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Observation of K-dependent Reaction Rates in Pulsed Uniform Supersonic Flows by Chirped-Pulse Microwave Spectroscopy BERNADETTE BRODERICK, NUWANDI ARIYASINGHA, ARTHUR SUITS, University of Missouri, UNIVERSITY OF MISSOURI TEAM — Chirped-pulse Fourier-transform microwave spectroscopy was used to interrogate the reaction of Cl atoms with propyne in a pulsed uniform supersonic flow. The technique, termed "CPUF", utilizes broad-band microwave spectroscopy to extract structural information with MHz resolution and near universal detection, in conjunction with a Laval flow system, which offers thermalized conditions at low temperatures and high number densities. Previous studies have exploited this approach to obtain multichannel product branching fractions in a number of polyatomic systems, with isomer and often vibrational level specificity. This report highlights an additional capability of the CPUF technique: here, the state-specific reactant depletion is directly monitored on a microsecond timescale. In doing so, a clear dependence on the rotational quantum number K in the rate of the reaction between Cl atoms and propyne is revealed. Future prospects for the technique will be discussed.

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