

Abstract Submitted
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Resonant

power absorption in helicon plasma sources: Experiment¹ CHARLES A. LEE, GUANGYE CHEN, ALEXEY AREFIEV, BORIS N. BREIZMAN, ROGER D. BENGTON, L.L. RAJA, University of Texas at Austin — Helicon discharges produce plasmas with a strong density gradient across the confining magnetic field. Theoretically, such a non-uniform plasma can create a radial potential well for non-axisymmetric whistlers, allowing radially localized helicon (RLH) modes. This work presents new experimental evidence that RLH modes play a significant role in the power absorption mechanism of helicon plasma sources. Experimentally, the mode has been identified by its resonant response to a low power rf-generator with variable frequency. The 2D plasma density profile was measured with Langmuir probes and then used to calculate the corresponding eigenfrequency and RLH mode structure for the experimental parameters. The resulting mode frequency matches the driving frequency of the rf-antenna. The calculated power deposition into the plasma is comparable to the experimental value for a relevant electron collision frequency. Wave fields in the plasma are measured and compared with the calculations.

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