

Abstract Submitted
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Electron screening and disorder-induced heating in ultracold neutral plasmas¹ MARY LYON, SCOTT BERGESON, Brigham Young University — We report measurements of the influence of electron screening on plasma evolution at early times in ultracold neutral plasmas. Due to their large electrical potential energies and comparatively small kinetic energies, ultracold plasmas occupy a regime of plasma systems which are called “strongly coupled.” Ion motion at early times in these ultracold plasmas is dominated by nearest-neighbor Coulomb interactions. The spatial disorder in the initial plasma state gives rise to rapid ion heating. This relaxation, called disorder-induced heating (DIH), limits the strong coupling of the system to order unity. Using laser-induced fluorescence on the ions we map out the time evolution of the velocity distribution by changing the frequency of the laser beam we use to probe the ions. This allows us to study DIH with ns time resolution and to observe and characterize effects due to electron screening on ion equilibration over a wide range of plasma conditions.

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