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Theoretical and numerical characterization of drift-wave instabilities in magnetized discharges ANDREA MARCOVATI, MARK CAPPELLI, Stanford Univ — Gradient-driven drift-waves form and propagate in non-uniform magnetized plasmas. In previous work we presented a linear model that describes their dynamics consistent with what is seen in small magnetron configurations. These instabilities (100 kHz - 800 kHz) develop in the form of spoke-like coherent structures propagating azimuthally and transitioning between coherent modes when varying discharge voltage. Between modes the fluctuations are much more stochastic. Experiments conducted to characterize these stochastic regimes show energy concentration at multiple discrete frequencies, generally higher than the linear ones (>1MHz). Analyses of the power spectra show interactions between these frequencies consistent with three-wave mixing processes, suggesting nonlinear energy transfer. To better understand these experimental findings, we numerically integrate the nonlinear perturbation equations. In this presentation we present this nonlinear model as well as the first results, and compare these to experiments carried out which characterize the wave dispersion through measurements of fluctuation-driven current density using a finely segmented anode, providing higher wavelength resolution than in past studies.

Andrea Marcovati
Stanford Univ

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