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Limit of strong ion coupling due to electron shielding[1] SCOTT BERGESON, MARY LYON, Brigham Young University, MICHAEL MURILLO, Los Alamos National Laboratory — We show that strong coupling between ions in an ultracold neutral plasma is limited by electron screening. While electron screening reduces the quasiequilibrium ion temperature, it also reduces the ion-ion electrical potential energy. The net result is that the ratio of nearest-neighbor potential energy to kinetic energy in quasiequilibrium is constant and limited to approximately 1 unless the electrons are heated by some external source. We support these conclusions by reporting measurements of the ion velocity distribution in an ultracold neutral calcium plasma. These results match previously reported simulations of Yukawa systems. Theoretical considerations are used to determine the screened nearest-neighbor potential energy in the plasma.

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Scott Bergeson
Brigham Young University

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