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Results of Dual Readout single crystal test beam at Jefferson Lab and matrix test plans for CalVision

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Homogeneous inorganic scintillator-based calorimeters are the gold standard for electromagnetic energy resolution, but often degrade the hadronic energy resolution achievable at colliders. By incorporating the dual readout technique, we seek to improve the hadronic energy resolution of these calorimeters through the measurement and separation of the scintillation and Cherenkov light in hadronic showers. Recently, CalVision ran in parallel with the GlueX experiment at the Thomas Jefferson National Accelerator Facility using electrons from conversions of their primary photon beam to test samples of BGO, PWO, BSO and PbF₂ with new fast-shaping electronics for improved pulse shape discrimination for Cherenkov and scintillation light. These new results precede the construction of a BGO matrix for electromagnetic containment to demonstrate if precision electromagnetic resolution can be obtained while allowing for the dual readout technique.

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