

Abstract Submitted
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Orientation of “asymmetric-top” water molecules with shaped terahertz fields CATHERINE HERNE, University of Michigan, PHILIP BUCKS-BAUM, Stanford University — We demonstrate orientation of the asymmetric top water molecule with a programmable series of half-cycle terahertz pulses. Molecular orientation or alignment controls initial conditions and reduces random spatial orientations of molecules, and is essential for efficient generation of high-order harmonics and many other processes. Our experimental evidence confirms what has until now only been theoretically considered; the orientation of asymmetric tops. The application of a sequence of broadband half-cycle pulses to an ensemble of water molecules in the gas phase initiates a sequence of orientation revivals. Two parallel pulses with optimal pulse separation are shown to enhance the degree of orientation and restrict motion about the most polarizable molecular axes.

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