Abstract Submitted
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Error field minimization strategies towards MAST Upgrade operation[1] LIDIA PIRON, I. CHAPMAN, G. CUNNINGHAM, G. FISHPOOL, R. GOWLAND, I. KATRAMADOS, A. KIRK, G. NAYLON, R. MARTIN, CCFE, MAST UPGRADE TEAM — In fusion devices, the presence of magnetic error fields (EF) leads to toroidal asymmetries in the magnetic field. Even small EFs of the order of B_r/B_t of about 10^{-4} can have detrimental effect on plasma operations, since they can induce locked mode formation and thus plasma termination. In the MAST spherical tokamak, intrinsic EFs have been identified as limiting low density experiments and have been compensated using error field correction coils. In building MAST Upgrade device, a careful design, manufacture and installation of axisymmetric coils has been adopted to reduce the EF amplitude to the lowest possible value. In the present work, passive and active control strategies for EF correction are presented. The passive control concerns the optimization of the fine-scale coil alignment in order to minimize the n=1 EF amplitude. Such studies require high accuracy magnetic measurements and associated 3D modelling. A model-based optimization approach has been adopted to identify the right shift and tilt in the coil position which allow for the n=1 EF correction. However, inevitably residual EFs will be present and active control algorithms will need to be implemented in the plasma control system to compensate them. Such control schemes will be discussed.

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Lidia Piron
CCFE

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