

Abstract Submitted
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Quantum Polar Coding for Noisy Optical Quantum Channels¹

LASZLO GYONGYOSI, SANDOR IMRE, Budapest University of Technology and Economics — Polar channel coding is a revolutionary encoding and decoding scheme, which makes possible the construction of codewords to achieve the symmetric capacity of noisy communication channels. Here, we show that by using quantum polar codes, the symmetric classical capacity of noisy optical quantum channels can be achieved. We also demonstrate the existence of quantum polar codes capable of transmitting classical information privately, although initially these channels had zero private classical capacity. As we prove, there also exist polar coding-based codewords for the transmission of quantum entanglement; however, these channels are so noisy that they cannot transmit any quantum information.

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Laszlo Gyongyosi
Budapest University of Technology and Economics

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