Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Analysis of hyperfine structure in photoassociation spectra[1] T. BERGEMAN, SUNY Stony Brook — The low Doppler width in photoassociation spectra from cold atoms makes hyperfine structure clearly visible, especially with heavier alkali atoms. Recently the focus has been on photoassociation to weakly bound dimers [1,2]. However there are also useful data on somewhat more deeply bound levels [2] for which a different coupling scheme is appropriate. Following [3], we use a $\vec{F} = \vec{J} + \vec{I}$ representation, and develop a transformation between this and the usual case e representation which applies at asymptotically large internuclear distance. We hope to model and assign hyperfine structure in $\Omega = 1$ states, using appropriate ground and excited state wavefunctions. To obtain eigenvalues from very large DVR matrices, we use a "stepwise diagonalization" procedure, which appears to be more efficient than standard sparse matrix methods.
[1] E. Tiesinga *et al.* PRA **71**, 052703 (2005); K. M. Jones *et al*, RMP **78**, 483 (2006).
[2] Data on Rb_2 from J. Qi, D. Wang, Y. Huang, H. Pechkis, E. Eyler, P. Gould, W. C. Stwalley, C. C. Tsai and D.J. Heinzen; Data on RbCs from A. J. Kerman, J. M. Sage, S. Sainis and D. DeMille.
[3] B. Gao, PRA **54**, 2022 (1996).

[1]Supported by NSF Grant PHY0652459.

T. Bergeman
SUNY Stony Brook

Date submitted: 04 Feb 2008 Electronic form version 1.4