

# **Strong correlated multi-photon transport in photonic crystal waveguide coupled to a two-level system**

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We show that two-photon transport is strongly correlated in one-dimensional waveguide, such as a line defect waveguide in a photonic crystal, coupled to a two-level system. The exact S-matrix is constructed using a generalized Bethe-Ansatz technique. We show that the scattering eigenstates of this system include a two-photon bound state that passes through the two-level system as a composite single particle. Also, the two-level system can induce effective attractive or repulsive interactions in space for photons. This general procedure can be applied to the Anderson model as well