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A photonic cluster state machine gun TERRY RUDOLPH, Imperial College London, NETANEL LINDNER, Technion Institute, SOPHIA ECONOMOU, Naval Research Lab — A method is developed to convert certain single photon sources into devices capable of emitting large strings of photonic cluster state in a controlled and pulsed "on demand" manner. Such sources greatly alleviate the resources required to achieve linear optical quantum computation. Standard spin errors, such as dephasing, are shown to affect only 1 or 2 of the emitted photons at a time. This allows for the use of standard fault tolerance techniques. Using realistic parameters for current quantum dot sources, we conclude high entangled-photon emission rates are achievable, with Pauli-error rates less than 0.2%. For quantum dot sources the method has the added advantage of circumventing the problematic issue of obtaining identical photons from independent, non-identical quantum dots. By using recently controlled-phase gates between two spins in neighboring quantum dots, a two-dimensional cluster can be generated.

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