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Development of Pixelated Scintillation Detector for Highly Precise Timing Measurement in MEG Upgrade

The MEG experiment is searching for the lepton flavour decay, $\mu^+ \rightarrow e^+\gamma$, with an unprecedented sensitivity. We plan to upgrade the experiment to search for the decay down to a branching ratio sensitivity of around 5×10^{-14} , which would improve the sensitivity goal of the current experiment by one order of magnitude. A pixelated scintillation detector is under development for the upgraded experiment to significantly improve the positron time measurement.

Each segment pixel is a small ultra-fast plastic scintillator plate with silicon photomultiplier (SiPM) readout. A high timing resolution at a level of 30-35 ps is expected for the signal positron by averaging the positron impact times over multiple hit pixels.

The concept and the expected performance of the proposed detector will be presented as well as the RD status including the performance measured with a prototype of the pixel counter.

quote your primary experiment

MEG

Primary author: Prof. OOTANI, Wataru (ICEPP, University of Tokyo)

Presenter: Prof. OOTANI, Wataru (ICEPP, University of Tokyo)

Track Classification: Scintillating Detectors