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**Photoionization of Endohedral Atoms Using R-matrix Methods: Application to Xe@$C_{60}$** THOMAS GORCZYCA, Western Michigan University, MUHAMMET FATIH HASOGLU, Hasan Kalyoncu University, STEVEN MANSON, Georgia State University, CONNOR BALLANCE, Auburn University — It is demonstrated that the effect of a static cage potential on the photoionization of endohedrally-enclosed atoms can be incorporated into standard R-matrix calculations using one of two independent methods. For photoionization processes occurring entirely within the fullerene, the outer-region solutions can be modified by the additional cage potential to yield phase-shifted Coulomb functions that are matched to the inner-region R-matrix. Alternatively, if the cage potential is contained within the R-matrix "box," it can be directly incorporated into the formalism via simple one-electron integral contributions to the Hamiltonian, yielding a modified R-matrix itself. Both methods are applied to the photoionization of Xe@$C_{60}$ in the vicinity of the giant $4d \rightarrow \epsilon f$ resonance, and are found to be in excellent agreement with each other. Furthermore, good agreement with recent experimental results is obtained, validating the present approach and demonstrating that the full power of the many-electron, multi-channel, open-shell capabilities of the R-matrix method can be brought to bear on the photoionization of confined-atom systems in general.

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