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## Novel Ultrafast Lu<sub>2</sub>O<sub>3</sub>:Yb Ceramics for future HEP Applications

Inorganic scintillators activated by charge transfer luminescence Yb<sup>3+</sup> are considered promising ultrafast medium to break the ps timing barrier for future HEP applications. Inorganic scintillators in ceramic form have also attracted a broad interest due to its lower fabrication temperature, effective usage of raw material, and no need for aftergrowth mechanical processing. Lu<sub>2</sub>O<sub>3</sub>:Yb and Lu<sub>2</sub>xY<sub>2</sub>(1-x)O<sub>3</sub>:Yb scintillating ceramic samples fabricated by Radiation Monitoring Devices Inc., was investigated at Caltech HEP Crystal Lab. All samples show photoluminescence and x-ray excited luminescence peaked at 340 and 370 nm respectively with 0.6 ns decay time measured by using microchannel plate-photomultiplier tubes (MCP-PMT). Combined with their high density (9.4 g/cm<sup>3</sup>) Lu<sub>2</sub>O<sub>3</sub>:Yb ceramics is promising for future HEP calorimetry and time of flight (TOF) applications. Results of their optical and scintillation quality and radiation hardness and plans for further development will be presented.

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