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[X] Theory [ ] Experiment

Test of Plasma Equilibrium Response against MHD Models Using Slowly Rotating 3D Magnetic Perturbations in DIII-D RMP Experiments,* L.L. Lao, N.M. Ferraro, R.J. Buttery, T.E. Evans, R.J. La Haye, E.J. Strait, A.D. Turnbull, M.R. Wade, *GA*; W. Guo, *ASIPP*; M.J. Lanctot, *LLNL*; E.A. Lazarus, A.C. Sontag, *ORNL*; R. Nazikian, *PPPL*; Y.Q. Liu, *UKAEA* — Slowly rotating non-axisymmetric magnetic perturbations provide a convenient means to study plasma response to perturbation fields in H-mode discharges using DIII-D diagnostics such as the edge Thomson scattering measurements of electron temperature. Magnetic perturbations with n=1–3 have been routinely used to investigate plasma response in DIII-D RMP experiments. For n=1, a 0.1–0.3% perturbation of the poloidal equilibrium magnetic field can result in a large 2–4% change in the edge magnetic topology. Perturbations from higher n=2 and 3 typically result in smaller flux-surface distortions. In this study, the effects of 3D perturbation fields on plasma equilibria from these experiments are tested against theoretical predictions using 3D linear and non-linear MHD codes MARS-F, M3D-C1, and VMEC. First comparative results indicate that the response from stable helical kink modes contribute significantly to the observed plasma equilibrium responses. Details will be presented.

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