Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Unified and Self-Consistent Treatment of Photoionization and Recombination: Fe XXI, Ne VIII, Ne IX[1] SULTANA NAHAR, The Ohio State University — Photoionization models for astrophysical plasmas require a self-consistent treatment of ionization balance between photoionization and electron-ion recombination. We will present new results using the unified method for electron-ion recombination which enables (i) treatment of both radiative and di-electronic recombination (RR and DR) in an ab initio manner, (ii) self-consistent calculations for photoionization and recombination using the same wavefunction expansion, (iii) level-specific recombination rate coefficients for a large number of bound levels. The method provides a single and accurate total (e-ion) recombination rate coefficient, to be computed at all temperatures of interest in astrophysical and laboratory plasmas. Total recombination rates from the unified method will be presented for Fe XXI. Importance of channel coupling through relativistic effects, not allowed in non-relativistic LS coupling, at very low temperature for this ion will be shown as seen in the experiment. Latest results for highly charged Li- and He-like ions of interest in X-ray astronomy will be presented for Ne VIII-IX and Mg X-XI.

[1]Partially supported by NASA

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Date submitted: 28 Jan 2005 Electronic form version 1.4