

Abstract Submitted
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The Influence of Plasma Density on RF Breakdown in Antenna Systems¹ J.B.O. CAUGHMAN, F.W. BAITY, D.A. RASMUSSEN, Oak Ridge National Laboratory — One of the main power-limiting factors in antenna systems is the maximum voltage that the antenna can sustain before breaking down. In practice, antenna structures can typically sustain much higher stand off voltages during vacuum conditions compared to operating conditions in the presence of the edge plasma. In an effort to quantify this affect, the influence of plasma density on RF breakdown is being studied in a resonant 1/4-wavelength section of vacuum transmission line terminated with an open circuit electrode structure. A small inductively coupled plasma source is used to inject plasma into the high-voltage electrode gap. The maximum electric field that can be sustained without breakdown is on the order of 30-40 kV/mm for vacuum conditions, but this value is substantially reduced in the presence of plasma and magnetic field. Details of the influence of plasma density and magnetic field strength, including the effect of electrode materials (Ni and Cu), will be presented.

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