Speaker: Hwang Lee

Title:
Linear-optics quantum computation: A group-theoretical analysis.

The idea of Linear Optical Quantum Computing (LOQC) suggests that an effective optical nonlinearity at a single-photon level can be generated utilizing linear optics and single-photon detectors, opening a perspective for all-optical quantum computation. We analyze a maximum amount of nonlinearity that can be achieved in a multi-mode linear optical device as a result of a projective measurement of photons in one of the modes utilizing a Cartan decomposition of an underlying unitary group describing the device. Using this approach, we show an existence of an optimal realization of nonlinear sign gate and discuss possible realizations of two-qubit gates for a dual-rail encoding.