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Positron Reconstruction Algorithms for MEG II Pixelated Timing Counter

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The MEG II experiment is designed to achieve the world's most sensitive $\mu^+ \rightarrow e^+ \gamma$ decay search with the most intense muon beam ($7 \times 10^7 \mu^+/s$) in Paul Scherrer Institut. This decay is prohibited in the standard model theory but predicted to occur in the many beyond standard model theories. Thus, to find this decay means to find the new physics.

To discover this undiscovered rare decay, the precise reconstruction of positron under the intense muon beam environment is necessary. We constructed the pixelated timing counter (pTC) to determine the positron crossing timing under 40 ps resolution.

We have been developed the positron reconstruction algorithms using pTC information effectively. For example, a tracking algorithm inside pTC has recently developed and this will give us even more information for the precise reconstruction. Here we will present a novel positron reconstruction algorithms to bring out the potential of pTC and achieve the best performance for the experiment.

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