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**Development of a versatile permanent magnet based compact helicon plasma source** ARUN PANDEY, MAINAK BANDYOPADHYAY, DEBRUP MUKHOPADHYAY, ARUN CHAKRABORTY, Institute for Plasma Research — A compact helicon plasma source, which is advancement over the conventional inductively coupled plasma sources for producing high-density plasmas, is developed at IPR, India. Plasma and wave studies are carried out in Argon and hydrogen plasmas. The experimental setup uses a permanent magnet instead of the electromagnets. The plasma is produced in the narrow source tube by applying RF Power at  $\omega = 13.56$  MHz. It expands in a diverging field into the expansion chamber. In Argon plasma, a drastic increase in plasma density is achieved in the expansion chamber with the use of full line cusps. Higher radial modes are observed in the complicated field configuration. Using hydrogen gas, with the right antenna helicon plasma is created. In the expansion chamber the plasma conditions are conducive to the high yield of H- without the use of Caesium. The diverging magnetic field also enables resonance cone absorption when  $\omega$  approaches  $\omega_{ce}$ .

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