

Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Cancellation of correlations in the nonrelativistic high energy limit of photoeffect E.G. DRUKAREV, Petersburg Nuclear Physics Institute, St Petersburg 188300, Russia, R.H. PRATT, University of Pittsburgh, Pittsburgh, PA 15260 — We investigate the total effect of correlations on photoionization of atomic states with a nonzero value of orbital momentum in the nonrelativistic high energy asymptotic limit. The tendency for cancellation among such effects was reported in a particular situation of the angular distributions [1], and then more generally in [2], where it was found that the cancellations manifest themselves at the amplitude level, for both p and d states. We find that these cancellations can partially be viewed as a consequence of the closure properties satisfied by the eigenfunctions of the Hamiltonian. In the limit of a system with all the discrete and continuum states occupied, closure would give total cancellation. There is also total cancellation between the contributions of all such bound states and of the low energy continuum states, i.e. there are identities among these amplitudes. For real atoms results can be obtained from the closure results by subtracting contributions of the unoccupied bound states and of continuum states, using the quantum defect theory combined with the Fermi-Segre theorem. The corrections to the cancellation required by closure are small, and they tend to increase the cancellation. [1] V. K. Dolmatov, A. S. Baltenkov, and S. T. Manson, *Phys. Rev. A* **64**, 042718 (2002); [2] E. G. Drukarev and R. H. Pratt, *Phys. Rev. A* **72**, 06270 (2005).

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Date submitted: 05 Jan 2008

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