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Radiation Damping in the Photoionization of $\mathbf{Fe}^{14+}$ THOMAS W. GORCZYCA, Western Michigan University, MUHAMMET FATIH HASOGLU, Gazikent University, MANUEL A. BAUTISTA, Western Michigan University, ZINEB FELFLI, Clark Atlanta University, STEVEN T. MANSON, Georgia State University — We have completed a new theoretical investigation of photoabsorption and photoionization processes in Fe^{14+}, extending beyond an earlier frame transformation R-matrix implementation by performing fully-correlated, Breit-Pauli R-matrix calculations, to include both fine-structure splitting of the strongly-bound resonances and radiation damping effects. We find that radiation damping of $2p \rightarrow nd$ resonances is important, giving rise to a resonant photoionization cross section that is significantly lower than the total photoabsorption cross section. Furthermore, our radiation-damped photoionization cross section is found to be in excellent agreement with recent EBIT measurements once a global shift in energy of ≈ -3.5 eV is applied. These findings have important implications. Firstly, the use of EBIT experimental data is applicable only to photoionization processes and not to photoabsorption; the latter is required in opacity calculations. Secondly, our computed cross section shows a series of $2p \rightarrow nd$ Rydberg resonances that are about 3.5 eV higher in energy than the corresponding experimental profiles, indicating that those threshold L-edge energy values currently recommended by NIST are likely in error by more than one eV.

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