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## Developments of a Pulse Kicker System for the Three-Dimensional Spiral Beam Injection of the J-PARC Muon $g-2$ /EDM Experiment

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The J-PARC muon  $g-2$ /EDM experiment aims to perform ultra-precise measurements of anomalous magnetic moments ( $g-2$ ) and electric dipole moments (EDM) from the spin precession of muons in a precise magnetic field, and to explore new physics beyond the Standard Model. On experimental requirements, the beam must be stored in a compact storage orbit with a diameter of 66 cm, which is about 1/20th smaller than that of the previous experiment. To be realized, we adopt an unprecedented injection technique called three-dimensional spiral injection scheme. In this scheme, the beam is injected from upward of the solenoidal storage magnet. The vertical beam motion along the solenoid axis is controlled by a pulse kicker of a few 100 ns time duration. Once the beam is guided into the center fiducial storage volume, the muon beam is stored by the weak focusing magnetic field. Therefore, a stable and accurate control of the pulse kicker is one of the major technical challenges to realize ultra-precise measurement of the muon spin precession. From feedback knowledges of the stand-alone operation of the prototype pulse kicker device, we realize several issues which should be considered for actual operation.

In this presentation, we discuss about detailed studies of those matters firstly. And the required accuracy of the weak focusing magnetic field, as well as kicker fields. Adjustments of these parameters are highly coupled. These studies will reflect actual design of the kicker coil system for the production experiment at J-PARC. We will also report on the future prospects for that.

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