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Effect of non-uniform magnetic field on helicon plasma generation. SONU YADAV, Institute for Plasma Research, HBNI, Bhat Gandhinagar, 382428, India, KSHITISH KUMAR BARADA, Department of Physics and Astronomy, University of California, Los Angeles, California 90095, USA, PRABAL KUMAR CHATTOPADHYAY, Institute for Plasma Research, HBNI, Bhat Gandhinagar, 382428, India — Helicon plasmas are very efficient sources for high-density plasma generation. The original efficiency of helicon plasma source can be further raised, if this source operated in non-uniform magnetic field. In present work experiments are carried out with different non-uniformity of magnetic field near the antenna keeping the magnetic field at the center of antenna <100 G. It has been observed that antenna plasma coupling and plasma production efficiencies increase with magnetic field non-uniformity. It is found that density obtain by introducing non-uniform magnetic field results in higher density than conventional helicon. The effect results from the alternation in wave performance rather than in particle confinement. Observation of beat wave in the axial variation of axial wave magnetic field suggests the presence of different radial wavemode. Wavelength is measured for nonuniform magnetic field near the antenna when the magnetic field is kept at 25 G and 50 G at the antenna center. For the 25 G case, measured axial wavelength is found to be twice the length of the antenna. This suggests that half wavelength antenna excites full wavelength helicon wave. However, in the 50 G case, the measured wavelength is shown to be approximately equal to the antenna length.

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