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Mapping Jet-cooled Molecular Beam Pulses Using (2+1) REMPI Technique WATHEQ AL-BASHEER, ANIS DRIRA, The University of Tennessee, Knoxville — In molecular spectroscopy, understanding the spatial and temporal characteristics of supersonically expanded and jet-cooled molecular beam pulses in vacuum chambers is pivotal in obtaining higher resolution, well-resolved, and enhanced signal to noise ratio. Measurements of (2+1) Resonantly Enhanced Multiphoton Ionization (REMPI) were manipulated to study the shape and structure of a few polar molecules beam pulses ($C_6H_{10}O$, CH_3CN, CH_3I) dissolved in commonly used carrier gases (He, N_2, Ar) with concentration range (0.1-5%). Non-resonant multi-photon ionization signal of the molecular samples will also be presented in comparison to the REMPI technique. Monitoring produced mass selected cations in a standard time-of-flight and MCP detection system, while varying time delay between sprayed pulses and laser shots interaction, shows a lorentzian like structure of molecular pulses with FWHM comparable to the pulses time duration. Injected molecular beam velocity can be deduced by observing the lorentzian peak center which is sensitive to sample backing pressure and the solvent gas used. Experimental results of the aforementioned samples will be presented and compared against theoretical simulations

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