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**Broadband Tunable and ELM Resilient Traveling
Wave Antennas for Plasma Heating and Shaping in DIII-D,¹**

D.A. PHELPS, General Atomics — The traveling wave antenna (TWA) concept has now been successfully validated at low power in DIII-D and at high power in JFT-2M. These experiments have validated many desirable TWA features. Broadband tunability, low reflected power and stable launched wave phase velocity have been demonstrated, even during ELM-ing H-mode. Observations of TWA output power recirculation and the associated higher coupling efficiency have been made using a novel traveling wave resonant circuit. At high power in JFT-2M, plasma operation was achieved without rf breakdown even at rf electric fields exceeding 20 kV/cm (i.e. the antenna design criteria used in the JET antennas and proposed for ITER). In this presentation, we discuss how to best take advantage of the above features in the conversion of the existing antennas in DIII-D to TWAs. We analyze the leading TWA candidates using a coupled lossy transmission line code. Details of the optimum TWA solution for DIII-D will be presented, together with its scalability to ITER.

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Prefer Oral Session
 Prefer Poster Session

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