Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Seed islands driven by turbulence and NTM dynamics M. MURAGLIA, O. AGULLO, PIIM Laboratory UMR 7345, Aix-Marseille Univ, Marseille, France, A. POYE, CeLIA, University Bordeaux - CNRS - CEA, Talence 33405, France, S. BENKADDA, PIIM Laboratory UMR 7345, Aix-Marseille Univ, Marseille, France, W. HORTON, Institute for Fusion Studies, University of Texas at Austin, N. DUBUIT, PIIM Laboratory UMR 7345, Aix-Marseille Univ, Marseille, France, X. GARBET, CEA, IRFM, Saint-Paul-Lez Durance, France, A. SEN, Institute for Plasma Research, Bhat, Gandhinagar 382428, India — Magnetic reconnection is an issue for tokamak plasmas. Growing magnetic islands expel energetic particles from the plasma core leading to high energy fluxes in the SOL and may cause damage to the plasma facing components. The islands grow from seeds from the bootstrap current effects that oppose the negative delta-prime producing nonlinear island growth. Experimentally, the onset of NTM is quantified in terms of the beta parameter and the sawtooth period. Indeed, in experiments, (3;2) NTM magnetic islands are often triggered by sawtooth precursors. However (2;1) magnetic islands can appear without noticeable MHD event and the seed islands origin for the NTM growth is still an open question. Macroscale MHD instabilities (magnetic islands) coexist with micro-scale turbulent fluctuations and zonal flows which impact island dynamics. Nonlinear simulations show that the nonlinear beating of the fastest growing small-scale ballooning interchange modes on a low order rational surface drive a magnetic islands located on the same surface [1]. The island size is found to be controlled by the turbulence level and modifies the NTM threshold and dynamics. [1] M. Muraglia et al, Phys. Rev. Lett., 107, 095003 (2011)

Wendell Horton
Institute for Fusion Studies, University of Texas at Austin

Date submitted: 07 Jul 2014 Electronic form version 1.4