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Satellite formation in high intensity laser-solid interactions due to the presence of non-thermal electrons[1] H.-K. CHUNG, S.B. HANSEN, K.B. FOUNIER, S. MOON, S. WILKS, H. CHEN, A. NILES, Y. PING, R. SHEPHERD, K. WIDMANN, J. HUNTER, LLNL, T. DITMIRE, G. DYER, U of Texas, T.A. PIKUZ, A.Y. FAENOV, MISC VNIIFTRI — The COMET laser in LLNL was used to study the energy distribution between thermal and non-thermal electrons created by short-pulse laser interacting with soild-density matter. The aluminum-coated titanium targets were illuminated by the ultrashort laser pulses with variable intensities of 10^{17}-10^{19} W/cm^2. We have measured the time-dependent x-ray spectra of titanium K_α and the aluminum He-like 1s2p-1s^2 and Li-like satellites for tens of picoseconds. Data show that the titanium K_α line is broadened and shifted to higher energies and the Li-like satellites of aluminum He_α vary with time. Time-dependent collisional-radiative calculations were preformed to generate the time-resolved x-ray spectra of aluminum and titanium in the presence of a small fraction of non-thermal electrons in solid-density bulk electrons. We present the spectroscopic analysis to determine the plasma conditions of the front aluminum layer as a function of laser intensity, which will improve the understanding of the dynamics of non-thermal electrons and the heating of the thermal electrons.

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