

Plans for ELM mitigation on MAST

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In existing devices, type-I ELMs result in the sudden release of 5-15 % of the core stored energy in a short amount of time (100-300 μ s). If this behaviour extrapolates to future devices, such as ITER, type I ELMs may lead to unacceptably high-energy loads to the divertor plates and plasma facing components. A mechanism to decrease the amount of energy released by an ELM, or to eliminate the ELMs altogether, may therefore be necessary to ensure that the lifetime of plasma facing components in future devices is compatible with their objectives. One such amelioration mechanism relies on perturbing the magnetic field in the edge plasma region, enhancing the transport of particles and keeping the edge pressure gradient below the critical value that would trigger an ELM. This technique has been successfully employed on DIII-D using two up-down symmetric sets of 6 in-vessel coils and more recently on JET using the external error field correction coils. A set of 12 coils, similar in layout to those used in DIII-D are to be installed in MAST. 3 of the 12 coils have been installed in October 2006 and will be operated early in 2007. The remaining 9 coils will be installed in summer 2007. In this presentation, the effect on plasma operation of installing and energising part of the 3 coil system will be described and simulations based on the full set of coils will be discussed. In addition, MAST is equipped with a set of error field correction coils, similar to those installed on JET, and the effect of these coils on ELMy H-mode plasmas in MAST will also be presented.

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