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Strongly coupled plasmas from compressed gases with controllable coupling[1] GAUTHAM DHARUMAN, CMSE, Michigan State University (MSU), LIAM G. STANTON, Lawrence Livermore National Laboratory, MICHAEL S. MURILLO, CMSE, MSU — We propose a method for creating strongly coupled plasmas (SCPs) with controllable coupling and relatively low density. Strong coupling in plasmas created from neutral gases is hindered by the process of disorder induced heating (DIH), as shown in ultracold neutral plasmas (UCNPs) [1]. Mitigating DIH requires the neutral system to be pre-correlated [2]. Using molecular dynamics simulations we examine the formation of SCPs from cool gases that are pre-correlated using high gas pressures. By changing the initial pressure over orders of magnitude, we examine the variations in continuum lowering, ionization state, Coulomb coupling, degeneracy, Coulomb collisional processes, and species partial pressures. We are able to vary and control the effective Coulomb coupling over a wide range and much higher than the measured values in UCNPs [2]. This method has significant advantages over experiments in dense plasmas because of the lower energy-density environments that are produced. Further, the method has the advantage of varying the properties listed above by varying the electron and ion temperatures independently.[1] Phys. Rev. Lett. 83, 4776 (1999) [2] Phys. Rev. Lett. 87, 115003 (2001)

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