Abstract Submitted
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X-ray line formation in radiation dominated astrophysical plasmas[1] G. LOISEL, J.E. BAILEY, S.B. HANSEN, T. NAGAYAMA, G.A. ROCHAU, Sandia National Laboratories, New Mexico, D. LIEDAHL, Lawrence Livermore National Laboratory, California, R. MANCINI, University of Nevada, Nevada, M. KOEPKE, West Virginia University, West Virginia — A remarkable opportunity to observe matter in a regime where the effects of General Relativity are significant has arisen through measurements of strongly red-shifted iron x-ray lines emitted from black hole accretion disks. A major uncertainty in the spectral formation models is the efficiency of Resonant Auger Destruction (RAD), in which fluorescent Ka photons are resonantly absorbed by neighbor ions. The absorbing ion preferentially decays by Auger ionization, thus reducing the emerging Ka intensity. If Ka lines from L-shell ions are not observed in iron spectral emission, why are such lines observed from silicon plasma surrounding other accretion powered objects? To help answer this question, we are investigating photoionized silicon plasmas produced using intense x-rays from the Z facility. For the first time in a terrestrial lab, we measured simultaneous absorption and emission spectra from these plasmas at high resolution. The charge state distribution, electron temperature, and electron density are determined through space-resolved absorption spectra. The emission spectra have been recorded at different column densities thus testing different radiative transport regime. These should allow us to answer quantitatively the original RAD hypothesis.

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