

Abstract Submitted
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Demonstration of Quantum Entanglement in an Analog Electronic Device¹ BRIAN LA COUR, GRANVILLE OTT, GARY WILSON, MARTI BARLETT, The University of Texas at Austin — There are a surprising number of classical analogs to phenomena generally regarded as uniquely quantum in nature. We consider one such analog that uses complex basebanded signals in a classical electronic device to represent a multi-qubit quantum state. Formally, such a representation is capable of reproducing the mathematical structure of a tensor-product Hilbert space. In particular, entangled bipartite states can be represented in this manner. As a demonstration of this concept, we describe an experiment using an analog electronic device capable of emulating an arbitrary two-qubit system. We then show how, using a pair of independent “Alice” and “Bob” analog measurement devices, one can achieve correlations in violation of Bell’s inequality, much as those found in optical tests of quantum nonlocality.

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