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Experimental observation of Anderson localization in laser-kicked molecular rotors. MARTIN BITTER, VALERY MILNER, University of British Columbia — For the first time, the phenomenon of Anderson localization is observed and studied in a system of true quantum kicked rotors. Nitrogen molecules in a supersonic molecular jet are cooled down to 27 K and are rotationally excited by a periodic train of 24 high-intensity femtosecond pulses. Exponential distribution of the molecular angular momentum - the most unambiguous signature of Anderson localization - is measured directly by means of coherent Raman scattering. We demonstrate the suppressed growth of the molecular rotational energy with the number of laser kicks and study the dependence of the localization length on the kick strength. Both timing and amplitude noise in the pulse train is shown to destroy the localization and revive the diffusive growth of angular momentum.

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