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Ultracold neutral plasmas at room temperature[1] JOSHUA WILSON, STEPHEN RUPPER, DANIEL THRASHER, NATHAN HEILMANN, SCOTT BERGESON, Brigham Young University — Under certain conditions, the characteristics of ultracold neutral plasmas can be reproduced at room temperature. At high enough density the disorder-induced heating temperature is much greater than room temperature, meaning that the equilibrium ion temperature is determined by the ion density. We produce these plasmas using strong-field ionization of neon atoms in a jet. We have developed an interferometric method for determining the average plasma density as a function of time and observe the plasma expanding on time scales as short as 5 ns. We show that the ultracold neutral plasma expansion model can be used to extract the electron temperature with good reliability.

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Scott Bergeson
Brigham Young University

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