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A new calibration tool for the MEGII spectrometer

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The MEG experiment has set the latest limit of 4.2×10^{-13} (90% C.L.) on the branching ratio of the charged lepton flavour violating decay $\mu^+ \rightarrow e^+ \gamma$, making use of the most intense continuous surface muon beam in the world at the Paul Scherrer Institut (PSI), Villigen, Switzerland. An intense upgrade of the experiment, MEGII, has been carried out, successfully concluded with the beginning of the data taking just a few months ago. The aim of the MEGII experiment is to search for the $\mu^+ \rightarrow e^+ \gamma$ decay with a sensitivity of 6×10^{-14} (90% C.L.) with a few years of data taking.

In order to match such a challenging scientific achievement, all MEGII sub-detectors have been pushed at the detector performance edge. Furthermore, measuring the kinematic variables (energy, timing and relative opening angle) of the positron and the gamma resulting from the muon decay with high resolutions require careful calibration and monitoring of the experimental apparatus.

A new calibration method for the MEGII spectrometer has been studied to fully exploit its unique feature. The range of the measured momentum can be selected by tuning the gradient magnetic field inside which the detector is placed. It will be presented how the basic parameters of the detector (active cells, working channels, gain alignment) and the major kinematic variables (momentum, direction and timing) can be extracted using respectively straight and curved charged particle tracks.

Collaboration

MEGII collaboration

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