

Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Disordered dimer chains in waveguide quantum electrodynamics¹

IMRAN MIRZA, Macklin Quantum Information Sciences, Department of Physics, Miami University, Ohio, JOHN SCHOTLAND, Department of Mathematics and Physics, University of Michigan Ann Arbor, MACKLIN QUANTUM INFORMATION SCIENCES, DEPARTMENT OF PHYSICS, MIAMI UNIVERSITY, OHIO TEAM, DEPARTMENT OF MATHEMATICS AND PHYSICS, UNIVERSITY OF MICHIGAN, ANN ARBOR TEAM — Cold atoms trapped near optical fibers provide an excellent experimental setup to study single-photon propagation in periodic and disordered dimer chains (pair of atoms coupled through dipole-dipole interaction). The confinement of light in sub-wavelength fibers creates optical spin-orbit coupling which opens up the possibility of chiral photon emissions (preferential emission directions) into the waveguide [*“Chiral quantum optics”*, Nature 541, 473-480 (2017)]. By considering two types of position disorders, namely the disorder in the dimer length and dimer separation, we study how dipole-dipole interaction along with the chiral photon emissions impacts the transport of photons [*“Dimer chains in waveguide quantum electrodynamics”* arXiv: 1808.10048]. This study has relevance to the area of quantum communication and to the photonic analog of many-body1D disordered models of condensed matter physics. -/abstract-

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Date submitted: 03 Mar 2019

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