

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Molecular dynamics simulations of electron-ion temperature equilibration in an SF₆ plasma LORIN X. BENEDICT, JAMES N. GLOSLI, DAVID F. RICHARDS, FREDERICK H. STREITZ, STEFAN P. HAU-RIEGE, RICHARD A. LONDON, FRANK R. GRAZIANI, Lawrence Livermore National Lab, MICHAEL S. MURILLO, JOHN F. BENAGE, Los Alamos National Lab — We describe classical non-equilibrium molecular dynamics simulations aimed at studying electron-ion temperature equilibration in a two-temperature SF₆ plasma. We choose a density of 1.0×10^6 (dissociated) SF₆ molecules per cm³ and initial temperatures of $T_e = 100$ eV and $T_S = T_F = 15$ eV, in accordance with experiments currently underway at Los Alamos National Lab. Our computed relaxation time lies between two oft-used variants of the Landau-Spitzer relaxation formula. Discrepancies are also found when comparing to the predictions of more recent theoretical approaches. These differences should be large enough to be measured in the upcoming experiments. We highlight one particular source of discrepancy arising from the strong ion-ion coupling: the time-dependent specific heat of the screened ion subsystem.

Lorin X. Benedict
Lawrence Livermore National Lab

Date submitted: 16 Jul 2009

Electronic form version 1.4