

Abstract Submitted  
for the 4CF11 Meeting of  
The American Physical Society

**Very accurate quantum mechanical calculations on small atom with explicitly correlated Gaussian functions** KEEPER SHARKEY, University of Arizona — Techniques and algorithms for very accurate calculations of ground and excited states of atoms with three and four electrons will be presented. The approach has been used to determine state energies and the corresponding wave functions. The effect of the finite mass of the nucleus is explicitly include in the calculations, which are done with the variational method and employ the analytical energy gradient in the optimization of the Gaussian nonlinear parameters. Some recently obtained results for  $D$  states of the Li and Be atom will be shown.

Keeper Sharkey  
University of Arizona

Date submitted: 16 Sep 2011

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