OBSERVING CHEMICAL REACTIONS IN LOW-TEMPERATURE SUPERSONIC FLOWS USING CHIRPED PULSE FOURIER TRANSFORM MILLIMETER WAVE SPECTROSCOPY

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The CPUF (Chirped Pulse in Uniform Flow) technique has been used previously in pulsed CRESU (Reaction Kinetics in Uniform Supersonic Flow) conditions to observe chemical reactions at low temperatures. We have adapted the technique to the continuous CRESU flows available in Rennes, and have observed the products of photolysis and chemical reactions using a chirped pulse Fourier transform millimeter wave spectrometer. We have characterized the flow conditions suitable for observing products of reactions and provide limits to the performance of these systems. In particular, pressure broadening is found to dominate these measurements, so steps had to be taken to resolve as much of the free induction decays as possible. We also observe the products of chemical reactions, particularly of CN radicals with hydrocarbons. The behavior of these products in CRESU environments as well as the results from these studies will be given and the application to observing the branching ratios of chemical reactions will be discussed.