Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Third-order relativistic many-body calculation of transition probabilities for the beryllium and magnesium isoelectronic sequences DANSHA JIANG, RUPSI PAL, MARIANNA SAFRONOVA, University of Delaware — Third-order relativistic many-body perturbation theory formulas are derived for the calculation of the transition matrix elements in divalent systems. We use one-electron orbitals calculated in the $V^{(N-2)}$ Dirac-Fock (DF) potential of the closed core to start the perturbation expansion. B-splines are used to generate a complete set of DF basis orbitals for the numerical evaluation of the perturbation theory terms. The effect of Breit interation is also investigated. We made a detailed study of all electric-dipole transitions between the low-lying $2l2l'$ $[LSJ]$ states for beryllium-liked ions and $3l3l'$ $[LSJ]$ states for magnesium-like ions. Oscillator strength, transition probabilities and lifetimes are evaluated. The size of the third-order correlation correction is investigated. Comparisons are made with other theoretical calculations and experiments.

Dansha Jiang
University of Delaware

Date submitted: 31 Jan 2008 Electronic form version 1.4