ORIENTED DYNAMICS IN VAN DER WAALS COMPLEXES

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The effects of relative orientation on collision and reaction dynamics can be examined by characterizing the unimolecular decay of van der Waals complexes. Most commonly, the decomposition is initiated by exciting one of the monomers within a complex, and the relative orientation is defined by the zero-point motions for the intermolecular degrees of freedom. However, if simultaneous excitation of the intermolecular degrees of freedom is achieved, a considerable range of starting configurations may be accessed.

We are currently studying the electronic spectroscopy of CN-H_2/D_2 and I_2-Rg complexes with the goal of using these systems to examine oriented dynamics. The first stage of this effort is spectroscopic characterizations and determinations of the intermolecular potential energy surfaces. These data are then used to define vibrational wavefunctions for the low-frequency intermolecular motions. Experiments that probe the dynamics of these states are in progress. In this presentation I will review the spectroscopic data, potential energy surface calculations, and recent results from dynamical studies of the CN-H_2/D_2 and I_2-Rg complexes.