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**Arc Localization techniques for ICRF transmission lines**<sup>1</sup> R.H. GOULDING, F.W. BAITY, G.C. BARBER, D.A. RASMUSSEN, D.O. SPARKS, J.B. WILGEN, ORNL — Techniques are being developed to determine the location of electrical breakdowns in ICRF transmission lines used in heating and current drive systems for magnetic fusion experiments. A 5.8 m long resonant coaxial test line has been constructed with a 15 cm diameter outer conductor and  $Z_0 = 26\Omega$ . Tests to date have been run with the line filled with ambient air at atmospheric pressure. Arcs are produced at a fixed location using a sparkplug with  $\sim 20$  kW of injected RF power at  $\sim 47$  MHz, or at various locations by spontaneous breakdown at higher power. Simple acoustic techniques have been used to locate an arc to within 8 cm. An RF based technique that can be employed in vacuum lines has also been developed, which uses a higher frequency wave injected into the transmission line. Distance to the arc is determined by measuring the reflection coefficient phase as this frequency is swept over a period of  $\sim 1\mu s$ . Details of the high frequency coupler, measurement circuitry, and latest results will be presented.

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Prefer Oral Session  
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