

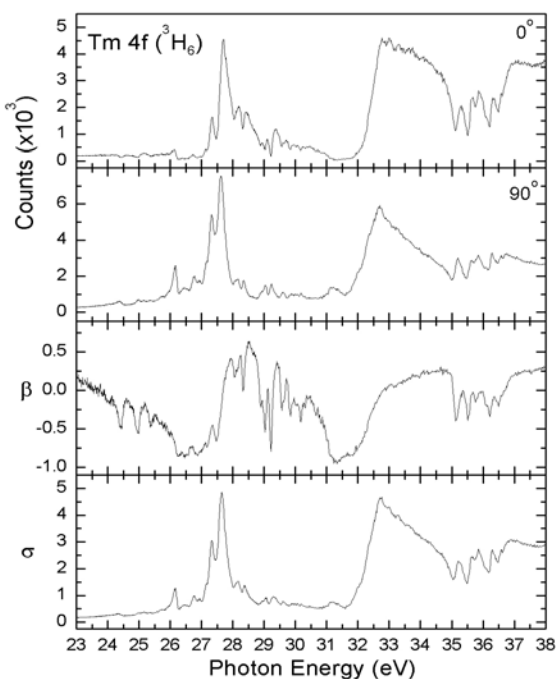
# VALENCE SUBSHELL PHOTOIONIZATION OF ATOMIC THULIUM IN THE REGION OF THE 5P EXCITATIONS

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Photoionization studies of f-subshell atoms are intrinsically interesting due to the high angular momentum of the f electrons. In addition, due to the high atomic number  $Z$  of the lanthanides, relativistic effects can also be expected to play an important role. Atomic Tm, which is one electron short of a filled 4f subshell, is an ideal first candidate for a detailed study of the photoionization dynamics of an open-f subshell atom. To date there has only been one photoelectron study of atomic Tm [1] which was carried out at only a few photon energies and did not measure angular distributions. We will present an investigation of the photoionization dynamics of both the angular distributions parameters,  $\beta$ , as well as the partial cross sections,  $\sigma$ , of the main 4f and the 6s photolines in the region of the 5p autoionizing resonances. A comparison to recent theoretical calculations [2] will also be made.



The figure at the left shows the  $0^\circ$  and  $90^\circ$  differential cross sections, the  $\beta$  curve and the  $\sigma$  curve of the 4f ( $^3H_6$ ) multiplet through the 5p autoionizing resonances. The two strong resonance regions at photon energies of about 27.5 eV and 33 eV have been attributed to excitations of the  $5p_{3/2}$  and the  $5p_{1/2}$  spin-orbit components, respectively [3]. Both features are visible in the spectra of all of the 4f and 6s photolines, with the feature at the lower photon energy generally stronger than that at the higher photon energy. The strong variations in  $\beta$  seen here are also observed for the other photolines.

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## References:

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