

Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

**Quantum Channels that cannot Transmit Quantum Correlations
can Generate Quantum Entanglement from Classical Correlation¹**

LASZLO GYONGYOSI, Budapest University of Technology and Economics, Hungarian Academy of Sciences, SANDOR IMRE, Budapest University of Technology and Economics — One of the most fundamental questions in the development of future communication networks is the process of entanglement transmission. If it were possible to find quantum channels that could generate entanglement between two distant points without sending the entanglement itself over the links, then we could dramatically reduce the cost of development of future quantum communication networks. We prove that the noise transformation of quantum channels that are not able to transmit quantum entanglement can be used to generate entanglement from classically correlated, fully separable unentangled input. We call this new phenomenon the Correlation Conversion property (CC-property) of quantum channels. The proposed solution does not require any local operations or local measurement, only the use of standard quantum channels. Our results have serious implications and fundamental consequences for the future of quantum communications, and for the development of global-scale quantum communication networks. It also makes possible to reduce dramatically the cost of development of global quantum communication networks and quantum repeaters.

¹The results discussed above are supported by the grant TAMOP-4.2.2.B-10/1-2010-0009 and COST Action MP1006.

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Date submitted: 23 Jan 2013

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