



Towards the construction of a model to describe the inter-ELM evolution of the pedestal on MAST

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(Submitted on 15 Jul 2011 (v1), last revised 30 Sep 2011 (this version, v2))

Pedestal profiles that span the ELM cycle have been obtained and used to test the idea that the pedestal pressure gradient in MAST is limited by the onset of Kinetic Ballooning Modes (KBMs). During the inter-ELM period of a regularly type I ELM-ing discharge on MAST, the pressure pedestal height and width increase together while the pressure gradient increases by only 15 % during the ELM cycle. Stability analyses show that the pedestal region over which infinite-n ballooning modes are unstable also broadens during the ELM cycle. To test the relationship between the width of the region that is unstable to $n = \infty$ ideal magnetohydrodynamic ballooning modes and KBMs the gyrokinetic code, GS2, has been used for microstability analysis of the edge plasma region in MAST. The gyrokinetic simulations find that KBM modes with twisting parity are the dominant microinstabilities in the steep pedestal region, with a transition to more slowly growing tearing parity modes in the shallower pressure gradient core region immediately inside the pedestal top. The region over which KBMs are unstable increases during the ELM cycle, and a good correlation is found between the regions unstable to KBMs and infinite-n ideal ballooning modes.

Comments: Version accepted and to appear in PPCF October 2011
 Subjects: **Plasma Physics (physics.plasm-ph)**
 Journal reference: Plasma Physics and Controlled Fusion 53 115010 (2011)
 DOI: [10.1088/0741-3335/53/11/115010](https://doi.org/10.1088/0741-3335/53/11/115010)
 Cite as: [arXiv:1107.3109](https://arxiv.org/abs/1107.3109) [physics.plasm-ph]
 (or [arXiv:1107.3109v2](https://arxiv.org/abs/1107.3109v2) [physics.plasm-ph] for this version)

Submission history

From: Colin Roach [[view email](#)]

[v1] Fri, 15 Jul 2011 17:10:22 GMT (631kb)

[v2] Fri, 30 Sep 2011 15:47:52 GMT (650kb)

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