

**Abstract Submitted for the Twelfth Topical Conference
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Category Number and Subject:

Theory Experiment

Fast Wave Antenna Array Feed Circuits Tolerant of Time-Varying Loading for DIII-D,^{*} R.I. Pinsker, C.P. Moeller, J.S. deGrassie, D.A. Phelps, C.C. Petty, R.W. Callis, F.W. Baity,[#] *General Atomics* — We have shown¹ that a fast wave coupler based on the “traveling wave antenna” can be used to couple high power levels to tokamak plasmas without any adjustable tuning elements. One of the most remarkable and useful features of this type of coupler is that its input impedance is constant regardless of the variation in the plasma loading of the individual array elements. This property is not unique to the particular version of the traveling wave antenna used in Ref. 1 (the “comblines”). In the present work, we show that an existing four-element array can be connected using only standard coaxial transmission line components to produce a tolerance to loading variations similar to that of a comblines. The properties of this system are compared with those of a tunerless variation of the present system transmission line topology, which has a related load resiliency property. The details of practical implementation of these circuits for high power operation are described.

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[#]Oak Ridge National Laboratory.

¹R.I. Pinsker, C.P. Moeller, C.C. Petty, et al., *Proc. 19th Symp. on Fusion Technology*, Lisbon, 1996, to be published.

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Robert I. Pinsker
(Same Name Typewritten)

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General Atomics
P.O. Box 85608
San Diego, CA 92186-9784
(Address)

(619)455-2074/(619)455-2838
Phone/Fax

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pinsker@gav.gat.com
Email Address