USING A HIGH RESOLUTION MID-IR OPO FOR CHEMICAL DYNAMICS STUDIES OF HIGHLY EXCITED MOLECULES

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Quantum state-resolved energy flow dynamics are investigated for inelastic collisions of highly vibrationally excited molecules with HCl and DCl using high resolution transient IR absorption spectroscopy with a mid-IR OPO. Pyrazine molecules are optically pumped into high vibrational states with E_{vib} = 37,900 cm^{-1} using the quadrupled output Nd:YAG laser at λ = 266 nm. The state-resolved outcome of collisions is probed by measuring transient IR absorption for individual quantum states of HCl and DCl. The nascent energy partitioning among the rotational and translational degrees of freedom of the scattered HCl and DCl molecules is used to reveal how isotopic shifts in rotational energy states affect collisional energy transfer.