

ELM pacing using modulated non-axisymmetric magnetic fields on DIII-D

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Abstract. Edge localized mode (ELM) pacing using modulated $n = 3$ non-axisymmetric fields has been demonstrated on DIII-D over a wide range of conditions, including significant variations in temperature, β_N , density and shape. At low collisionality, the pacing results in a clear reduction in the ELM size and peak heat flux to the divertor, up to a factor of 5 – 6 for short time windows, although only a factor of two for sustained periods with the present hardware capability. At higher collisionality, although similar increases in the ELM frequency have been demonstrated, no meaningful reduction in the heat flux is typically observed as a direct result of the pacing. However, it appears that the ELM size may be reduced indirectly via changes in the L-H power threshold as a result of density pumpout associated with the application of non-axisymmetric fields. At this stage, it remains unclear whether the failure to reduce the ELM size with modulated fields is a limitation associated with high collisionality, high density, or relative proximity to the L-H power threshold.

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