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Operational results with the pixelated timing Counter (pTC) of the MEGII experiment during the first year of physics data taking

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The upgrade of the MEG experiment, MEGII, has started physics data taking in fall 2021, collecting ~ 8x10^13 mu on target during 34 days of DAQ live time, searching for the Standard Model violating Lepton Flavor Violating Decay mu->e gamma with sensitivity improved by an order of magnitude.
During this period the pixelated Timing Counter (pTC), a time of flight detector devoted to extrapolating the muon decay time on target by measuring the positron hit time, has been fully readout and has operated stably.
The detector consists of 512 fast plastic scintillator pixels (120x50(40)x5 mm^3) readout by two arrays of 6 SiPM each connected in series glued on opposite sides.
Its goal is to achieve a resolution on positron hit time of about 40 ps by exploiting multiple-hits events.
This contribution will show how the detector achieved the design performance during the 2021 run reaching ~39 ps for events with 8 hits corresponding to the average number of hits expected from MC simulation for mu->e gamma events.
This result was obtained in spite of a suboptimal performance of electronic noise and of a slow degradation in dark current due to irradiation damage on SiPMs.
Instrumental in achieving this performance was a full set of hardware and software calibration tools developed to align precisely in time and space the counters relative to each other and to the rest of the MEG II detector.

Collaboration

MEGII

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