

Abstract Submitted
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Implementing quantum Fourier transform with integrated photonic devices¹ GELO NOEL TABIA, Perimeter Institute for Theoretical Physics — Many quantum algorithms that exhibit exponential speedup over their classical counterparts employ the quantum Fourier transform, which is used to solve interesting problems such as prime factorization [1]. Meanwhile, nonclassical interference of single photons achieved on integrated platforms holds the promise of achieving large-scale quantum computation with multipoint devices [2]. An optical multipoint device can be built to realize any quantum circuit as a sequence of unitary operations performed by beam splitters and phase shifters on path-encoded qudits. In this talk, I will present a recursive scheme for implementing quantum Fourier transform with a multimode interference photonic integrated circuit.

[1] P.W. Shor, SIAM J. Comput. 26, 1484-1509 (1997).

[2] A. Politi, M. J. Cryan, J. G. Rarity, S. Yu, J. L. O'Brien, Science 320, 646-649 (2008).

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Gelo Noel Tabia
Perimeter Institute for Theoretical Physics

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