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Global Structure of a Stable, Driven Kink Mode: DIII-D Measurements and Model Validation[1] M.J. LANCTOT, H. REIMERDES, J.M. HANSON, G.A. NAVRATIL, Columbia U., A.M. GAROFALO, M.S. CHU, G.L. JACKSON, R.J. LA HAYE, M.J. SCHAFFER, E.J. STRAIT, GA, Y.Q. LIU, UKAEA, M. OKABAYASHI, W.M. SOLOMON, PPPL — Recent DIII-D measurements of the global structure of the non-axisymmetric plasma perturbation driven by applied $n = 1$ magnetic fields enable the quantitative test of ideal MHD theory. Extensive magnetic measurements show that the ideal MHD code MARS-F predicts the plasma response within 20% for values of beta up to 75% of the beta limit calculated without a conducting wall, but overestimates the perturbed field at higher pressures. Experiments varying the pitch angle of the applied field at different values of plasma current demonstrate the plasma response depends primarily on the match of the applied field to the kink mode structure. Toroidally distributed soft x-ray measurements indicate the kink-like internal perturbation structure depends on the plasma pressure. The measurements are used to test kinetic stabilization models in the MARS-K code.

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