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Particle ID, position and timing measurement with scintillating fibers readout by SiPMs

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The silicon photomultiplier (SiPM) is a recent and established evolution of the avalanche photodiode (APD). This device is particularly appropriate for use in scintillation detection because of its high sensitivity, high quantum efficiency, and insensitivity to magnetic field (up to 4 T). Excellent time and energy resolution in addition to small size and high efficiency are crucial for applications at high rate and low photon production. An active target for the MEG experiment based on very thin scintillating fibers readout by SiPM is considered. The tool should provide a very precise measurement of the muon decay vertex and its timing, with a consequently improvement on the positron momentum and angular variable resolutions into the MEG experiment. A particle ID can be performed to distinguish between positrons and muons.

High rate can be sustained and applications on beam monitoring are also considered. Muon beam rate (the highest on the world), profile and spot can be measured.

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