

## Nanooptics and photonics

### Temperature spectra of conductance of Ge/Si p-i-n structures with Ge quantum dots

**I.I. Izhnin<sup>1,2</sup>, E.I. Fitsych<sup>1</sup>, A.A. Pishchagin<sup>2</sup>, A.V. Voitsekhovskii<sup>2</sup>, A.P. Kokhanenko<sup>2</sup>, V.Yu. Serokhvostov<sup>2</sup>, S.M. Dzyadukh<sup>2</sup>, A.I. Nikiforov<sup>2,3</sup>**

<sup>1</sup> Scientific Research Company "Carat", 202 Stryjska St., Lviv-79031, Ukraine.  
E-mail: i.izhnin@carat.electron.ua

<sup>2</sup> National Research Tomsk State University, Lenin Av. 36, Tomsk- 634050, Russia.

<sup>3</sup> Rzanov Institute of Semiconductor Physics SB RAS, Ac. Lavrentiev Av, 13, Novosibirsk- 630090, Russia.

Currently optoelectronics is experiencing rapid development, and the main objects of research are complex heterostructures with nanoscale inclusions. New types of photodetectors based on silicon-germanium low-dimensional heterostructures using intrasubband and intersubband transitions are intensively being developed. Such devices may be used in optoelectronic communication systems and remote monitoring. [1,2].

This paper shows the possibility of studying silicon p-i-n-structures with germanium quantum dots by the method of admittance spectroscopy. Two peaks are observed on the temperature dependences of conductance of the investigated nanoheterostructures. The first peak is observed at any bias voltage, the second peak is observed in the narrow voltage range. Position of the first peak does not depend on the applied bias voltage, the second peak is shifted on temperature scale with changing the bias voltage from 1 V to 2 V. For both peaks corresponding activation energies were calculated. The first peak of the temperature dependence of conductance may be associated with the impurity level in Si. The second peak is explained by the presence of spatial quantization levels in the system associated with Ge quantum dots.

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2. Lozovoy K. A., Voytsekhovski, A. V., Kokhanenko A. P., Satdarov V. G., Pchelyakov O.P., Nikiforov A.I. Heterostructures with self-organized quantum dots of Ge on Si for optoelectronic devices // *Opt El Rev.* - 2014.- **22**, N 3. -P. 6-12.