

Abstract Submitted
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Study of Linear and Nonlinear Wave Excitation¹ FENG CHU, JORGE BERUMEN, RYAN HOOD, SEAN MATTINGLY, FREDERICK SKIFF, The University of Iowa — We report an experimental study of externally excited low-frequency waves in a cylindrical, magnetized, singly-ionized Argon inductively-coupled gas discharge plasma that is weakly collisional. Wave excitation in the drift wave frequency range is accomplished by low-percentage amplitude modulation of the RF plasma source. Laser-induced fluorescence is adopted to study ion-density fluctuations in phase space. The laser is chopped to separate LIF from collisional fluorescence. A single negatively-biased Langmuir probe is used to detect ion-density fluctuations in the plasma. A ring array of Langmuir probes is also used to analyze the spatial and spectral structure of the excited waves. We apply coherent detection with respect to the wave frequency to obtain the ion distribution function associated with externally generated waves. Higher-order spectra are computed to evaluate the nonlinear coupling between fluctuations at various frequencies produced by the externally generated waves. Parametric decay of the waves is observed.

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