

Abstract Submitted
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Laboratory observation of multiple double layer resembling space plasma double layer PRINCE ALEX, SARAVANAN ARUMUGAM, SURAJ SINHA, Pondicherry University — Perceptible double layer consisting of more than one layers were produced in laboratory using a double discharge plasma setup. The confinement of oppositely charged particles in each layer with sharply defined luminous boarder is attributed to the self-organization scenario. This structure is generated in front of a positively biased electrode when the electron drift velocity (ν_d) exceeds 1.3 times the electron thermal velocity (ν_{te}). Stable multiple double layer structures were observed only between $1.3 \nu_{te} \leq \nu_d \leq 3 \nu_{te}$. At $\nu_d = 1.3 \nu_{te}$, oscillations were excited in the form of large amplitude burst followed by a high frequency stable oscillation. Beyond $\nu_d = 3 \nu_{te}$, multiple double layer begins to collapse which is characterized by an emergence in turbulence. Long range dependence in the corresponding electrostatic potential fluctuations indicates the role of self-organized criticality in the emergence of turbulence. The algebraic decaying tale of the autocorrelation function and power law behavior in the power spectrum are consistent with the observation.

Prince Alex
Pondicherry University

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