

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Off-resonant RF Heating of Ultracold Plasmas to Measure Collision Rates¹ JOHN GUTHRIE, PUCHANG JIANG, JACOB ROBERTS, Colorado State University — We have developed a new technique to measure electron-ion collision rates in ultracold plasmas. An off-resonant, high-frequency field is applied to an ultracold plasma. The electrons oscillate in response, and electron-ion collisions produce electron heating. The off-resonant nature of the oscillation reduces sensitivity to the plasma density as well as possible distortions. By using the known variation in photoionization energy with photoionization laser wavelength and applying controlled sequences of electric fields, the amount of heating imparted can be calibrated and precisely measured. This allows the comparison of electron-ion collision rates as a function of plasma parameters such as electron temperature/degree of strong coupling and magnetization. A description of this technique and the experimental results obtained with it will be presented.

¹This work is supported by the AFOSR

Jacob Roberts
Colorado State University

Date submitted: 03 Jul 2019

Electronic form version 1.4