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## Recent Progresses of Inorganic Scintillators for Future High Energy Physics Experiments

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Following the priority research directions documented in the 2019 DOE Basic Research Needs Study on Instrumentation [1] for future HEP calorimetry novel inorganic scintillators are under development at the Caltech Crystal Lab. They are radiation hard LYSO:Ce crystals and LuAG:Ce ceramics, ultrafast BaF<sub>2</sub>:Y crystals and Lu<sub>2</sub>O<sub>3</sub>:Y ceramics, and cost-effective heavy scintillating crystals and glasses [2]. These novel inorganic scintillators are expected to provide the best energy resolution and detection efficiency for photons and electrons in future HEP experiments at the energy and intensity frontiers. We report recent progresses of novel inorganic scintillators and their potential applications for an ultra-compact and radiation hard ECAL at the HL-LHC and the proposed FCC-hh, an ultrafast calorimeter and a precision TOF detector, and a homogeneous hadron calorimeter for dual readout calorimetry for the proposed lepton Higgs factory, such as the ILC or FCC-ee.

### References

- [1] Basic Research Needs Study on HEP Detector Research and Development, 2019, <https://science.osti.gov/hep/Community-Resources/Reports>
- [2] arXiv: 2203.06731 [physics.ins-det], <https://doi.org/10.48550/arXiv.2203.06731>;  
arXiv: 2203.06788 [physics.ins-det], <https://doi.org/10.48550/arXiv.2203.06788>.

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