Abstract Submitted
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K-Shell Photoabsorption Cross Sections for the Magnesium Isonuclear Sequence[1] SHAHIN ABDEL-NABY, Department of Physics, Western Michigan University, Kalamazoo, MI 49008-5252, FATIH HASOGLU, Department of Physics & Astronomy, Georgia State University, Atlanta, GA 30303-4106, THOMAS GORCZYCA, Department of Physics, Western Michigan University, Kalamazoo, MI 49008-5252 — With the improved spectral resolution of launched X-ray telescopes, there is a demand for highly-accurate K-shell photoabsorption cross sections. Such data are needed for modeling astrophysical plasmas, interpreting the observed spectra from distant cosmic emitters, and determining the elemental abundances of the interstellar medium (ISM). Here we present new calculations for photoabsorption of the entire Mg isonuclear sequence using state-of-the-art R-matrix methods, including important spectator Auger broadening and inner-shell relaxation effects. Unlike our earlier work on carbon, oxygen, and neon ions, and the present work on multiply-ionized magnesium, the calculations for neutral Mg and singly-ionized Mg^+ are complicated by additional M-shell occupancy, which leads to a larger R-matrix box and difficulties in implementing the quantum defect theoretical spectator Auger decay method for low-lying resonances.

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