CHIRPED-PULSE FOURIER-TRANSFORM MICROWAVE/PULSED UNIFORM FLOW SPECTROMETER: THE LOW-TEMPERATURE, PULSED UNIFORM SUPERSONIC FLOW SYSTEM

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Traditional techniques (e.g. REMPI, imaging, etc.) that are used to study reaction dynamics are able to provide a great deal of fundamental information about systems containing atoms and smaller molecules. However, as larger molecules and more complex systems are targeted, it becomes more of a challenge to determine isomer- and vibrational level-specific information and accurate branching ratios. In order to complement existing methods and obtain information about larger systems, a Ka-band (26-40 GHz) chirped-pulse Fourier transform microwave (CP-FTMW) spectrometer has been has been constructed. The system integrates a pulsed uniform supersonic flow (PUSF) source to ensure that experimental conditions, such as temperature and density, are well-known and constant. This PUSF system is based around a high-throughput piezoelectric stack valve, a Laval nozzle, and simple pumping scheme. This system is able to produce cold, uniform flows with densities on the order of 10^{16} cm^{-3} that persist for up to 20 cm from the nozzle exit. A description of this system and its characterization will be presented.