

Abstract Submitted
for the GEC07 Meeting of
The American Physical Society

Propagating double layers in electronegative plasmas ALBERT MEIGE, NICOLAS PLIHON, GERJAN HAGELAAR, JEAN-PIERRE BOEUF, PASCAL CHABERT, ROD BOSWELL, LPTP, Ecole Polytechnique — Double layers have been observed to propagate from the source region to the diffusion chamber of a helicon-type reactor filled up with a low-pressure mixture of Ar/SF₆ [N. Plihon et al., *J. Appl. Phys.*, **98**(023306), 2005]. In the present paper the most significant and new experimental results are reported. A full self-consistent hybrid model where the electron energy distribution function, the electron temperature and the various source terms are calculated is developed to investigate these propagating double layers. The spontaneous formation of propagating double layers is only observed in the simulation for system where the localized inductive heating is combined with small diameter chambers. The conditions of formation and the properties of the propagating double layers observed in the simulation are in good agreement with that of the experiment. By correlating the results of the experiment and the simulation, a formation mechanism compatible with ion two-stream instability is proposed.

Albert Meige
LPTP, Ecole Polytechnique

Date submitted: 14 Jun 2007

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