Abstract Submitted
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Investigation of electron-ion equilibration using time-dependent Stark broadening[*,+1] J. CLARK, FAMU, Tallahassee, Fl, R. HOLLINGER, S. WANG, H. SONG, CSU, Fort Collins, Co., J. PARK, CSU, Fort Collins, Co., LLNL, M. MACDONALD, E. MAGEE, J. EMIG, LLNL, Y. WANG, CSU, Fort Collins, Co., C. IGLESIAS, LLNL, J. ROCCA, CSU, Fort Collins, Co., M. MARTIN, R. LONDON, H. WHITLEY, J. NILSEN, LLNL, R. WILLIAMS, FAMU, Tallahassee, Fl, G. BROWN, LLNL, M. CAPELUTO, V. SHLYAPTSEV, CSU, Fort Collins, Co., A. PUKHOV, U. Dusseldorf, Dusseldorf, Germany, L. HOBBS, M. HILL, D. HOARTY, AWE, Aldermaston, U.K., R. SHEPHERD, LLNL — Measurement of the electron-ion temperature relaxation has proven to be a difficult quantity to ascertain. We present a different approach to determining the electron-ion relaxation time using spectral line-shape theory. At constant density, the spectral line shape of a Stark broadened line will be driven by the temperature separation between the electrons and ions. We exploit this physics by utilizing time-resolved, x-ray spectroscopy of ultra-short pulse laser heated matter. During this interaction, the laser energy heats the electrons which transfers energy to the ions via collisions. We observe the temporal evolution of the Si 1s-3p transition to explore the possibilities of this technique. Preliminary data and simulations will be presented.

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