Random-phase approximation with exchange for inner-shell electron transitions II: Effects of inter-shell correlations\textsuperscript{1} ZHIFAN CHEN, ALFRED Z. MSEZANE, Clark Atlanta University — A random-phase approximation with exchange (RPAE) method, which allows the inclusion of both the intra-shell correlations and the inter-shell correlations in photoionization calculations, has been developed for open-shell atoms (ions), such as I, Xe\textsuperscript{+}, and I\textsuperscript{+}. The equations for all types of matrix elements have been derived and implemented in a computer code. The program has been used to study the effects of inter-shell correlations on the Xe\textsuperscript{+} 5s, 5p and 4d photoionization processes, which are found to increase dramatically the cross sections for the Xe\textsuperscript{+} 5s and 5p electrons.

\textsuperscript{1}This work was supported by the U.S. DOE, Division of Chemical Sciences, Geosciences and Biosciences, Office of Basic Energy Sciences, OER, and AFOSR.