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Quantum tomography of photon number statistics using integrated optical circuits¹ BENJAMIN SZAMOSFALVI, SEQUOIA PLOEG, HYRUM GUNTHER, RYAN CAMACHO, Brigham Young University — We propose a chip-scale photonic circuit for photon number state tomography. The circuit consists of conjugate homodyne receivers and implements a protocol recently proposed by Qi, Lougovski and Williams. We characterize the wavelength-dependent scattering parameters of the device and demonstrate the ability to reconstruct the photon number statistics of an unknown quantum state without single photon detectors or knowledge of the phase of the input states or local oscillator. These results may be useful for chip-scale quantum information processing tasks in communications, sensing, and computing.

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