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Demonstration of local teleportation using classical entanglement

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Teleportation is the most widely discussed application of the basic principles of quantum mechanics. Fundamentally, this process describes the transmission of information, which involves transport of neither matter nor energy. The implicit assumption, however, is that this scheme is of inherently nonlocal nature, and therefore exclusive to quantum systems. Here, we show that the concept can be readily generalized beyond the quantum realm. We present an optical implementation of the teleportation protocol solely based on classical entanglement between spatial and modal degrees of freedom, entirely independent of non-locality. Our findings could enable novel methods for distributing information between different transmission channels and may provide the means to leverage the advantages of both quantum and classical systems to create a robust hybrid communication infrastructure.

Biography

Marco Ornigotti has completed his PhD in Physics from the Polytechnic Institute of Milan in Italy and has done his Post-doctoral studies at the Max Planck Institute for the Science of Light from 2010-2013 in the Optics Theory Group led by Dr. Aiello. Currently, he is pursuing his second Postdoctoral degree from the Friedrich Schiller University in Jena. He is a well-recognized scientist in the community of Optical Beams and the Angular Momentum of Light, with more than 20 publications in reputed international journals.

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