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Electron Ion Collision Rates in Ultracold Plasmas[1] WEI-TING CHEN, JACOB ROBERTS, Colorado State University — By using applying a short electric field pulse to an ultracold plasma, it is possible to induce a collective oscillation of the electrons. This oscillation will damp after the application of the electric field pulse. We have found that under certain achievable experimental conditions, this damping can be dominated by the electron-ion collision rate. We have measured this damping rate experimentally under these conditions and thus can compare it to theoretical predictions. We will present our measurement technique and results. In addition, we will discuss extensions of this technique to measurements of electron temperature, to investigating strong-coupling physics in the electron component of an ultracold plasma, and to measuring the electron-ion collision rate when the electrons are highly magnetized.

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