

Abstract Submitted
for the DAMOP06 Meeting of
The American Physical Society

Photoionization of the $4f$ and $6s$ Subshells of Atomic Thulium in the Region of the $5p$ Excitations¹ S. B. WHITFIELD, K. CASPARY, Dept. of Physics and Astronomy, University of Wisconsin-Eau Claire, Eau Claire, WI 54702, R. WEHLITZ, University of Wisconsin, Synchrotron Radiation Center, Stoughton, WI 53589, M. MARTINS, Universität Hamburg, Institut für Experimentalphysik, D-22761 Hamburg, Germany — The relative partial cross sections, σ , and the angular distribution parameters, β , of the photoelectrons originating from the $4f$ and $6s$ subshells of atomic thulium have been measured in the region of the $5p$ excitations (23 eV – 38 eV). In qualitative agreement with the early absorption work of Tracy [1], our σ curves show two regions of strong resonance enhancement, one around a photon energy of 27 eV corresponding to $5p_{3/2}$ excitations and the other near 32 eV corresponding to $5p_{1/2}$ excitations. The β curves show considerable variation between the allowed extremes of -1.0 and 2.0 for many of the $4f$ photolines. In addition, the $6s$ photoline shows very marked deviations from $\beta = 2.0$ which is indicative of an open-shell atom. We also compare our calculated $4f$ partial cross sections, using a modified version of the Cowan code [2], with experiment. While there is good qualitative agreement between theory and experiment, quantitative details are not reproduced: i) the $5p_{3/2}$ excitations are too narrow and ii) have an intensity larger than what is observed experimentally. [1] D. H. Tracy, Proc. R. Soc. Lond. A **357**, 485 (1977), [2] M. Martins, J. Phys. B, **34**, 1321 (2001).

¹This work was supported by an NSF RUI grant, No. 0244812.

Scott B. Whitfield
University of Wisconsin-Eau Claire

Date submitted: 27 Jan 2006

Electronic form version 1.4