APPLICATIONS OF THE DISCRETE VARIABLE REPRESENTATION (DVR) FOR MODELING ENERGY LEVELS OF ALKALI DIMER MOLECULES

THOMAS H. BERGEMAN, *Department of Physics and Astronomy, State University of New York, Stony Brook, New York 11794-3800.*

This will be a brief review of recent work in which DVR methods have been used to model spectroscopic data on various alkali dimer states. Many collaborators have contributed experimental data for studies on K_2 ($A\ ^1\Sigma_u^+$ and $b\ ^3\Pi_u$); RbCs ($A\ ^1\Sigma^+$, $b\ ^3\Pi$, $c\ ^3\Sigma_u$ and $B\ ^1\Pi$, for which more data would be helpful!); Rb_2 (0_u^+ dissociating to $5^2S + 5^2P$); Na_2 (A and b states again) and Cs_2 ($a\ ^3\Sigma_u^+$). The motivation has been to model photoassociation of laser-cooled atoms, to design routes for the production of ultracold molecules and to identify "window states" for stepwise excitation to higher triplet states. DVR has been useful for fitting data on mutually perturbing electronic states directly to analytic potentials plus spin-orbit or hyperfine interactions.