Computation of Dielectronic Recombination Data for the Oxygen-Like Isoelectronic Sequence

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We have systematically calculated rate coefficients for dielectronic recombination (DR) along the oxygen-like sequence. A recent benchmarking of DR resonance strength and energies between our theoretical techniques and the experimental results from the Test Storage Ring in Heidelberg has already shown fairly good agreement for the most highly-ionized oxygen-like system we consider here, DR of Fe XIX forming Fe XVIII. [1] At the low-charge end of this isoelectronic sequence, we benchmark our results using F II DR data which are determined from measured neutral fluorine photoionization measurements [2] and the principle of detailed balance. To assess the reliability of our calculations for intermediate Oxygen-like ionization stages, we compare between theoretical R-matrix and perturbative results. All calculations have been performed in intermediate-coupling, so that fine structure effects are incorporated. Furthermore, both $\Delta n = 0$ and $\Delta n > 0$ core transitions are included in order to span a higher temperature range. Final-state-resolved rate coefficients and total rate coefficients have been tabulated, and these data are available in either format from our web site. [3]

References:

[1] D. W. Savin, S. M. Kahn, J. Linkemann, A. A. Saghiri, M. Schmitt, M. Grieser, R. Repnow, D. Schwalm, A. Wolf, T. Bartsch, A. Müller, S. Schippers, M. H. Chen, N. R. Badnel, T. W. Gorczyca, and O. Zatsarinny, *Astrophys. J.* submitted (2002).

[2] C. D. Caldwell, S. Benzaid, A. Menzel, and M. O. Krause, *Phys. Rev. A* **53**, 1454 (1996).

[3] http://unix.cc.wmich.edu/~gorczyca/drdata

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