


Brief Biodata

Dr. Sunil Singh Kushvaha

Designation:	Principal Scientist	
DP No. and Name:	2.05, QHRS and 2D Physics	
DU No. and Name:	2, Electrical and Electronics Metrology	
Email:	kushvahas@nplindia.org	
Date of Joining CSIR-NPL:	01-09-2011	
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Research Area/ Interest

Growth and characterization of various 2D materials, topological insulators thin films, epitaxial III-Nitrides layers and heterostructures. Characterization techniques include RHEED, AFM, STM, HR-XRD, PL, Raman spectroscopy.

Educational Qualifications

Degree	Subject	University/ Institute	Year
PhD	Physics	National University of Singapore (NUS), Singapore	2008
M.Tech	Solid State Materials	Indian Institute of Technology (IIT) Delhi, New Delhi, India	2002
M.Sc.	Physics	Banaras Hindu University, Varanasi, India	2000

Academic / Research Experience

Grade / Post	Institute	Duration		Research Field
		From	To	
Principal Scientist	CSIR-NPL	September 2019	Present	Topological Insulators, 2D materials and III-nitrides film for devices
Senior Scientist	CSIR-NPL	September 2015	August 2019	LMBE, III-nitrides film and photodetector devices
Scientist	CSIR-NPL	September	August	MBE, III-nitrides film and

		2011	2015	heterostructures, STM
Scientist-1	IMRE, Singapore	Dec 2008	August 2011	Thermoelectric power using UHV-AFM, Superlubricity machine, STM
Post-doc	NUS, Singapore	July 2007	Nov 2008	Magnetic nanostructures, MFM, SEMPA, Four-nanoprobes, SP-STM

No. of Publications

No. of Publications in SCI Journals	No. of Publications in non-SCI Journals	No. of Publications in Conference Proceedings	Books	Total
63		12	10 book chapters, 01 (edited)	85

Selected Publications

1. V. Aggarwal, C. Ramesh, P. Tyagi, S. Gautam, A. Sharma, S. Husale, M. S. Kumar, **S. S. Kushvaha**, *Controlled epitaxial growth of GaN nanostructures on sapphire (11-20) using laser molecular beam epitaxy for photodetector applications*, **Mater. Sci. Semicond. Processing** 125, 105631 (2021).
2. R. Kumar, **S. S. Kushvaha**, M. Kumar, M. S. Kumar, G. Gupta, K. Kandpal, P. Kumar, *Flexible perylenediimide/GaN organic-inorganic hybrid system with exciting optical and interfacial properties*, **Scientific Reports** 10, 10480 (2020).
3. C. Ramesh, P Tyagi, B. Bhattacharyya, S. Husale, K.K. Maurya, M S. Kumar, **S.S. Kushvaha**, *Laser molecular beam epitaxy growth of porous GaN nanocolumn and nanowall network on sapphire (0001) for high responsivity ultraviolet photodetectors*, **J. Alloys Compounds** 770, 572 (2019).
4. Ch Ramesh, P. Tyagi, B.S. Yadav, S. Ojha, K.K. Maurya, M. S. Kumar, **S.S. Kushvaha**, *Effect of nitridation temperature on formation and properties of GaN nanowall networks on sapphire (0 0 0 1) grown by laser MBE*, **Mater. Sci. Eng.: B** 231, 105 (2018).
5. **S.S. Kushvaha**, Ch. Ramesh, P. Tyagi, A.K. Shukla, B.S. Yadav, N. Dilawar, K.K. Maurya and M. Senthil Kumar, *“Quantum confinement effect in low temperature grown homoepitaxial GaN nanowall network by Laser assisted Molecular Beam Epitaxy”*, **J.**

Alloys Compounds 703, 466 (2017).

6. **S.S. Kushvaha**, M. Senthil Kumar, B.S. Yadav, P.K. Tyagi, S. Ojha, K.K. Maurya and B.P. Singh, “*Influence of laser repetition rate on the structural and optical properties of GaN layers grown on sapphire (0001) by Laser Molecular Beam Epitaxy*”, **CrystEngComm** 18, 744 (2016).
7. **S.S. Kushvaha**, P. Pal, A.K. Shukla, A.G. Joshi, M. Kumar, S. Singh, B.K. Gupta and D. Haranath. “*Effect of growth temperature on defects in epitaxial GaN film grown by plasma assisted molecular beam epitaxy*” **AIP Advances** 4, 027114 (2014).
8. **S.S. Kushvaha**, W. Hofbauer, Y.C. Loke, S.P. Singh and S.J. O’Shea. “*Thermoelectric power measurements using different tips in atomic force microscopy*”, **J. Appl. Phys.** 109, 084341 (2011).
9. S.Y.H. Lua, **S.S. Kushvaha**, Y.H. Wu, K.L. Teo and T.C. Chong, “*Chirality control and switching of vortices formed in hexagonal shaped ferromagnetic elements*” **Appl. Phys. Lett.** 93, 122504 (2008).
10. **S.S. Kushvaha**, Z. Yan, W. Xiao, M.-J. Xu, Q.-K. Xue and X.-S. Wang. “*Self-assembled Ge, Sb and Al nanostructures on Graphite: Comparative STM studies*”, **Nanotechnology** 18, 145501 (2007).

Current Activities

- Epitaxial III-nitrides, topological Insulator and 2D materials growth and characterizations.
- Indigenous development of Quantum Hall devices for primary resistance standards
- SERB-DST project “Structure/microstructure-magnetotransport correlations in sputtered magnetically doped Bi₂Se₃ Topological Insulator thin films”

Honour(s)/Award(s)/ Fellowship(s)

- Early Career Research Award from SERB-DST, India (2018)
- NUS Research Fellowship (July 2007-Nov 2008)
- NUS Research Scholarship (August 2003 – July 2007)
- Institute scholarship granted by Govt. of India through GATE (2001-2002)
- CSIR-UGC-JRF (2001)

Contributions to AcSIR

- Associate Professor, Faculty of Physical Sciences
- Supervised – 01 PhD and Under Supervision – 04 Students
- Faculty: Electromagnetic Wave Characterization for Physicist and Biologist

Membership of Professional Societies/ Institutions

- Life Member, Metrological Society of India (MSI), India.
- Life Member, Material Research Society, India.
- Life Member, Indian Physics Association, India.
- Member, Material Research Society, Singapore (2003-2013).

Any other Information

Review Editor: Frontiers of Materials

Reviewer of various journals: Nanoscale, Sci. Rep., Nanotechnology, ACS Appl. Mater. Interface, ACS Appl. Electronic Mater., CrystEnggComm, RSC Adv., Appl. Phys. Lett., J. Appl. Phys., J. Phys. D: Appl. Phys, Semicond. Sci. Tech, Mater. Res. Exp., J. Alloy Compd., Crystal Growth, Vacuum.