Abstract Submitted
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Optimization of applied non-axisymmetric magnetic perturbations using multimodal plasma response on DIII-D[1] D.B. WEISBERG, ORAU, C. PAZ-SOLDAN, M.J. LANCTOT, E.J. STRAIT, T.E. EVANS, General Atomics — The plasma response to proposed 3D coil geometries in the DIII-D tokamak is investigated using the linear MHD plasma response code MARS-F. An extensive examination of low- and high-field side coil arrangements shows the potential to optimize the coupling between imposed non-axisymmetric magnetic perturbations and the total plasma response by varying the toroidal and poloidal spectral content of the applied field. Previous work has shown that n=2 and n=3 perturbations can suppress edge-localized modes (ELMs) in cases where the applied fields coupling to resonant surfaces is enhanced by amplifying marginally-stable kink modes. This research is extended to higher n-number configurations of 2 to 3 rows with up to 12 coils each in order to advance the physical understanding and optimization of both the resonant and non-resonant responses. Both in- and ex-vessel configurations are considered. The plasma braking torque is also analyzed, and coil geometries with favorable plasma coupling characteristics are discussed.

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