MAPPING THE MOLECULAR OUTFLOWS OF THE HIGH EXCITATION RED SPIDER NEBULA (NGC 6537)

JESSICA L. EDWARDS, LUCY M. ZIURYS, *Department of Chemistry and Biochemistry, Department of Astronomy, Steward Observatory, The University of Arizona, Tucson, AZ 85721.*

The Red Spider nebula is a relatively young (~1,600 years), very high excitation Planetary Nebula (PN). It is one of the few PN that has been well classified in terms of its molecular content. A number of atomic emission lines, including high energy ions like [Si IV] and [Ne V], as well as H_2 and CO have been observed in this object. Remarkably, this very hot nebula is chemically-rich, as indicated by our recent molecular detections of CN, HCN, HNC, CCH, CS, SO, H_2CO, HCO^+ and N_2H^+. Fractional abundances with respect to H_2 range from $f(X) \sim 8 \times 10^{-9}$ - 2×10^{-7}. In order to further evaluate the extent of its chemical content and excitation conditions, a number of maps in multiple transitions of CO are being made using the Sub-Millimeter Telescope of the Arizona Radio Observatory. A map of the J = 3 $\rightarrow$ 2 transition at 345 GHz (22 arcsecond resolution) is partially completed. A map of the J = 4 $\rightarrow$ 3 line at 461 GHz is also in progress as well as measurements of the J = 6 $\rightarrow$ 5 transition near 691 GHz. These data will be analyzed to determine densities and temperatures in this nebula. Preliminary findings suggest that CO emission is coincident with the optical image of the Red Spider.