Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Dynamical transitions and ion acoustic waves in presence of electronegative double layers NICOLAS PLIHON, Laboratoire de Physique ENS Lyon - CNRS, PASCAL CHABERT, Laboratoire de Physique des Plasmas - CNRS — This paper presents a detailed experimental study of the transition from continuous plasma diffusion to static double-layer and eventually pseudo-periodically propagating double layers when increasing the negative ion fraction in a low pressure, radio frequency driven plasma (in Ar - SF_6 mixtures). The transitions between these three states involve the propagation of unstable ion acoustic waves (of the slow branche type). These waves are driven unstable due to the counter-streaming of positive and negative ion. We will show the dynamical richness of the dynamics of these transitions, with turbulence-like features of the ion acoustic activity and long time fluctuations of the ion acoustic wave properties (such as wavelength, amplitude...) We will develop here the link between ion acoustic waves and double layer formation (and propagation) in electronegative gases and compare our experimental work with previous theoretical predictions and recent numerical simulations.

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Date submitted: 10 Jun 2010 Electronic form version 1.4