Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Overlapping Resonances in Atomic Ions W.-C. CHU, Georgia State University, Atlanta, GA and Kansas State University, Manhattan, KS, H.-L. ZHOU, S.T. MANSON, Georgia State University, Atlanta, GA — The resonances in the low-energy region resulting from photoionization have been studied for the four-electron Be isoelectronic series. The Breit-Pauli R-matrix methodology has been employed [1]. In particular, the overlap of resonances converging to different thresholds have been analyzed and general rules formulated as to how this overlap changes with Z, along with the asymptotic high-Z behavior. For Be and B^+, the 4s4p resonance manifests as an isolated resonance. Starting with C^{2+}, however, this resonance overlaps with resonance series converging to the n=3 thresholds, i.e., the 4s4p resonance lies below the n=3 thresholds, and, since it is so much wider than the 3*lnl'* resonances, it appears as a modulation on the intensities of the lower narrow resonances. With increasing Z, the 4s4p resonance moves to overlap with lower and lower members of the various 3*lnl'* series and, by Ne^{6+}, it becomes completely mixed with the 3*lnl'* resonances so that no modulation appears and its presence can be discerned only by examining the 3*lnl'* in detail and noting the departures from regularity in the quantum defects and widths. It is expected that this sort of behavior is quite general for resonances along isoelectronic series over the entire periodic table. This work is supported by NSF and DOE. [1] W.-C Chu et al, J. Phys. B **42,** 205003 (2009) and references therein.

W.-C. Chu
Georgia State University, Atlanta, GA and
Kansas State University, Manhattan, KS

Date submitted: 06 Jan 2010 Electronic form version 1.4