

Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Revisiting the anomalous rf field penetration into a warm plasma

IGOR KAGANOVICH, Princeton University — Radio frequency waves do not penetrate into a plasma and are damped within a skin layer. However, 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 temperature effects are taken into account. It is shown that separating the electric field profile into exponential and non-exponential parts –as it was originally done by Landau - yields an efficient qualitative and quantitative description of the anomalous skin effect [1]. The anomalous penetration of the rf electric field occurs not only for transversely propagating to the plasma boundary wave (inductively coupled plasmas) but also for the wave propagating along the plasma boundary (capacitively coupled plasmas). Such anomalous penetration of the rf field modifies the structure of the capacitive sheath [2]. Recent advances in the nonlinear, nonlocal theory of the capacitive sheath are reported. [1] Igor D. Kaganovich, et al., submitted to IEEE Trans. on Plasma Sci. (2005); <http://arxiv.org/abs/physics/0506135>. [2] Igor D. Kaganovich, Phys. Rev. Lett., **89**, 265006 (2002).

Igor Kaganovich
Princeton University

Date submitted: 18 Jul 2005

Electronic form version 1.4