Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

Revisiting the anomalous skin layer IGOR KAGANOVICH, Princeton Plasma Physics Laboratory — Radio frequency waves do not penetrate into a plasma and are damped within it. The electric field of the wave and plasma current are concentrated near the plasma boundary in a skin layer. Electrons can transport the plasma current away from the skin layer due to their thermal motion. As a result, the width of the skin layer increases when electron thermal velocity is taken into account. This phenomenon is called the anomalous skin effect. The anomalous penetration of the rf electromagnetic field occurs not only for the electric field parallel to the plasma boundary (inductively coupled plasmas) but also for the electric field normal to the plasma boundary (capacitively coupled plasmas) [1]. Recent advances in the nonlinear, nonlocal theory of the anomalous skin layer are reported. It is shown that separating the electric field profile into exponential and non-exponential parts yields an efficient qualitative and quantitative description of the anomalous rf field penetration in inductively coupled plasmas.

[1] I. D. Kaganovich, O. V. Polomarov, and C. E. Theodosiou, "Revisiting the anomalous rf field penetration into a warm plasma," to be published in IEEE Trans. Plasma Sci. (2006).

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Date submitted: 14 Jun 2006 Electronic form version 1.4