

Test and characterization of SiPMs for the upgrade of MEGII high resolution Timing Counter

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Abstract:

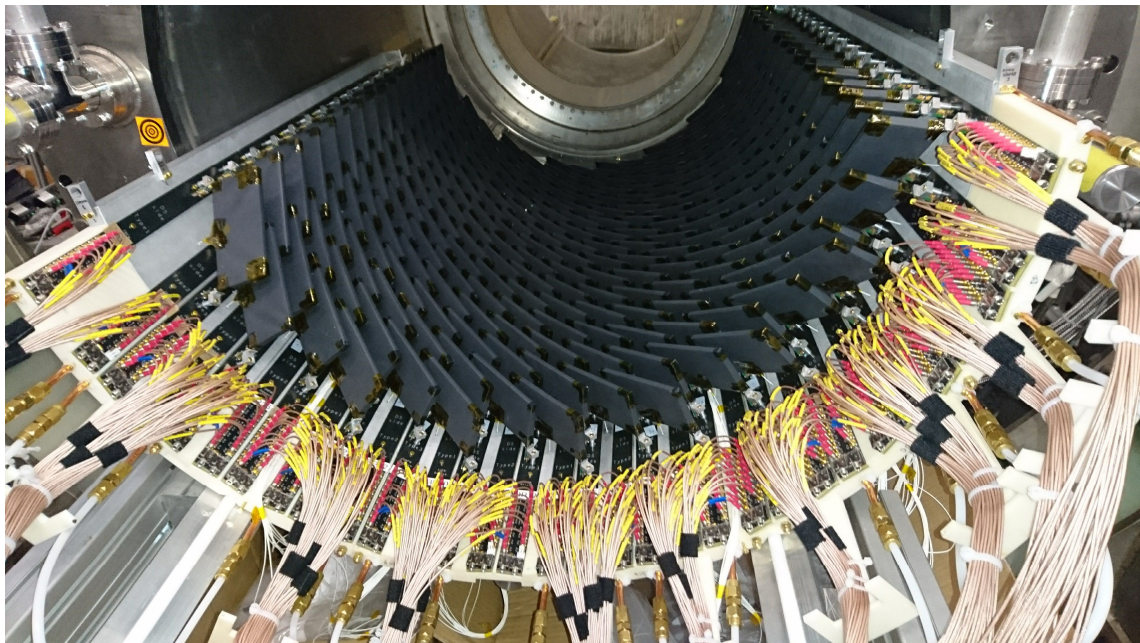
The MEG II experiment based at PSI (Zuerich, Switzerland) has been committed and is taking data since 2021 to improve sensitivity on the decay $\mu \rightarrow e + \gamma$.

The time resolution, measured in laboratory, of the single counter is ~ 110 ps. The Timing Counter, exploiting multiple measurements, achieve a resolution in positron impact time of ~ 43 ps relying on two arrays of 512 scintillator pixels each, read out by 6 3×3 mm², 50um cell, Silicon Photomultipliers (SiPMs) from AdvanSiD, for a total of 6144 SiPM.

To improve additionally this resolution, 4×4 mm², 40um cell SiPMs have been selected to substitute a fraction of the old ones (~ 1000) next year.

By means of automated test system, they have been characterised, measuring their breakdown voltage and their IV curves, to match as much as possible SiPMs with the same gains in each pixel, to maximize the pixel time resolution.

Those results and the automated system will be presented together with preliminary results on single pixel time resolution and expectations of average time resolution of the pTC in the coming years.



MEG II Timing Counter