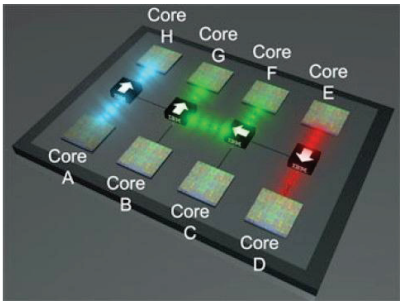
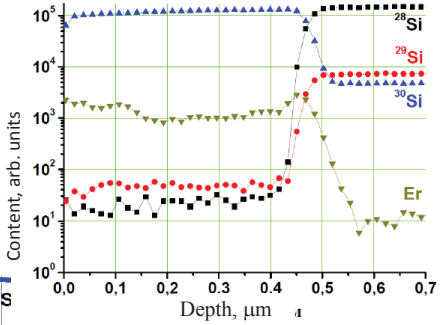
Research (What is it about?)	**Monoisotopic Si, Ge and $Si_{1-x}Ge_x$ alloy layers for Si photonics**
UNN authors	*Shengurov V.G., Ezhevskii A.A., Denisov S.A., Chalkov V.Yu., Detochenko A.P., Mashin A.I., Nezhdanov A.V., Trushin V.N.*
We find (The result)	Epitaxially grown ***monoisotopic*** Si, Ge, and $Si_{1-x}Ge_x$ layers of high crystal quality has been produced
Abstract	Silicon chips are the basis of modern processors. The limiting element for higher production of them (silicon electronics) are optical connections. High speed optical fibers characterize the ineligible sizes and technology for chips. For higher speed the transition to silicon photonics it is necessary. One of the problems to do that is a technology for the production of silicon of a specified isotope composition. We demonstrate the technology of the growth of Si, Ge, and $Si_{1-x}Ge_x$ layers by molecular-beam epitaxy with the use of a sublimation source of monoisotopic ^{30}Si or ^{28}Si and/or gas sources of monogermane $^{74}GeH_4$. All of the epitaxial layers are of high crystal quality. The secondary-ion mass spectroscopy data and Raman data suggest the high isotopic purity (99.9%) and structural perfection of the ^{30}Si, ^{28}Si, ^{74}Ge, and $^{30}Si_{1-x}{}^{74}Ge_x$ layers. The ^{30}Si layers doped with Er exhibit an efficient photoluminescence signal. The most promising field of application of monoisotopic silicon, germanium, or their alloys ($^{28}Si_{1-x}{}^{74}Ge_x$, $^{30}Si_{1-x}{}^{74}Ge_x$) is the engineering of devices for quantum calculations, specifically, for a quantum computer.

Representative articles 2016-2017, quartiles	1. *Detochenko A.P., S.A. Denisov, M.N. Drozdov, A.I. Mashin, V.A. Gavva, A.D. Bulanov, A.V. Nezhdanov, A.A. Ezhevskii, M.V. Stepikhova, V.Yu. Chalkov, V.N. Trushin, D.V. Shengurov, V.G. Shengurov, N.V. Abrosimov, H. Riemann.* Epitaxially grown monoisotopic Si, Ge, and $Si_{1-x}Ge_x$ alloy layers: production and some properties. Semiconductors. **50**(3), 345-348 (2016).	Q4
	Q-index (Qi) of the result	**1**

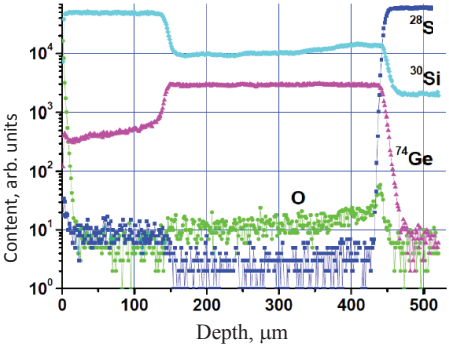
In collaboration	Russian Acad Sci, Devyatykh Inst Chem High Pur Subst, Nizhnii Novgorod 603950, Russia Russian Acad Sci, Inst Phys Microstruct, Nizhnii Novgorod 603950, Russia Leibniz Inst Crystal Growth, D-12489 Berlin, Germany



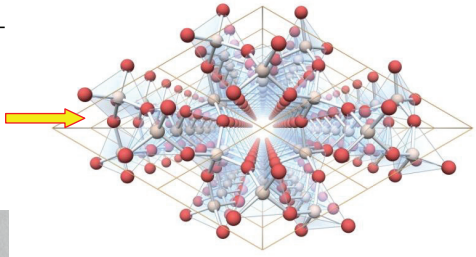
Internuclear communication in a silicon photonics processor.



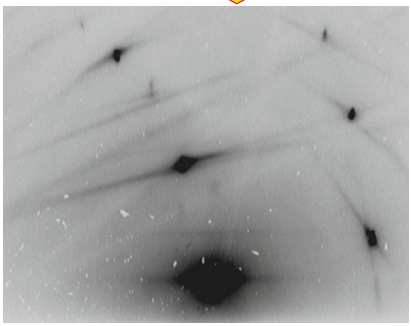
0.45-μm-thick Si layer deposited from a monoisotopic ^{30}Si source onto a Si(100) substrate: the determination of the purity of the layer and the sharpness of the layer–substrate interface.

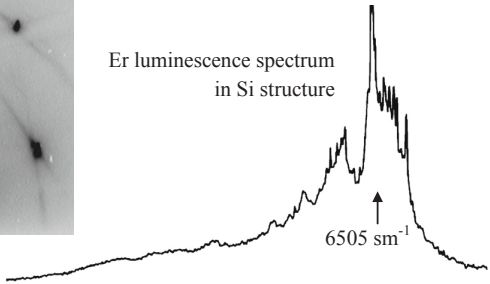


Monoisotopic $Si_{1-x}Ge_x$ heterostructure.



The silicon structure of high crystal quality is confirmed by diffraction of electrons picture





Er luminescence spectrum in Si structure