

If possible schedule directly before Universal Linear Optics: A Testbed for Optical Quantum Logic, author Chris Sparrow.

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Universal Linear Optics: An implementation of Boson Sampling on a Fully Reconfigurable Circuit CHRISTOPHER HARROLD, JACQUES CAROLAN, CHRIS SPARROW¹, NICHOLAS J. RUSSELL, JOSHUA W. SILVERSTONE, GRAHAM D. MARSHALL, MARK G. THOMPSON, JONATHAN C.F. MATTHEWS, JEREMY L. O'BRIEN, ANTHONY LAING, University of Bristol, ENRIQUE MARTIN-LPEZ, Nokia Technologies, Cambridge, PETER J. SHADBOLT, Imperial College London, NOBUYUKI MATSUDA, NTT Basic Research Laboratories, NTT Corporation, MANABU OGUMA, MIKITAKA ITOH, TOSHIKAZU HASHIMOTO, NTT Device Technology Laboratories, NTT Corporation — Linear optics has paved the way for fundamental tests in quantum mechanics and has gone on to enable a broad range of quantum information processing applications for quantum technologies. We demonstrate an integrated photonics processor that is universal for linear optics. The device is a silica-on-silicon planar waveguide circuit (PLC) comprising a cascade of 15 Mach Zehnder interferometers, with 30 directional couplers and 30 tunable thermo-optic phase shifters which are electrically interfaced for the arbitrary setting of a phase. We input ensembles of up to six photons, and monitor the output with a 12-single-photon detector system. The calibrated device is capable of implementing any linear optical protocol. This enables the implementation of new quantum information processing tasks in seconds, which would have previously taken months to realise. We demonstrate 100 instances of the boson sampling problem with verification tests, and six-dimensional complex Hadamards.

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