

4) Influence of stochastisation on barriers / ELM mitigation

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A Project to Implement an ITER-relevant Edge Ergodisation System for ELM Control on JET

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Large type I ELMs will cause considerable problems for ITER because they will severely diminish the lifetime of the divertor target, prevent the coupling of ICRH and LHCD, interfere with the internal barrier in advanced scenarios and reduce the effectiveness of the divertor for particle removal. A potential scheme for the suppression of type I ELMS is the ergodise the plasma edge, to increase transport across the H-mode barrier, thereby preventing the pressure gradient from attaining the critical value for MHD instability, causing ELMs. An edge resonant magnetic perturbation has been used in DIII-D to mitigate large ELM impulses for periods as long as $9 \tau_E$ without affecting energy confinement. Thus encouraged, this paper reports on a conceptual design to implement such an ELM control system on ITER and a project to devise an “ITER-prototype” system for JET. The process of optimization of the perturbation coil configuration, given the substantial constraints on both machines and the need to inhibit islands in the plasma core, the proposed technological solutions and a programme of research, including further experimentation on DIIID, will be described.