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Experimental Study of Double Layer in Helicon Plasma with Diverging Magnetic Field P.K. CHATTOPADHYAY, KSHITISH BARADA, J. GHOSH, S. KUMAR, Y.C. SAXENA, Institute for Plasma Research, Bhat,Gandhinagar, Gujarat, India -382428 — Existence of double layer in helicon plasma with diverging magnetic field was first reported by Boswell (Appl. Phys. Lett., 1356, 82, 2003). Later many other researchers have also observed DL with the simultaneous presence of ion beam only. Though there are some speculations about the existence of the DL but the issue is far from resolved. In the present study, double layer in helicon plasma with diverging magnetic field has been investigated. Double layers with both electron and ion beams are observed for the first time. The experiment is performed in a glass tube of inner diameter 10 cm and length 70 cm connected to a stainless steel chamber of inner diameter 21 cm and length 50 cm. A 13.56 MHz RF (Radio Frequency) source ($Prf < 1.2$ KW) with a capacitive L matching network is used to power the m = +1 helicon antenna. Diagnostics used are Langmuir probe, B-dot probe and an emissive probe for the present study. Characterization of double layer under different operational parameters such as magnetic field, pressure, and RF power will be presented. Detailed observations along with a model to explain the existence of DL will be presented.

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