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Metrics to Quantify Magnetic Field Stochasticity for DIII-D and ITER Discharges[1] D.M. ORLOV, S. NOGAMI, R.A. MOYER, UCSD, T.E. EVANS, M.J. SCHAFFER, N.M. FERRARO, GA, E.A. UNTERBERG, ORNL, A. LOARTE, ITER, M.J. LANCTOT, M.E. FENSTERMACHER, LLNL — Stochastic layers are created in tokamaks by adding small resonant magnetic perturbations (RMPs) to the equilibrium magnetic field using external coils. These stochastic fields are often quantified by the widely accepted Chirikov parameter. The Chirikov parameter was developed for a single toroidal mode, and becomes very complex and difficult to interpret when multiple toroidal harmonics are present. It can also be inapplicable for some codes. In this work, we present several metrics to quantify stochasticity, such as the vacuum island overlap width and the field line loss fraction, that have the advantage of automatic computation. We use these metrics to quantify stochasticity in vacuum and plasma response models to assess the impact of plasma response, to evaluate DIII-D RMP discharges, to improve the ELM suppression criterion, and to determine the optimum RMP coil currents and phasings.

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