This abstract is replacing DPP16-2016-000898

Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

EC power management and NTM control in ITER[1] FRANCESCA POLI, E. FREDRICKSON, PPPL, M. HENDERSON, ITER, N. BERTELLI, PPPL, D. FARINA, L. FIGINI, S. NOWAK, IFP, E. POLI, IPP, O. SAUTER, SPC — The suppression of Neoclassical Tearing Modes (NTMs) is an essential requirement for the achievement of the demonstration baseline in ITER. The Electron Cyclotron upper launcher is specifically designed to provide highly localized heating and current drive for NTM stabilization. In order to assess the power management for shared applications, we have performed time-dependent simulations for ITER scenarios covering operation from half to full field. The free-boundary TRANSP simulations evolve the magnetic equilibrium and the pressure profiles in response to the heating and current drive sources and are interfaced with a GRE for the evolution of size and frequency of the magnetic islands. Combined with a feedback control of the EC power and the steering angle, these simulations are used to model the plasma response to NTM control, accounting for the misalignment of the EC deposition with the resonant surfaces, uncertainties in the magnetic equilibrium reconstruction and in the magnetic island detection threshold. Simulations indicate that the threshold for detection of the island should not exceed 2-3cm, that preemptive control is a preferable option, and that for safe operation the power needed for NTM control should be reserved, rather than shared with other applications.

[1]Work supported by ITER under IO/RFQ/13/9550/JTR and by DOE under DE-AC02-09CH11466.

Francesca Poli
PPPL

Date submitted: 14 Jul 2016 Electronic form version 1.4