


Brief Biodata

Name: Suraj Parkash Khanna

Designation:	Sr. Pr. Scientist	
DP No. and Name:	2.01, LF HF Impedance and DC Metrology	
DU No. and Name:	Electrical & Electronics Metrology	
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Research Area/ Interest

III-V semiconductors for optoelectronic applications
2D materials for optoelectronic applications
Microfabrication
Terahertz technology

Educational Qualifications

(Please write latest qualification first)

Degree	Subject	University/ Institute	Year
PhD	Electrical Engineering	University of Leeds, UK	2008
MSc	Nanotechnology	University of Leeds, UK	2004

Academic / Research Experience

Grade / Post	Institute	Duration		Research Field
		From	To	
Research Associate	University of Leeds, UK	Feb 2008	Jan 2011	Terahertz Quantum Cascade Lasers
Research Fellow	Northwestern University, USA	Jan 2011	Jan 2012	Magnetic bipolar heterojunction devices
Quick Hire Fellow	CSIR-National Physical Laboratory, India	03.07 2012	24.07.2012	Optoelectronic Devices
Principal Scientist	CSIR-National Physical Laboratory, India	25.07.2012	25.07.2017	Optoelectronic Devices
Senior Principal Scientist	CSIR-National Physical Laboratory, India	25.07.2017	Till date	Optoelectronic Devices

No. of Publications

No. of Publications in SCI Journals	No. of Publications in non-SCI Journals	No. of Publications in Conference Proceedings	Books	Total
100	-	92	1	193

Full list of publications: <https://orcid.org/0000-0002-2733-6538>

Selected Publications

DEVICE - Novel Edge-Contact for 2D-3D heterostructure interface (Nov 2019)

Role: CoPI

The device demonstrates fast photoresponse speeds of <40 ms range under -5 V and $+5$ V. Important finding: No persistent photocurrent behaviour under +ve bias conditions in the 2D/3D heterostructure photodetector.

(*Sensors & Actuators: A. Physical*; <https://doi.org/10.1016/j.sna.2019.111720>)

DEVICE - MOCVD GaN/r-GO UV-Visible photodetector for low light applications (July 2019)

Role: CoPI

We have demonstrated a heterojunction photodetector (PD) based on reduced graphene oxide (r-GO) and metal-organic chemical vapor deposition (MOCVD)-grown gallium nitride (GaN) that can sense very low light intensities in the above-band-gap and below-band-gap regimes, showing no and high photoconductive gains, respectively.

(*ACS Applied Electronic Materials*; <https://pubs.acs.org/doi/abs/10.1021/acsaelm.9b00280>)

DEVICE - HRGaN/r-GO based photodetector for Harsh Electronics (May 2019)

Role: CoPI

Broadband ultraviolet photodetector based on hybrid 2D/3D structure is demonstrated. The device employs a highly resistive GaN integrated with thin reduced graphene-oxide for applications in harsh environments, working up to ± 200 V bias and 116 °C with long-term stability over 28 months. The device operates appreciably in both photovoltaic and photoconductive modes showing high responsivity and fast switching speed.

(*Advanced Optical Materials*; <https://doi.org/10.1002/adom.201900340>)

DEVICE – gC3N4/Si Binary Multifunctional Photodetector (May 2018)

Role: CoPI

First realization of novel binary photoswitching over an ultrabroadband range is demonstrated. The device employs a hybrid 2D/3D structure based on silicon platform which opens up a possibility for the application of graphitic carbon-nitride (g-C3N4) nanosheets for light-based binary communications, interconnects for optical computing and weak signal detections. An overlayer of g-C3N4 may also significantly improve the performance of silicon solar cells.

(*Advanced Optical Materials* - <https://doi.org/10.1002/adom.201800191>)

DEVICE – self powered UV Photodetector (DEC 2016):

Role: CoPI

Fabrication of high performance photodetectors using molecular beam epitaxy grown GaN is quite challenging & extremely costly. It is thus very essential to develop simple and cost effective fabrication routes to facilitate their large scale deployment. His group successfully

demonstrated non-cleanroom fabrication of a hybrid device (r-GO/GaN) that works in self-powered mode for UV detection.

(*Applied Physics Letters* - <http://dx.doi.org/10.1063/1.4971982>)

Current Activities

Hybrid heterostructure devices based on the integration of bulk semiconductors with 2D layered (van der Waals) materials for optoelectronic applications

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

Start Up Research Grant (Young Scientist) award of Rs. 33.25 Lacs (2015-2018) from Science and Engineering Board (SERB), Department of Science and Technology (DST), successfully completed the project; Project outcome: 5 publications in SCI journals

Contributions to AcSIR

Guiding PhD student

Member of Doctoral Advisory Committee for a number of students

Membership of Professional Societies/ Institutions

Metrology Society of India

Any other Information

Past Students:

- NISHA PRAKASH; Ph.D. “Hybrid photodetector based on 2D materials and III- Nitrides” (2014 – 2020) (Presently, Senior Scientist @ Hind High Vacuum, Bangalore)
- GAURAV KUMAR; (DST JRF) (Feb 2016-May 2019) (presently pursuing PhD @ The Institute of Photonics Sciences - ICFO)
- RAJESH; M.Tech trainee Growth towards layered MoO₃ 2D material (Jan 2017-June 2017)
- SARABJHOT KAUR; M.Tech trainee Study of transport characteristics and optoelectronic properties of reduced-graphene-oxide (June 2016-May 2017)
- KRITIKA ANAND; Research Intern, Growth and characterization of III-Nitrides (Jan 2013-June 2015)
- MOHD. SHAKEEL; M.Tech Trainee, Characterization of plasma assisted molecular beam epitaxy (PAMBE) grown III-Nitride (July 2014)