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[ ] Theory [X] Experiment

High Power Fast Wave Coupling and Heating in H-mode Plasmas on DIII-D,* R.I. Pinsker, R.J. Buttery, T.C. Luce, *General Atomics*; M. Porkolab, *MIT*; S. Diem, M. Kaufman, P.M. Ryan, *ORNL*; J.C. Hosea, A. Nagy, R. Perkins, W.M. Solomon, *PPPL*; R. Maggiora, D. Milanesio, *U. Torino* – Up to 2.5 MW of fast wave (FW) heating power has been coupled to the core of ELMing H-mode discharges with $\beta_N \leq 2.5$ in conjunction with 3–7 MW of neutral beam injection and 2.6 MW of electron cyclotron heating. Core FW heating efficiency has been found experimentally to approach 100% in the Advanced Inductive regime, consistent with the excellent absorption predicted by ray-tracing models in this high β_e regime. Low antenna loading (high rf voltages) characteristic of such regimes makes increasing the FW power challenging. A study of techniques to enhance FW antenna loading has been carried out in DIII-D, with emphasis on maintenance of good confinement. The loading is in absolute agreement with modeling when edge density profiles measured with reflectometry are used in the model. Recent work extending the range of H-mode regimes to which FW heating has been applied and on increasing the FW power coupled to those regimes is described.

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