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Electron-ion collision rate measurement in an ultracold neutral plasma[1] WEI-TING CHEN, CRAIG WITTE, JACOB ROBERTS, Colorado State University — By applying sharp electric field pulses to an ultracold plasma (UCP), it is possible to induce an electron center-of-mass oscillation around the ion center-of-mass that subsequently damps at a measurable rate. By tuning the experimental parameters of the UCP, the main contribution to the damping rate can be made to be electron-ion collisions. Thus, the electron-ion collision rate can be studied in these systems. We have measured the electron-ion collision rate at multiple temperatures and compared them to theory predictions and will report the results of these measurements. We are able to explore parameters where strong-coupling effects are predicted to be relevant. In addition to presenting our recent results, we describe our plans to extend these measurements further towards a more strongly-coupled regime.

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