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Title:	Quantum imaging of a polarisation sensitive phase pattern with hyper-entangled photons
Authors:	Kaur, Manpreet (/jspui/browse?type=author&value=Kaur%2C+Manpreet) Singh, Mandip (/jspui/browse?type=author&value=Singh%2C+Mandip)
Keywords:	Optics photonics Physics
Issue Date:	2021
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Citation:	Scientific Reports, 11(1).
Abstract:	A transparent polarisation sensitive phase pattern makes a polarisation dependent transformation of quantum state of photons without absorbing them. Such an invisible pattern can be imaged with quantum entangled photons by making joint quantum measurements on photons. This paper shows a long path experiment to quantum image a transparent polarisation sensitive phase pattern with hyper-entangled photon pairs involving momentum and polarisation degrees of freedom. In the imaging configuration, a single photon interacts with the pattern while the other photon, which has never interacted with the pattern, is measured jointly in a chosen polarisation basis and in a quantum superposition basis of its position which is equivalent to measure its momentum. Individual photons of each hyper-entangled pair cannot provide a complete image information. The image is constructed by measuring the polarisation state and position of the interacting photon corresponding to a measurement outcome of the non-interacting photon. This paper presents a detailed concept, theory and free space long path experiments on quantum imaging of polarisation sensitive phase patterns.
Description:	Only IISERM authors are available in the record
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