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Comparison of 3-D Modeling With Experimental Results on Fast Wave Antenna Loading in DIII-D[1] R.I. PINSKER, General Atomics, P.M. RYAN, R.H. GOULDING, G.R. HANSON, ORNL, D. MILANESIO, R. MAGGIORA, Torina Politecnico, J.C. HOSEA, A. NAGY, PPPL, M. PORKOLAB, MIT, L. ZENG, UCLA — In DIII-D and other tokamaks, with a fixed system voltage limit, the parameter that limits the ICRF power that can be coupled to H-mode plasmas is the antenna loading resistance R_L. For a fixed antenna geometry and excitation (phasing), R_L is determined by the electron density profile in the antenna near-field region. Quantitative understanding of the coupling physics is obtained by comparing the resistive (R_L) and reactive components of the antenna loading, without and with plasma, to predictions of 3-D models of the antenna and the edge plasma (Microwave Studio and TOPICA). When measured density profiles from reflectometers are used, good agreement between predicted and measured values of R_L is obtained without any adjustable parameters in the model. The improved understanding is applied to enhancement of R_L in advanced scenarios in DIII-D to increase the coupled fast wave power.

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