Research (What is it about?)	**Effective InGaAs/GaAs/AlGaAs laser for CMOS technologies**
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We find (The result)	The InGaAs/GaAs/AlGaAs laser on a ***non-inclined*** Si(001) substrate at room temperature has been first created
Abstract	Complimentary metal-oxide semiconductor technology (CMOS) on silicon is the basic one for modern processors. To increase the production of those processors it is necessary to replace electric (copper) connections to optic ones. Semiconductor GaAs/AlGaAs lasers can provide that optic connections. But the problem is that CMOS technologies developed for strictly oriented along (001) crystallographic axis silicon substrates while GaAs/AlGaAs lasers work on Si substrates which noticeably diverge from (001) axis for reducing defects on the boundaries of different materials. We show that the use of buffer Ge layer can significantly suppress the defect emergence even on a non-inclined Si(001) substrate and possessed rather good crystalline quality and smooth surface so provided the subsequent growth of the high-quality InGaAs/GaAs/AlGaAs heterostructure. On the basis of this structure with three InGaAs quantum wells we create laser diode with waveguide of 20 μm width and 2.7 mm length which has the threshold current density 5.5 kA/cm^2 at ***room temperature***. It radiates at 992 nm wavelength in 1 μs pulses with the duty cycle 400 Hz.

Representative articles 2016-2017, quartiles	1. *Aleshkin V.Ya., Baidus N.V., Dubinov A.A., Fefelov A.G., Krasilnik Z.F., Kudryavtsev K.E., Nekorkin S. M., Novikov A.V., Pavlov D.A., Samartsev I.V., Skorokhodov E.V., Shaleev M.V., Sushkov A.A., Yablonskiy A.N., Yunin P.A., Yurasov D.V.* Monolithically integrated InGaAs/GaAs/AlGaAs quantum well laser grown by MOCVD on exact Ge/Si(001) substrate. Appl. Phys. Letts. **109**:061111 (2016).	Q1
	Q-index (Qi) of the result	**4**

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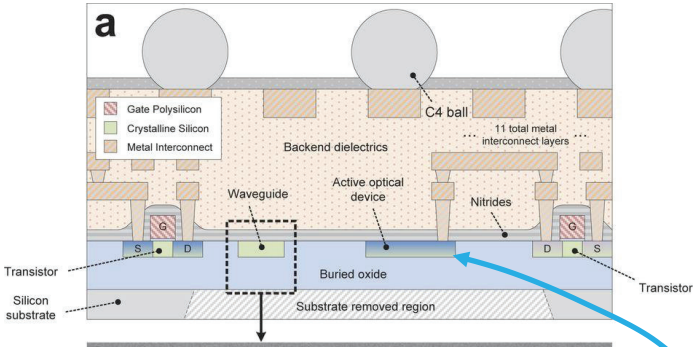
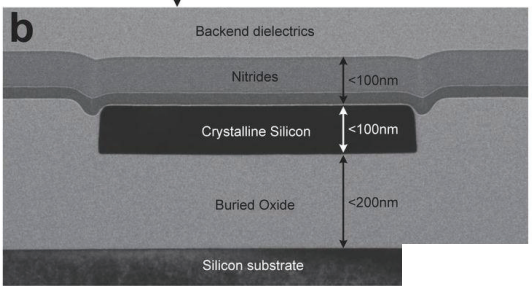


Microprocessor with optical connections (it is shown the element which consists 2 transistors from 70 million ones), which on silicon CMOS produced in one chip (a) and the face cut of its optical waveguide (b).



The scheme of a laser diode on a non-inclined Ge/Si (001) substrate