

Abstract Submitted
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Channel Activation of CHSH-nonlocality¹ RODRIGO ARAIZA BRAVO², Department of Physics, Harvard University, YUJIE ZHANG³, VIRGINIA O. LORENZ, Department of Physics, University of Illinois at Urbana-Champaign, ERIC CHITAMBAR, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, ILLINOIS QUANTUM INFORMATION SCIENCE AND TECHNOLOGY CENTER (IQUIST) TEAM — The production and use of nonlocal states are of fundamental importance in many quantum information protocols. Yet, the nonlocality of a state can be destroyed due to noisy communication channels. In this work, we analyze quantum channels that model several classes of experimental noise and that prohibit transmission of CHSH-nonlocal states. We call these quantum channels CHSH-breaking. We demonstrate that by combining two CHSH-breaking channels, we can recover a CHSH-violating outcome, therefore activating the CHSH-nonlocality of the quantum channels. We find that this type of activation can emerge in both uni-directional and bi-directional communication scenarios with robustness against errors in the channels' preparation. Our results are an important step towards more reliable quantum communication that requires transmission of nonlocal resources through networks.

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