Edge Localised Mode mitigation by Resonant Magnetic Perturbations on MAST

ERIC NARDON, ANDREW KIRK, Euratom/UKAEA Fusion Association, Culham Science Centre, Abingdon, OX14 3DB, UK, MAST TEAM —

ELM mitigation is essential for both ITER and a possible spherical tokamak Component Test Facility. Externally applied Resonant Magnetic Perturbations (RMPs) have given promising results at DIII-D and JET and are now considered seriously for ITER. The physics of ELM mitigation by RMPs remains, however, not fully understood. This motivated the implementation on MAST of a set of 12 in-vessel coils dedicated to ELM mitigation during the last shutdown. The coils were designed so as to be able, in the vacuum approximation (i.e., neglecting the plasma response) to ergodise the magnetic field in the region \(0.8 < \psi_{pol,N} < 1\) (\(\sim 4\) times broader than the pedestal). In DIII-D, this was found to be sufficient to lead to complete ELM suppression. After having described the coils, the first experimental results will be presented, focusing not only on the impact of the RMPs on the ELM size and frequency, but also on the plasma density, temperature and rotation profiles, edge radial electric field, divertor strike zones and edge filaments, looking in particular for signs of the magnetic field ergodisation.

Eric Nardon
Euratom/UKAEA Fusion Association,
Culham Science Centre, Abingdon, OX14 3DB, UK

Date submitted: 18 Jul 2008

Electronic form version 1.4