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Quantum interference of topological states of light[1]

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The introduction of topological concepts into photonics has opened up many exciting avenues of research. Much of this activity has been focused on the experimental observation of topologically-protected edge states in systems ranging from photonic crystals and metamaterials in the microwave domain, to arrays of coupled waveguides, and integrated silicon ring resonators in the visible domain. In all of these works, spatially-periodic dielectric structures act as lattices for light which, in combination with an engineered synthetic gauge field, lead to topological photonic energy bands. The resulting topological boundary states exhibit remarkable properties such as unidirectional propagation and robustness to noise that offer an opportunity to improve the performance and scalability of quantum technologies. For quantum applications, it is essential that the topological states are indistinguishable. I will report high-visibility quantum interference of two single-photon topological states in an integrated photonic circuit waveguide array, and observe a Hong-Ou-Mandel interference with 93.1 2.8

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