

**Abstract Submitted for the 55th Annual Meeting
Division of Plasma Physics
November 11 through 15, 2013
Denver, Colorado**

Category Number and Subject:

Theory Experiment

Resonant Error Fields and Their Relation to Fully Penetrated Locked Modes in Ohmic Plasmas in DIII-D,* R.J. LA HAYE and E.J. STRAIT, General Atomics, C. PAZ-SOLDAN, ORISE – Relatively small resonant ($m/n=2/1$) static error fields are shielded in Ohmic plasmas by the natural rotation at the electron diamagnetic drift frequency. However, the drag can lower rotation such that a bifurcation results going from nearly complete shielding to full penetration, i.e., a locked mode island that can induce disruption [1]. Understanding is of importance for the initial plasma operation of ITER without supplementary heating. Error field correction (EFC) is done on DIII-D with *either* the $n=1$ C-coil (no handedness) *or* the $n=1$ I-coil (more resonant hand). ***Despite EFC*** which allows significantly lower plasma density (figure of merit) before penetration occurs, ***the resulting saturated islands have similar large size***; they differ only in phase after typically being pulled in the electron diamagnetic drift direction as they grow to saturation. The data are explained by a change-of-state of the classical tearing index from stable before penetration starts to non-linearly marginal. Comparison to an island evolution model will be presented.

[1] R.J. La Haye et al., Bull. Am. Phys. Soc. **57**, 141, (2012)

*Work supported in part by US Department of Energy under DE-FC02-04ER54698 and DE-AC52-07NA27344.