Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

The Role of Fast ICRF Waves in Enhancing the Plasma Potential in the SOL of Alcator C-Mod[1] ROMAN OCHOUKOV, DENNIS WHYTE, DANIEL BRUNNER, MIT PSFC, DANIEL D'IPPOLITO, Lodestar Research Corporation, BRIAN LABOMBARD, YIJUN LIN, BRUCE LIPSCHULTZ, MIT PSFC, JAMES MYRA, Lodestar Research Corporation, JAMES TERRY, STEPHEN WUKITCH, MIT PSFC — An extensive experimental survey of the plasma potential (Φ_P) enhancement in the SOL of ICRF-heated discharges on Alcator C-Mod reveals that plasma facing surfaces that do not magnetically map to the active ICRF antennas experience Φ_P enhancement of >100 V. The key implication of this result is that surfaces that generally do not affect the core plasma performance may become impurity sources. The study reveals that the fast ICRF waves have a strong influence on Φ_P. A mechanism for Φ_P enhancement is proposed that involves a fast-to-slow wave coupling at conducting surfaces. Several features of this coupling theory are observed experimentally. Examples include the effect of the shape of the conducting surface and the strength of the fast wave fields on Φ_P. Overall, we observe an increase in the enhanced Φ_P in unmapped SOL regions with the strength of the fast wave amplitude and the correlation is most pronounced in monopole-heated discharges. It is concluded that strong single-pass absorption regime is crucial to minimizing the impact of ICRF power on plasma-material interactions and core plasma performance.

[1]Work supported by US DOE grants DE-FC02-99ER54512 and DE-FC02-05ER54823.

Roman Ochoukov
MIT PSFC

Date submitted: 12 Jul 2013 Electronic form version 1.4