

Abstract Submitted
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Unified Method for Electron-Ion Recombination, Photoionization, and Dielectronic Satellite Lines of Fe XXIV, Ni XXVI, N V-VI, F VII-VIII¹ SULTANA NAHAR, ANIL PRADHAN, The Ohio State U — Dielectronic satellite (DES) spectra of highly charged ions are useful diagnostics in high-temperature laboratory and astrophysical X-ray sources. The unified method for total electron-ion recombination has been extended to study the strengths and rates of DES lines. The method subsumes radiative and dielectronic recombination and enables self-consistent results for the inverse process of photoionization. It is demonstrated that the resonances in the unified recombination cross sections correspond directly to the observed DES spectra. The new approach includes interference effects of resonant and background contributions in an ab initio manner giving proper autoionization line profiles. The relativistic Breit-Pauli R-matrix calculations yield accurate satellite intensities as a function of temperature. Results for the DES spectra of Fe XXIV and Ni XXVI obtained using the new approach are compared with those from the individual resonance approximation. The new extension generalizes the unified method based on the close-coupling approximation using the R-matrix method to accurate and complete treatment of several atomic processes. Unified results will be presented for level-specific photoionization and electron-ion recombination of several hundreds levels of Li- and He-like ions N V-VI and F VII-VIII.

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