

ACHIEVEMENT OF STRONG CORRELATIONS IN ULTRACOLD NEUTRAL PLASMAS

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In a number of recent experiments ultracold neutral plasmas have been produced by photoionizing laser-cooled atomic ensembles and investigated using a variety of different techniques. While the very low temperatures suggest the plasma to be initially created deep in the strongly correlated regime, various heating mechanisms are known to drive the system into a weakly coupled state. Based on recently developed theoretical approaches, we discuss several ways to reach one of the major goals of the early ultracold plasma experiments, namely to increase the degree of coupling for both the ions and the electrons. Moreover, the efficiency and feasibility of such proposals will be addressed in some detail. Observable strong correlation effects on the dynamical plasma behavior will be identified and discussed, also in the context of present experiments.