Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

**Accelerating K-Alpha Resonance Fluorescence Via Monochromatic X-Ray Beams And Comparison With LCLS-XFEL** ANIL PRADHAN, SULTANA NAHAR, SARA LIM, The Ohio State University — The presence of K-alpha resonances below the K-edge has been studied theoretically for high-Z (Fe, Pt, Au) and low-Z (Al, Ti, Cu) atoms [1], and recently observed experimentally at the LCLS x-ray free-electron laser facility in "warm dense matter" [2]. We present a mechanism for possible enhancement of the "Auger cycle" by employing a twin-beam monochromatic x-ray beams setup [3]. We extend the theoretical formulation to construct a detailed radiative-cascade model using atomic rates computed using atomic structure and R-matrix codes. We also report preliminary results on K-alpha resonance fluorescence from experiments at the European Synchrotron Research Facility using a tungsten target. In addition, we describe a simple Broadband-to-Monchromatic (B2M) x-ray conversion device for potential use in monochromatic K-alpha imaging and other applications [4].

[1] Pradhan et al., J. Phys. Chem. A. 113 45 12356 (2009); Nahar et al., Can. J. Phys. 89 5 483 (2011).
[2] S.M. Vinko et al., Nature 482 7383 59 (2012).
[3] S.N. Nahar and A.K. Pradhan, J. Quant. Spectrosc. Radiat. Transfer (in press).
[4] S.N. Lim, PhD Thesis, Ohio State University, 2014.

Sara Lim
The Ohio State University

Date submitted: 22 Jan 2015 Electronic form version 1.4