

Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Resonance Cone Interaction with a Self-Consistent Radio Frequency Sheath¹ J.R. MYRA, D.A. D'IPPOLITO, Lodestar Research Corp — Lower-hybrid type resonance cones (RCs) can be launched parasitically by an ICRF antenna and propagate in the tenuous scrape-off-layer plasma. This provides a means of transmitting rf voltages from the antenna to distant points on the wall. We study the RC interaction with, and reflection from, the plasma sheath near a conducting wall. The sheath is modeled as a vacuum gap [D. A. D'Ippolito and J. R. Myra, Phys. Plasmas **13**, 102508 (2006)] whose width is given by the Child-Langmuir law, and is typically many Debye lengths. The calculation yields the fraction of launched voltage in the RCs that is transmitted to the sheath. This fraction has a sensitive threshold-like turn-on when a critical parameter (related to rf power, plasma parameters and RC dimensions) reaches order unity. Above threshold, the fractional voltage transmitted to the sheath is order unity, leading to strong and potentially deleterious rf-wall interactions in tokamak rf heating experiments. Below threshold, these interactions can be avoided. Application to Alcator C-Mod will be discussed.

¹Supported by the USDOE under grants DE-FG02-97ER54392 and DE-FC02-05ER54823.

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Date submitted: 16 Jul 2008

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