# Interchannel Coupling in the Photoionization of Ions

Steven T. Manson
*Georgia State University*

Himadri S. Chakraborty
*Kansas State University*

Pranawa C. Deshmukh
*Indian Institute of Technology-Madras, India*

Photoionization is of great importance in astrophysical modeling. Much effort has gone into calculations for outer shells, e.g., the Opacity Project [1], using methods which include extensive correlation effects; inner shells are treated using simple independent particle model (IPM) calculations [2]. Recently, however, it has been shown that correlation is significant for photoionization at x-ray energies and for inner shells [3,4]; correlation, in the form of interchannel coupling [5], is important for most subshells, of most atoms, at most energies [6]. With increasing stage of ionization correlation becomes increasingly less important compared to the nuclear Coulomb interaction. A research program has been initiated to quantify the effects of interchannel coupling in ionic photoionization, thereby assessing existing photoionization data bases in the x-ray region, using Relativistic Random-Phase-Approximation (RRPA) methodology [7,8] which includes significant apects of correlation, including interchannel coupling. Calculations have been performed on the neon isoelectronic sequence as test case which show that at the higher energies, the interaction of the larger 2s cross section with the smaller 2p cross section modifies the former by a factor of about 1.4 in neutral neon, and this modification decreases monotonically to about 1.1 in neon-like iron. Based upon these results, we conclude that interchannel coupling must be taken into account for the photoionization of low-charge ions.

**References**:

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