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## Design method of active shield coils of steering magnet for fine tuning of muon injection orbit in muon storage magnet of g-2/EDM precision measurement

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Experiments of g-2/EDM precise measurements are under preparation in J-PARC and they use a high field (3.0 T) muon beam storage magnet (MBSM) with a cylindrical fiducial volume with 3cm-radial width, 10cm-vertical (axial) height and 66.6 cm diameter with less than 0.2 ppm peak-to-peak magnetic field homogeneity. Muons will be injected through the spiral injection from the magnet top through iron-yoke, reducing axial momentum by the fringe field and will be stopped by a kicker radial field. However, there can be some error fields and some corrections of muon injection orbit are necessary. Then, the steering magnets (SMs) are under developments. They are planned to be placed inside and outside of the MBSM yoke. SMs should have active shield coils to avoid additional error fields from magnetic interactions with structural metals and inside one should be compatible with the high field. Then, they need active shields (ASs) and they are ASSMs. Under these specifications, the designs are undergoing. Such active shield coils can be seen in MRI scanner gradient field coils (GCs), in which precision magnetic field shieldings are necessary to obtain good MR Imagings. Expanded from the MRI GC design method, an ASSM design method has been developed and applied. The method defines a current carrying surface (CCS) on which shield coil pattern is designed. Since the CCS can be formed arbitral shape, the CCS can be tuned so that leak field is small. A trial design shield coil has small leak field and tuning of actual shield coil shape for ASSMs are undergoing.

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