# INFRARED LASER SPECTROSCOPY OF $(HCl)_m(H_2O)_n$ CLUSTERS IN HELIUM NANODROPLETS

S. D. FLYNN, A. M. MORRISON, T. LIANG, G. E. DOUBERLY, *Department of Chemistry, University of Georgia, Athens, GA 30602.*

Small hydrogen chloride-water clusters are of great theoretical and experimental interest, with much recent attention focusing on HCl charge dissociation in small water clusters. We have employed Helium Nanodroplet Isolation techniques to definitively assign bands in the 2570-2900 $cm^{-1}$ range to specific $(HCl)_m(H_2O)_n$ clusters. Vibrational Transition Moment Angle (VTMA) analysis, dipole moment measurements, optically selected mass spectrometry (OSMS), pick up cell pressure dependence studies and *ab initio* calculations are all used together to arrive at the assignments. We will discuss these new assignments in the context of the vibrational dynamics of the $H_3O^+(H_2O)_{n>3}Cl^-$ charge separated species.