Abstract Submitted
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Mapping the rapid time evolution of impulsively aligned deuterium molecules using intense few-cycle infrared laser pulses.[1] JARLATH MCKENNA, CHRIS CALVERT, IAN WILLIAMS, Queens University Belfast, WILLIAM BRYAN, ELIZABETH ENGLISH, JOSEPH WOOD, ROY NEWELL, University College London, RICARDO TORRES, Imperial College London, EDMOND TURCU, Rutherford Appleton Laboratory — Short intense laser pulses have recently become a viable and efficient method of impulsively inducing alignment of molecules, ranging from simple diatomics to more exotic structures. Key to the widespread applicability of this technique is that the maxima and minima of alignment occur under field-free conditions at delayed periodic intervals corresponding to the quantum rotational revival of the system. In effect, the laser pulse creates a coherent superposition of the rotational states of the molecule which undergo a quantum dephasing and rephasing as the system evolves in time. We present here an experiment where we use few-cycle infrared laser pulses to induce and map the ultrafast field-free alignment of deuterium molecules starting from a randomly distributed ensemble at room temperature. The results, including angular distribution measurements, are compared to theory which describes the experimental data to a high degree.

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