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Plasma-assisted molecular beam epitaxy of Al(Ga)N layers and quantum well structures on c-Al_2O_3 for mid-UV emitters and solar-blind photodiodes

Prof. Sergey Ivanov

Prof. Sergey Ivanov，Graduated from St.Petersburg Electrical-Engineering University in 1983. Since that time has been working in the Ioffe Institute of Russian Academy of Sciences, St.Petersburg, Russia. PhD from the Ioffe Institute in 1989 on molecular beam epitaxy (MBE) of ultra-low threshold AlGaAs/GaAs quantum well lasers. Habilitation from Ioffe Institute 2000 on MBE of II-VI quantum well and quantum dot wide gap heterostructures for green laser applications.Current position: Head of the Quantum-size heterostructures Laboratory at the Ioffe Institute, including around 50 researchers. More than 600 publications, among them about 400 articles in refereed journals, 9 book chapters, 2 patents. More than 30 Invited talks at International Conferences. Member of Advisory and Program Committees of several regular International conferences (ICPS, II-VI Compounds, IMBE, IWN, ICNS, E-MRS, ISGN). Teaching activity: Professor of St.Petersburg's Electrical Engineering University and Academic University. Research interests: MBE growth and properties of epilayers and low-dimensional nanostructures based on narrow gap III-V, III-Nitride and wide gap II-VI compounds for basic studies and optoelectronic applications.

Abstract： The history and current status of the Ioffe Physical-Technical Institute, St.Petersburg, Russia, which is the one of the world-famous center in the field of semiconductor physics and technology, will be introduced shortly. Main directions of the activity of Quantum-size Heterostructure laboratory headed by Prof. Ivanov will be given.In the special research part, the paper will be focused on novel approaches developed in plasma-assisted molecular beam epitaxy and physics of Al-rich AlGaN epilayers and quantum well heterostructures grown on c-sapphire, which allowed one to fabricate the low-threshold optically-pumped separate confinement heterostructure lasers emitting in the mid-UV spectral range (258-290 nm) with the threshold power density as low as 150 kW/cm^2 (289nm) as well as the solar-blind photodiodes. Different techniques of threading dislocation filtering down to the level 10^8-10^9 cm^{-2} in strongly lattice-mismatched III-N heterostructures, as well as strain engineering in AlGaN quantum wells to preserve TE polarization of both spontaneous and stimulated emission at wavelengths below 290nm will be discussed.

时间：5月15日（星期四）15:00—16:30

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