Local two-level PT symmetric system violates no-signalling condition YI-CHAN LEE, Physics Department, National Tsing-Hua University, MIN-HSIU HSIEH, Center of Quantum Computation and Intelligent Systems, Faculty of Engineering and Information Technology, University of Technology, Sydney, STEVEN FLAMMIA, School of Physics, University of Sydney, RAY-KUANG LEE, Institute of Photonics Technologies, National Tsing-Hua University — We examine $\mathcal{PT}$ symmetric quantum theory by considering a composite physical system. The parties of this composite system are spatially separated and each hold half of a part of a maximally entangled state. According to the transition rule between Hermitian quantum systems and $\mathcal{PT}$ symmetric quantum systems which is used in previous literature, the existence of a local $\mathcal{PT}$ symmetric quantum system will cause a violation of the non-signalling condition. Our results reveal that either the transition rules need to be modified or $\mathcal{PT}$ symmetric quantum theory is not a local theory.

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