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## Polaritons in defect-containing lattice of coupled microcavities under elastic deformation

**Vladimir V Rumyantsev**
A A Galkin Donetsk Institute for Physics and Engineering, Ukraine

Utilization of novel materials for designing the sources of coherent irradiation has become an extensive interdisciplinary scientific area, which includes laser physics, condensed matter physics, nanotechnology, chemistry, and information science. Special attention is paid to possibilities of controlling the propagation of electromagnetic excitations in resulting composite structures by subjecting them to various kinds of external actions such as e.g. elastic strains. The advent of optoelectronic devices has created an ever growing interest for optical modes in microcavity systems. A rapidly developing area is currently the photonics of imperfect structures. Some of our previous works are devoted to optical activity of imperfect structures and to dispersion of exciton-like electromagnetic excitations in defect-containing lattices of tunnel-coupled microcavities. In these studies it was demonstrated that electromagnetic spectrum and optical properties of materials can be manipulated by introduction of appropriate defects or subjecting them to carefully chosen external action. In the present work we elaborate the results of Refs. [4, 5] and on this basis investigate a topologically ordered microcavity system composed of tunnel-coupled microresonators. Particular attention is paid to the effect of uniform elastic stress on the spectrum of the polariton excitations in the coupled microcavities array with embedded quantum dots. This chain of cavities has a randomly located defects in composition (with concentration of $C_C$) and distances between the pores (with a concentration of $C_T$ ). The peculiarities of polariton spectrum in the 1D lattice of microcavities caused by uniform elastic deformation ($\varepsilon$ is a corresponding component of strain tensor) of the structure are considered as well. The results of numerical calculation performed on the basis of the constructed model contribute to modeling of the new class of functional materials—photonic crystalline system constituted of couple microcavities. Their capabilities include the controllable propagation of electromagnetic excitations.

rumyants@dfti.donbass.com