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Theory Experiment

Possible Cause of H–L Transition Following MARFE Formation,* Z.W. Friis, W.M. Stacey, *Georgia Tech*, T.W. Petrie, and A.W. Leonard, *GA* – The sequence of core MARFE formation followed almost immediately by a back transition from H-mode to L-mode confinement is well documented in DIII-D [1] and other tokamaks. In the process of testing a thermal instability onset model for the H-L power threshold [2], we have recently found that the conductive power across the separatrix was about equal to the predicted H-L power threshold for several DIII-D shots, all but one of which had shown evidence of MARFE formation shortly before the H-L transition [3]. This observation prompts us to explore the possibility that discharges undergo a H-L transition shortly after MARFE formation because the increased MARFE radiation from inside the separatrix reduces the conductive power flux across the separatrix to below the threshold value needed to remain in H-mode. We will present the results of an investigation of this possibility for several DIII-D shots.

[1] T.W. Petrie, *et al.*, *J. Nucl. Mater.* **241-243**, 639(1997).

[2] W.M. Stacey, *Phys. Plasmas* **9**, 3082 (2002).

[3] W.M. Stacey and T.W. Petrie, *Phys. Plasmas* **10**, 3949 (2003).

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