Abstract Submitted
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Empirical scalings and modeling of error field penetration thresholds in tokamaks[1] C. SCHAEFER, MIT, M.J. LANCTOT, O. MENEGHINI, S.P. SMITH, General Atomics, N.C. LOGAN, S. HASKEY, PPPL — Recent experiments in several tokamaks show that applied n=2 fields can lead to disruptive n=1 locked modes at field thresholds similar to those found for n=1 fields. This has important implications for the allowable size of error fields in next-step devices. In order to extrapolate field thresholds to ITER, an error field database (EFDB) is being developed under the OMFIT integrated modeling framework. The initial phase of development involves analysis of the applied 3D field, detection of island onset, characterization of island structure, reconstruction of the plasma equilibrium, determination of measurable plasma parameters at the relevant rational surfaces, and archiving in a dedicated MDSplus tree. The EFDB is both an extension of previous data assembly efforts and a means of documenting the parametric dependencies of error field penetration thresholds for a variety of tokamaks, across different plasma regimes, and for arbitrary applied field configurations. Through analysis of available data, empirical scalings for n=1 and n=2 fields are resolved. The trends are compared to functional dependencies predicted by drift-MHD models.

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