Measurement system of the background proton in DeeMe experiment at J-PARC

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The existence of a mu-e conversion process is expected by some theories beyond the standard model in particle physics, but has not been discovered yet due to its low probability.

The DeeMe experiment, proposed at J-PARC Material Life Science Facility (MLF), is planned to find the mu-e conversion process on a Muon production target[1].

In order to distinguish mu-e event signal from a background, the number of a proton that comes after hundreds of nanoseconds from the main beam should be less than one per one hour during the DeeMe experiment. Therefore we designed a new measurement system to confirm low background level. A simulation result showed that the new system could detect such delayed proton.

References

[1] M. Aoki and DeeMe Collaboration, “Proposal to the Experimental Search for μ-e Conversion in Nuclear Field at Sensitivity of 10^{-14} with Pulsed Proton Beam from RCS”, December, 2011.