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Electrostatic electron oscillations and damping in an ultracold plasma KEVIN TWEDT, STEVEN ROLSTON, Joint Quantum Institute and Department of Physics, University of Maryland — We study various collective oscillations in ultracold plasmas by driving the oscillations with an applied rf field and measuring the current induced on a nearby electrode. Previously we made measurements of a zero-temperature edge-mode and confirmed the importance of the changing plasma neutrality in determining the resonant frequency. We present an equivalent circuit model for the plasma that is capable of reproducing the main features of the induced current signals that we observe. We attempt to use the model to measure the damping of the oscillation and how it changes with electron temperature. We also show results from driving cold plasma oscillations at an arbitrary angle to a uniform magnetic field, where we find a series of modes roughly consistent with upper hybrid oscillations and a series of modes at very low frequencies (< 1 MHz) that as yet are unidentified. This work is supported by the NSF.

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