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Experimental Study of Low Magnetic Field Density Peaking in Helicon Plasma KSHITISH BARADA, P.K. CHATTOPADHYAY, J. GHOSH, S. KUMAR, Y.C. SAXENA, Institute for Plasma Research, Bhat, Gandhinagar, Gujarat, India -382428 — In addition to the dense plasma performances at high magnetic field ($B > 200$ Gauss), the local density peak at $B < 50$ Gauss was observed previously in various helicon plasma sources. This is a resonance phenomenon unlike density change during capacitive to inductive to wave mode transitions. In the present experiment, however, multiple density peaks are observed for the first time when magnetic field is varied upto 100 Gauss. Detail characterization of the density peak phenomenon with respect to different operational parameters such as magnetic field, pressure and RF (radio frequency) power has been done. Initial analysis suggests the density peaks are due to coupling of Trivelpiece-Gould (TG) mode with Helicon mode. 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 source ($P_{rf} < 1.2$ 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.

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