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Hollow Quantum Dot Shells: Optical Response Function Analysis JARED MAXSON, SLAVA V. ROTKIN, Lehigh University Department of Physics — We consider the response of finite two-dimensional lattice shells of coupled quantum dots, approximated as dipoles, to an applied external electric field. We assume that the lattice constant is much smaller than the wavelength of applied electric field, to provide a coherent excitation. Using the matrix Green's function and Coupled Dipole Hamiltonian, the response function is derived and analyzed numerically. Treating the dipole coupling as a parameter, the response function of an entirely decoupled lattice is calculated, from which the coherence effects are identified in the fully coupled case. The effect of hollowness is considered, in which optical resonator effects are determined, resulting from the matching of the radius of the cylindrical shell to the light wavelength. The response function is decomposed into partial response functions due to individual modes, in which the polarization dependence is determined by altering the orientation of the incident field.

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