J Laser Opt Photonics 2018, Volume:5
DOI: 10.4172/2469-410X-C2-027

Dispersion of electromagnetic excitations in a non-ideal lattice of coupled microcavities containing quantum dots

Vladimir V Rumyantsev
Donetsk Institute for Physics and Engineering, Ukraine

Photonic structures and metamaterials are in the focus of theoretical and experimental interdisciplinary studies, which span laser physics, condensed matter physics, nanotechnology and information science. The important features of photonic band-gap structures under discussion are connected with slow light, which is one of the promising fundamental physical phenomena that can be explored in the design of various quantum optical storage devices. In particular, the effective reduction of the group velocity was demonstrated in the associated optical waveguide resonators. Based on the representations of the ideal photonic structures, the non-ideal system of this class - polaritonic crystal, which is a set of spatially ordered microcavities containing ultracold atomic clusters, is studied. We considered 1D and 2D polaritonic crystals as topologically ordered systems of coupled microcavities containing quantum dots. The peculiarities of polariton spectrum in the 1D or 2D lattice of microcavities caused by the structural defects and uniform elastic deformation are considered. It is shown that in this case it is possible to achieve the necessary changes of the energy structures and optical properties caused by the restructuring of the polariton spectrum. Numerical modeling of dependence of the dispersion of polaritons in the studied lattices of coupled microresonators on an elastic deformation and the concentration of defects is completed. Using the virtual crystal approximation, the analytical expressions for polaritonic frequencies, effective mass and group velocities as functions of components of the strain tensor are obtained. These results enable to extend the possibility of creating a new class of functional materials - polaritonic crystal systems.

rumyants@teor.fti.ac.donetsk.ua

Structure of Electron, Proton and Neutron

M. J. Faraji, Gh. Saleh, R. Alizadeh, A. Dalili
Saleh research centre, Shiraz, Fars, Iran

Superstring Theory is an attempt to explain all the particles and fundamental forces of nature in a single theory, by modeling them, as vibrations of tiny supersymmetric strings . If we assume that the smallest massive particle which constructs the whole universe is such tiny supersymmetric or consists of several tiny supersymmetric, it can be seen that electron, proton, neutron, etc. as basic subatomic particles are also composed of these particles.

Now assume that electrons, protons and neutrons are consists of these smallest massive particles. Surely the difference between the constructions of them is described with the numbers and positioning of these smallest massive particles that we named “Angel Particle”. Physicists consider a continuous texture for proton but we calculate and show that it is not possible for electrons or neutrons.

Faraji.photonic@gmail.com