Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Relativistic many-body calculation of energies, lifetimes, polarizabilities, and hyperpolarizabilities in Li-like Be^+ MARIANNA S. SAFRONOVA, University of Delaware and JQI, ULYANA SAFRONOVA, University of Nevada, Reno — Excitation energies of the ns, np, nd, and nf ($n \leq 9$) states in Li-like Be^+ are evaluated within the framework of relativistic many-body theory. All-order calculations of reduced matrix elements, oscillator strengths, transition rates, and lifetimes are given for levels up to $n = 9$. Electric-dipole ($2s - np$), electric-quadrupole ($2s - nd$), and electric-octupole ($2s - nf$) matrix elements are evaluated in order to obtain the corresponding ground state multipole polarizabilities using the sum-over-states approach. Recommended values are provided for a large number of electric-dipole matrix elements. Scalar and tensor polarizabilities for the ns, $np_{1/2}$, $np_{3/2}$, $nd_{3/2}$, and $nd_{5/2}$ states with $n \leq 9$ are also calculated. Scalar hyperpolarizability for the ground $2s$ state is evaluated and compared with non-relativistic calculation. The uncertainties of our calculations are evaluated for most of the values listed in this work. These calculations provide recommended values critically evaluated for their accuracy for a number of Be^+ atomic properties useful for a variety of applications.

Marianna S. Safronova
University of Delaware and JQI

Date submitted: 25 Jan 2013 Electronic form version 1.4