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Compact calorimeter based on oriented crystals.

Recently, a test has been performed by the INFN-STORM collaboration on the H2 line at CERN SPS North Area with a hundred-GeV electron beam on two PWO samples, which confirmed the acceleration of electromagnetic shower, and thus the reduction of the radiation length, in axially oriented crystals.
We measured directly, for the first time ever, the light produced by the energy deposited inside the crystals. It has been found that the energy deposited when the beam is aligned with the crystal axes is much larger than the one in the random condition. Moreover, the reduction of the radiation length experienced by the electrons in the strong field has been evaluated.
In the near future, the experiment INFN-OREO will test a calorimeter prototype with an oriented layer of PWO.
The reduction of the radiation length in oriented crystals, caused by the acceleration of the electromagnetic shower development, open the way to the development of compact electromagnetic calorimeter with a wide range of applications, such as in accelerator based
fixed target experiments at high energy or in the astrophysical field, for instance
in satellite-based γ-telescopes.

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