Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Electron Multipactor Discharges in Vacuum Transmission Lines for VHF[1] TIMOTHY P. GRAVES, B. LABOMBARD, S. WUKITCH, I. HUTCHINSON, MIT-PSFC — A multipactor discharge is a resonant condition for electrons in an alternating electric field. This discharge can be disruptive to RF circuits, cavities, and resonators. The Coaxial Multipactor Experiment (CMX) investigates these discharges in parallel plate and coaxial transmission line geometries with goals of measuring the electron energy distributions at frequencies from 40 to 150 MHz. CMX has a unique experimental setup which allows the transmission line to pass continuously through a vacuum region. Retarding potential analyzers with secondary electron suppression measure the electron current as a function of bias voltage. Results for both parallel plate and coaxial multipactor discharges provide the first detailed measurements of the electron energy distributions with varying frequency. Results show that coaxial multipactoring can be much more destructive to the RF circuit than parallel plate multipactoring under certain conditions, as is the case at 80 MHz and 4 inch coaxial line. This is the scenario on the C-MOD ICRH system, making it highly susceptible to coaxial multipactoring.

[1]Work supported by DoE

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Date submitted: 25 Aug 2005 Electronic form version 1.4