

# Physics and engineering issues associated with edge localized mode control in ITER

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## Abstract

The mitigation or suppression of large edge localized modes (ELMs) is a critical issue for successful operation of ITER. In recent years, a concerted worldwide effort has emerged to develop efficient and reliable ELM mitigation and suppression techniques that can be scaled to the full range of ITER regimes and more generally to burning plasmas in a generic fusion reactor design. These techniques include the use of small-ELM or ELM-free regimes, the repetitive triggering of ELMs by external means, and the suppression of ELMS with non-axisymmetric fields. The extrapolation of all of these techniques to ITER is highly uncertain due to outstanding physics issues. However, two techniques have emerged as the preferred methods for use in ITER: ELM pacing using pellet injection and the use of edge resonant magnetic perturbations for ELM suppression. This paper discusses the issues related to ELM control in ITER, provides a general introduction to various ELM control techniques, and a more detailed discussion of the physics and engineering requirements of the two preferred techniques for ELM control in ITER.

*Key words:* DIII-D, ELMs, ITER

*PACS:* 52.55a, 52.55.Rk, 52.35.Py

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