Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Photoionization of Fe^{7+} from the ground and metastable states[1]
SWARAJ TAYAL, Clark Atlanta University, OLEG ZATSARINNY, Drake University — The B-spline Breit-Pauli R-matrix method is used to investigate the photoionization of Fe^{7+} from the ground and metastable states in the energy region from ionization thresholds to 172 eV. The present calculations were designed to resolve the large discrepancies between the recent measurements and available theoretical results. The multiconfiguration Hartree-Fock method in connection with B-spline expansions is employed for an accurate representation of the initial and final states wavefunctions. The close-coupling expansion includes 99 fine-structure levels of Fe^{8+} in energy region up to $3s^23p^54s$ states. It includes levels of the $3s^23p^6$, $3s^23p^53d$, $3s^23p^54s$, and $3s3p^63d$ configurations and some levels of the $3s^23p^43d^2$ configuration which lie in the energy region under investigation. The present photoionization cross sections agree well with the Breit-Pauli R-matrix calculation of Sossah et al. and the TOPbase data in the magnitude of the background cross sections, but show somewhat richer resonance structure which qualitatively agree with the measurements. The calculated cross sections, however, are several times lower than the measured cross sections depending upon photon energy. The cross sections for photoionization of metastable states

[1]This work was supported by NASA under grant NNX11AB62G from the Solar and Heliophysics program.

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Date submitted: 17 Nov 2014 Electronic form version 1.4