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**Plasma Oscillation Damping in an Ultracold Neutral Plasma**<sup>1</sup> WEI-TING CHEN, CRAIG WITTE, JACOB ROBERTS, Colorado State University — In sufficiently low-density ultracold plasmas, free (i.e. non-driven) plasma oscillations can be induced that persist for timescales on the order of the oscillation period. These oscillations are initiated by a short electric field pulse. The oscillation amplitude and frequency can be probed by applying a second short electric field pulse at a chosen delay time after the first. The fraction of electrons that leave the ultracold plasma in response to this second pulse exhibits a damped sine wave character, allowing for the determination of the damping time constant of the free plasma oscillation. We expect that this damping time should be related to both collision-based (e.g. electron-ion collisions) and non-collision-based factors. We present our measurements of the oscillation damping time as a function of ultracold plasma density and temperature.

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Jacob Roberts Colorado State University

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