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(54) Title: SCALABLE PHOTONIC QUANTUM COMPUTING WITH HYBRID RESOURCE STATES

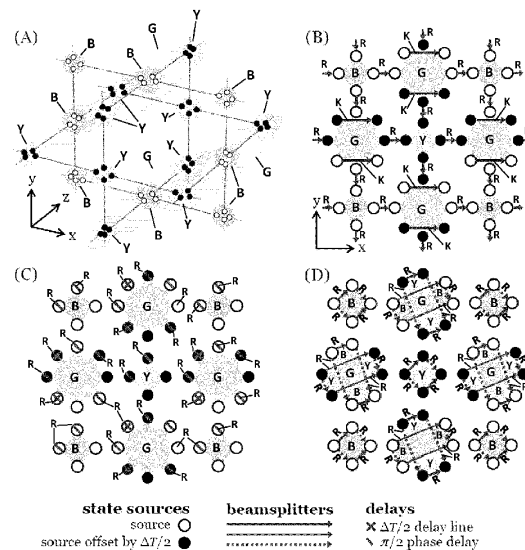


FIG. 12

(57) Abstract: A system for scalable, fault-tolerant photonic quantum computing includes multiple optical circuits, multiple photon number resolving detectors (PNRs), a multiplexer, and an integrated circuit (IC). During operation, the optical circuits generate output states via Gaussian Boson sampling (GBS), and the PNRs generate qubit clusters based on the output states. The multiplexer multiplexes the qubit clusters and replaces empty modes with squeezed vacuum states, to generate multiple hybrid resource states. The IC stitches together the hybrid resource states into a higher-dimensional cluster state that includes states for fault-tolerant quantum computation.

[Continued on next page]



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