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Quantum Chaos and Entanglement for Two Coupled Spins[1] COLLIN TRAIL, IVAN DEUTSCH, University of New Mexico, LEIGH NORRIS, PARIN SRIPAKDEEVONG, ARJENDU PATTANAYAK, Carleton College — We explore the relationship between classical chaos and the generation of quantum entanglement in a system of two coupled and driven "tops" e.g. electron angular momentum and nuclear spins coupled by the hyperfine interaction and driven by an applied time varying magnetic field. Chaos arises here through the coupling and time dependent drive, rather than the coupling of independently chaotic subsystems, as has been previously studied. Using the same Hamiltonian to generate both classical and quantum dynamics, we find that the long time averages of the entanglement generated between two initially uncoupled coherent spin states correlates with the structure of the mixed classical phase space and interpret these results.

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