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Performance of a Crystal + Dual readout Calorimeter system at FCC-ee

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Crystal calorimetry has a long history of pushing the frontier of high energy resolution measurements for EM particles. Recent technological developments in the fields of crystal manufacturing and photodetector developments (SiPMs) have opened new perspectives on how a segmented crystal calorimeter with dual-readout capabilities could be exploited for particle detectors at future collider experiments like FCC-ee. In this contribution, we will discuss how a segmented EM crystal calorimeter can be cost-effectively integrated with the fiber-based calorimeter of the IDEA detector to achieve an energy resolution of $3\%/\sqrt{E}$ for EM particles and $27\%/\sqrt{E}$ for neutral hadrons. We will also show how the extension of the dual-readout method in such a longitudinally segmented hybrid calorimeter can achieve the target energy resolution of about 3-5% for 50 GeV jets and discuss the potential of such calorimeter in the context of future particle flow algorithms.

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