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Multiqubit entanglement and photonic localization in waveguide quantum electrodynamics (QED)[1] IMRAN MIRZA, JOHN SCHOTLAND, Univ of Michigan - Ann Arbor — Chiral nanophotonic waveguides [Nature, 541, 473-480 (2017)], in which photonic emission can be set preferential in a particular direction, has seen a tremendous progress over the past few years. In particular, the applications of such waveguide-emitter platforms have shown promising applications in quantum communications and quantum information processing. In this talk, we'll discuss how waveguide chirality can enhance and prolong few-photon induced entanglement among many qubits in one-dimensional geometry [Phys. Rev. A 94, 012302 and 012309 (2016)]. Moreover, we'll also present how the presence of the qubit position disorder can form localized and extended photonic states which opens the possibility of using these waveguide QED setups as reliable single photon quantum memories.

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