PREDISSOCIATION DYNAMICS OF THE $A^2\Sigma^+$ STATE OF THE SH RADICAL

A.J. ORR-EWING and R.A. ROSE, *School of Chemistry, University of Bristol, Bristol BS8 1TS, U.K.*; C.-H. YANG, K. VIDMA, and D.H. PARKER, *Institute for Molecules and Materials, University of Nijmegen, Toernooiveld 1, 6525 ED Nijmegen, the Netherlands*.

Velocity map imaging of the $S(^3P_{J=0,1,2})$ fragments from the predissociation of selected ro-vibrational levels of the $A^2\Sigma^+$ state of SH has been used to determine photofragment recoil anisotropies, branching into spin-orbit levels, and the electronic angular momentum polarization of the S atoms. The photofragment recoil anisotropies will be compared with predictions from a model by Houston and coworkers[a] that accounts for the effects of excited state lifetimes. These vibrational and rotational level dependent lifetimes were previously measured by cavity ring-down spectroscopy and modelled using Fermi Golden rule calculations.[b] The spin-orbit level branching and populations of m_J states, derived from the angular momentum polarization measurements, depend on the correlation of the repulsive states responsible for the $A^2\Sigma^+$ state predissociation to the asymptotic $H(^2S_{1/2}) + S(^3P_J)$ limits and non-adiabatic dynamics during the fragmentation.

[a] H. Kim, K.S. Dooley, S.W. North, G.E. Hall and P.L. Houston, *J. Chem. Phys.*, 125, 133316 (2006).
[b] M.D. Wheeler, A.J. Orr-Ewing and M.N.R. Ashfold, *J. Chem. Phys.*, 107, 7591 (1997).