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Dynamical Localization in Kicked Quantum Rotors[1] ANDREI KAMALOV, DOUGLAS BROEGE, PHILIP H. BUCKSBAUM, SLAC - Natl Accelerator Lab — The quantum periodically δ-kicked rotor has been shown to experience localization within angular momentum space, rotational wavepacket amplification or annihilation, and Bloch oscillations, amongst other effects, depending on the choice of time-separation between individual kicks. Localization within rotation state space has been linked to Anderson localization within 1-D chains, and has been extensively studied with calculations. Previous experiments used cold atoms in optical lattices to measure a related localization phenomenon. We utilize a train of eight femtosecond scale pulses and compare the molecular alignment signal of a true quantum linear rotor at room temperature when it is kicked periodically and aperiodically. Our data is the first observation of the much studied dynamical localization phenomenon within the quantum rotor.

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