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Abstract

Chaotic Entanglement: Entropy and Geometry †

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In chaotic entanglement, pairs of interacting classically-chaotic systems are induced into a state of mutual stabilization that can be maintained without external controls and that has been shown to exhibit several properties consistent with quantum entanglement. In such a state, the chaotic behavior of each system is stabilized onto one of the system's many unstable periodic orbits (generally located densely around an associated attractor), and the ensuing periodicity of each system is sustained by the symbolic dynamics of its partner system, and vice versa. Notably, chaotic entanglement is an entropy-reversing event: the entropy of each member of an entangled pair decreases to zero during each system's collapse to the given period orbit. In this talk, we further discuss the role that entropy plays in chaotic entanglement. We also discuss the geometry that arises when pairs of entangled chaotic systems organize into coherent structures that range in complexity from simple tripartite lattices to more involved patterns. The talk will conclude with a discussion of future research directions.