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Resonant excitation of off channel localized impurity modes by the modes of a photonic crystal waveguide ARTHUR MCGURN, Western Michigan University — A theoretical treatment is presented of the electromagnetic transmission properties of a photonic crystal waveguide that interacts with off channel dielectric impurities, impurity clusters, neighboring waveguides, or neighboring waveguide networks. The photonic crystal studied is a two-dimensional square lattice array of parallel axis dielectric cylinders (formed of linear dielectric medium) in vacuum, and impurities and waveguides are created by cylinder replacement. The waveguide whose transmission is calculated is formed from linear dielectric media, but the off channel features that it interacts with may be formed from either linear or Kerr nonlinear dielectric media. The off channel features may also be composed of dissipative or amplifying media. Waveguide transmission resonances, associated with resonant scattering from electromagnetic modes on the off channel features, are found. Modes present on off channel features formed from linear dielectric media include both propagating and localized modes. Modes present on off channel features formed from Kerr nonlinear dielectric media include simple localized and intrinsic localized (soliton like) modes.

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