

Abstract Submitted  
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**Investigating Energy Transfer Dynamics of High J N<sub>2</sub>O Super Rotors**<sup>1</sup> TARA J. MICHAEL, HANNAH M. OGDEN, MATTHEW J. MURRAY, AMY S. MULLIN, Univ of Maryland-College Park — State resolved collision dynamics of N<sub>2</sub>O in high J states up to J = 205 were investigated by preparing super rotor molecules using an optical centrifuge. High resolution transient IR spectroscopy was used to measure Doppler-broadened transient line profiles for the J = 160, 180, and 195 rotational states at 5 Torr with signals at 50 ns corresponding to 2-3 gas kinetic collisions. The results show that the J = 160, 180, and 195 states have initial translational energies near 500 K, indicating that modest amounts of translational energy results from the first 3-5 gas kinetic collisions. Translational energy increases are seen as the collision number increases, showing that non-resonant energy transfer becomes important later in the collisional cascade. The translational temperatures for higher J states remain constant for longer periods of time, showing that thermal collisions of high J rotors are more adiabatic and have more near-resonant energy transfer.

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