPS H4 beam line.

The performance of the prototype, read out with different types of wavelength-shifting fibers, conventional clad

plastic fibers and photo-luminescent radiation hard cerium-doped quartz fibers, will be shown in terms of energy

resolution, uniformity and timing performance.

A detailed simulation has been also developed in order to compare with data and to extrapolate to different configurations. Additional studies on the calorimeter and the R&D projects ongoing on the various components

of the experimental setup will be also discussed.

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