

# Strong light yield enhancement in oriented crystalline media for homogeneous calorimetry

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Scintillating homogeneous detectors represent the state of the art in electromagnetic calorimetry. Moreover, the currently neglected crystalline nature of the most common inorganic scintillators can be exploited to achieve an outstanding performance boost in terms of compactness and energy resolution. In fact, it was recently demonstrated by the AXIAL/ELIOT experiments that a strong reduction in the radiation length inside  $\text{PbWO}_4$ , and a subsequent enhancement in the scintillation light emitted per unit thickness, are attained when the incident particle trajectory is aligned with a crystal axis within  $\sim 0.1^\circ$ . This remarkable effect has been directly observed at CERN with a 120 GeV/c electron beam and a custom, SiPM-based light readout system. The same concept can be applied to full-scale detectors that would feature a design significantly more compact than currently achievable and unparalleled resolution in the range of interest for present and future experiments.

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