

Subindu Kumar F-IETE, SM-IEEE, LM-SSI Professor

Department of Electronics Engineering & Academic Building (2nd Floor), Room No: 229, IIT (ISM), Dhanbad. Dhanbad, Jharkhand - 826004, India. E-mail: subindu@iitism.ac.in Phone: +91 3262235732 (O)



Book Chapter

Kumar S., Sharma T. K. (2021) On-Chip Carbon Nanotube Interconnects: Adaptation to Multi-gate Transistors. In: Kaneko S. et al. (eds) Carbon Related Materials. Springer, Singapore. https://doi.org/10.1007/978-981-15-7610-2_7 [Recognition of Nobel Lecture by Prof. Akira Suzuki in IUMRS-ICAM-17]

Journals

SCI: THOMSON REUTERS

- S. Kumar, A. Rai and S. S. A. Askari, "Interdiffusion induced changes in the absorption spectra of III-V quantum dot systems", Optik - International Journal for Light and Electron Optics 321, 172159 (2025).
- P. Sharma and **S. Kumar** and P. Kumar, "Proposal for variability-induced effective radius of elliptical gate-all-around junctionless transistors and its applicability in hydrogen gas sensors." *AEU-International Journal of Electronics and Communications*, **180**, 155337 (2024).
- P. Sharma and S. Kumar, "Gaussian Doping Profile in the Channel Region: A Technology Booster for Junctionless Transistors." *AEU-International Journal of Electronics and Communications*, 169, 154749 (2023).
- P. Kumar, K. Koley and S. Kumar, "Impact of Hole trap-detrap Mechanism on X-ray Irradiation Induced Threshold Voltage Shift of Radiation-Hardened GAA TFET device," *Microelectronics Reliability*, 145, 114980 (2023).
- P. Kumar, K. Koley, S. S. A. Askari, A. Maurya and S. Kumar, "Assessment of Negative Bias Temperature Instability due to Interface and Oxide Trapped Charges in Gate-all-around TFET Devices," in *IEEE Transactions on Nanotechnology*, 22, 157-165 (2023).
- P. Kumar, K. Koley, S. S. A. Askari, A.Maurya and S. Kumar, "Assessment of interface trapped charge induced threshold voltage hysteresis effect in gate-all-around TFET", *Micro and Nanostructures*, 175, 207502 (2023).
- A. Rai, S. S. A. Askari, M. K. Das and S. Kumar, "Efficiency enhancement of solar cells using multilayer interdiffused InGaAs/GaAs quantum dots: A numerical approach", *Micro and Nanostructures*, 172, 207445 (2022).
- P. Kumar, K. Koley, B. C. Mech, A. Maurya and S. Kumar "Analog and RF performance optimization for gate all around tunnel FET using broken-gap material", *Nature: Scientific Reports* 12(1), 1-15 (2022).
- S. S. K. Sinha, A. Rai, S. Kumar, and S. S. A. Askari "On the spectral response of interdiffused quantum dot ensembles embedded in the intrinsic region of InGaAs/GaAs quantum dot solar cells", *Physica E: Low-dimensional Systems and Nanostructures* 134, 114810 (2021).
- S. S. K. Sinha, **S. Kumar**, and M. K. Das "Dot size variability induced changes in the optical absorption spectra of interdiffused quantum dot systems", *Applied Physics A* **125(11)**, 774 (2019).
- A. Kumari, **S. Kumar**, T. K. Sharma and M. K. Das "On the C-V characteristics of nanoscale strained gate-all-around Si/SiGe MOSFETs", *Solid State Electronics* **154**, 36-42 (2019).

- Md. Aref Billaha, Mukul K. Das and **S. Kumar** "Effect of doping on the performance of multiple quantum well infrared photodetector" *IET Circuits, Devices & Systems* **12(5)**, 551 (2018).
- Prakash Pareek, Mukul K. Das and **S. Kumar** "Responsivity calculation of group IV-based interband MQWIP" Journal of Computational Electronics **17(1)**, 319 (2018).
- Ravi Ranjan, Mukul K. Das and S. Kumar "Performance analysis of tin-incorporated group-IV alloy based transistor laser", *Optics and Laser Technology*, **106**, 228, (2018).
- 8. Prakash Pareek, Mukul K. Das and S. Kumar, "Numerical Analysis of SiGeSn/GeSn Quantum Well Infrared Photodetector", *Opto-Electronics Review*, **26**, 149 (2018).
- R. Bhattacharya, S. Kumar and S. Biswas "Fault Diagnosis in Switched-Linear Systems by Emulation of Behavioral Models on FPGA: A case study of current-mode buck converter" International Journal of Numerical Modelling: Electronic Networks, Devices and Fields (2017), 31(5), DOI: 10.1002/jnm.2314 Image State Stat
- R. Bhattacharya, S. Kumar and S. Biswas "Resource Optimization for Emulation of Behavioral Models of Mixed Signal Circuits on FPGA: A case study of DC–DC buck converter" International Journal of Circuit Theory and Applications (2017), 45(11), 1701. DOI: 10.1002/cta.2323 ⁽²⁾
- **S. Kumar**, A. Kumari and M. K. Das "Modeling Gate-All-Around Si/SiGe MOSFETs and circuits for digital applications" *Journal of Computational Electronics* **16**, 47 (2017).
- Prakash Pareek, Mukul K. Das and S. Kumar "Theoretical analysis of tin incorporated group IV alloy based QWIP" Superlattices and Microstructures 104, 128 (2017).
- S. Kumar, A. Kumari and M. K. Das "Strain induced changes in the performance of strained-Si/strained-Si_{1-y}Ge_y/relaxed-Si_{1-x}Ge_x MOSFETs and circuits for digital applications" *J. Cent. South Univ.* 24(6), 1233 (2017).
- Md. Aref Billaha, Mukul K. Das and **S. Kumar** "Doping dependent frequency response of MQW infrared photodetector" *Superlattices and Microstructures* **108**, 128 (2017).
- S. Kumar, A. Kumari and M. K. Das "Development of a Simulator for analyzing some Performance Parameters of Nanoscale Strained Silicon MOSFET-based CMOS Inverters" *Microelectronics Journal* 55, 8 (2016).
- B. Priyadarshini, M. K. Das, M. Sen, **S. Kumar** "Radial Microwire Array Solar Cell with Pyramidal Structure" *Superlattices and Microstructures* **98**, 208 (2016).
- **S. Kumar**, S. Sen and M. K. Das "A comparative analysis of the photoluminescence spectra of annealed ultrasmall In-rich InGaN/GaN quantum dots and wells" *Optik International Journal for Light and Electron Optics* **127**, 8654 (2016). ⁽²⁾
- S. Jha and **S. Kumar** "Comment on 'A compact drain current model of short-channel cylindrical gateall-around MOSFETs'", *Semicond. Sci. Technol.*, **29**, 038001 (2014).
- **S. Kumar** and S. Jha "Impact of elliptical croscection on the propagation delay of multi-channel gateall-around MOSFET based inverters", *Microelectronics Journal* **44**, 844 (2013).
- S. Jha, A. Kumar and **S. Kumar** "Impact of elliptical cross section on some electrical properties of gateall-around MOSFETs", *Bonfring International Journal of Power Systems & Integrated Circuits* **2(3)**, 18 (2012).
- **S. Kumar** and S. Kabi "Dependence of the Absorption Spectra of III-V Semiconductor Quantum Dots on the Fundamental Parameters", *International Journal of Nanoscience* **9** (4), 345 (2010).
- **S. Kumar**, S. Kabi and D. Biswas, "Dependence of the photoluminescence of annealed III-V semiconductor quantum dots on their shape and dimension", *J. Appl. Phys.* **104**, 086102 (2008).
- **S. Kumar**, D. Biswas and T. Das, "Dependence of the Absorption Spectra of III-V Semiconductor Quantum Dots on the Size Distribution", *Advanced Materials Research*, **31**, 59 (2008).
- D. Biswas, T. Das, S. Kabi and **S. Kumar**, "Conspicuous Presence of Higher Order Transitions in the Photoluminescence of In_xGa_{1-x}N/GaN Quantum Wells", *Advanced Materials Research*, **31** 62 (2008).
- **S. Kumar** and D. Biswas, "Effects of a Gaussian size distribution on the absorption spectra of III-V semiconductor quantum dots", *J. Appl. Phys.* **102**, 084305 (2007).
- D. Biswas, **S. Kumar** and T. Das, "Unusual changes observed in the photoluminescence of annealed In_xGa_{1-x}N/GaN quantum wells explained", *Materials Letters* **61**, 5282 (2007).
- D. Biswas, **S. Kumar** and T. Das, "Band Offsets of In_xGa_{1-x}N /GaN Quantum Wells Reestimated" *Thin Solid Films* **515** 4488 (2007). ⊘

• D. Biswas, **S. Kumar** and T. Das, "Interdiffusion induced changes in the photoluminescence of In_xGa₁₋ _xAs/GaAs quantum dots interpreted", *J. Appl. Phys.* **101**, 026108 (2007).

Conferences:

- S. C. Khan, Anup Dnyaneshwar Dongre, R. Kumar, and S. Kumar. "Impact of Barrier on the Absorption Spectra of Size Distributed III-V Quantum Dot Systems." In 2023 IEEE Workshop on Recent Advances in Photonics (WRAP), pp. 1-3. IEEE, 2023.
- P. Sharma, P. Kumar and S. Kumar, "Impact of Interface Trap Charges on the Performance of Gaussian Doped Gate-all-around Junctionless MOSFET", *IEEE International Conference on Multidisciplinary Research in Technology and Management,* Bangalore, India, September 22-23, 2023.
- A. Rai, Syed Sadique Anwer Askari, S. Kumar and M. K. Das, "Effect of Band Parameters on the Performance of Interdiffused InGaN/GaN Quantum Dot Solar Cells," *IEEE International Conference on Nanoelectronics, Nanophotonics, Nanomaterials, Nanobioscience and Nanotechnology(5NANO 2023).*
- P. Kumar, K. Koley, R. Goswami, A. Maurya, and S. Kumar, "Assessment of hot carrier stress induced threshold voltage shift in gate-all-around MOSFETs," *IEEE 19th India Council International Conference* (*INDICON*), Kochi, India, 2022, pp. 1-4, doi: 10.1109/INDICON56171.2022.10039693.
- P. Kumar, K. Koley, R. Goswami, A. Maurya, and S. Kumar, 2022, October. Electrical Noise Behaviour of High-k Gate-All-Around MOSFET Based on Two-Port Device Network Analysis. 2022 14th International Conference on Information Technology and Electrical Engineering (ICITEE), Indonesia, pp. 68-72, Oct. 2022.
- Anjali Rai, Subindu Kumar, "Effects of Shape and Gaussian size distribution on the Absorption spectra of Strained III-V Quantum Dot ensembles," International Conference on Advanced Nanomaterial and Nanotechnology (ICANN), 2019 at IIT Guwahati.
- INVITED TALK: S. Kumar, Tarun Kumar Sharma, Vatsala Raj, Neeta Bharti and Princy Sharma, "Adapting Carbon-based Interconnect Technology to Non-Classical FET Drivers for Enhanced Performance", International Union of Materials Research Societies – International Conference on Electronic Materials 2018 (IUMRS-ICEM 2018) held during August 19 – 24, 2018 at Daejeon, Korea.
- INVITED TALK: S. Kumar, A. Saikia, A. Kumari, T. Sharma and P. Chauhan, "Performance Evaluation of Carbon-based Interconnects in presence of Non-Conventional FET Drivers", *The 15th International Conference of Advanced Materials (IUMRS-ICAM)* held during August 27 – September 01, 2017 at Kyoto University, Kyoto, Japan.
- R. Bhattacharya, S. H. M. Ragamai, and S. Kumar, "SFG Based Fault Simulation of Linear Analog Circuits Using Fault Classification and Sensitivity Analysis" In Proc. 21st International Symposium on VLSI Design and Test (VDAT) 2017, CCIS 711, Springer, pp. 179-190, 2017.
- R. Bhattacharya and S. Kumar, "A New Approach for Modeling Parametric Faults in Linear Analog VLSI Circuits" In Proc. 6th IEEE International Conference on Computers and Devices for Communication (CODEC), December 16-18, 2015, pp.1-4.
- S. Kumar, S. S. K. Sinha and S. Sen, "Investigations on the optical transitions and linewidth of asgrown III-V quantum dot systems" 2015 International Conference on Microwave and Photonics (ICMAP) held during December 11-13, 2015 at ISM Dhanbad, India.
- Jhuma Saha, S. Jha and S. Kumar, "Transient analysis of junctionless and junction based CMOS inverters", XVIII International Workshop on the Physics of Semiconductor Devices (IWPSD 2015) held during December 07-10, 2015 at IISc Bangalore, India.
- R. Bhattacharya and S. Kumar, "A new approach for modeling parametric faults in linear analog VLSI circuits", 6th International Conference on Computers and Devices for Communication (CODEC-15) held during December 16-18, 2015 at Kolkata.
- Jhuma Saha, S. Jha and S. Kumar, "A comparative analysis of some multi gate junctionless transistors", 6th International Conference on Computers and Devices for Communication (CODEC-15) held during December 16-18, 2015 at Kolkata.
- INVITED TALK: S. Kumar and S. Jha, "Ellipticity Induced Variability in Gate-All-Around MOSFET- based Circuits", International Conference on Small Science (ICSS 20014), held during 8 – 11 Dec at Hong Kong.

- S. Jha, Jhuma Saha and S. Kumar, "Tuning the noise margins of Gate-All-Around MOSFET based inverters through non-circular multi-channel architecture", *International Conference on Advances in Electrical Engineering 2014 (ICAEE 2014)*, held during 9-11 Jan. 2014 at VIT University, Vellore. The work received BEST PAPER AWARD
- Amrita Kumari and S. Kumar, "Analysis of Nanoscale Strained-Si/SiGe MOSFETs including Source/Drain Series Resistance through a Multi-Iterative Technique", 27th International Conference on VLSI Design 2014 (VLSID 2014), held during 5-9 Jan. 2014 at IIT Bombay, Mumbai.
- Soumen Sen, S. S. K. Sinha and S. Kumar, "On the Optical absorption Spectra of as-grown III-V Quantum Dot Systems", IEEE International Conference on Microwave and Photonics 2013 (ICMAP 2013), held during 13-15 Dec. 2013 at ISM Dhanbad.
- Jhuma Saha, Amrita Kumari, Shankaranand Jha and S. Kumar, "On the Voltage Transfer Characteristics (VTC) of some Nanoscale Metal-Oxide-Semiconductor Field-Effect-Transistors (MOSFETs)", 17th International Workshop on The Physics of Semiconductor Devices (IWPSD 2013), held during 10-13 Dec. 2013 at Amity University, Noida.
- Amrita Kumari and S. Kumar, "Impact of Some Important Parameters on the Drain Current and Threshold Voltage of Nanoscale Strained-Si MOSFETs", 3rd National Conference on Electronics, Communication and Signal Processing (NCECS-2013) held on 19th Sept. 2013 at Siliguri institute of Technology, Siliguri, West Bengal, India.
- S. Jha and S. Kumar, "Impact of some important parameters on the propagation delay of elliptical gateall-around MOSFET based inverters", *IEEE CONECCT 2013*, held at World Trade Centre, Bangalore, India during Jan 17-19, 2013.
- S. Jha, A. Kumar and S. Kumar, "On some Electrical Properties of Elliptical Gate-All-Around MOSFETs", National Conference on Electronics, Communication & Signal Processing (NCECS-2012), held at Siliguri institute of Technology, Siliguri, West Bengal, India, on September 19, 2012.
- A. Kumar and S. Kumar, "On the Propagation Delay of Silicon Gate-All-Around MOSFET based Inverters", National Conference on Frontiers in Electronics, Communication & Instrumentation technology (FECIT 2011), held at Indian School of Mines, Dhanbad, Jharkhand, India, during November 3 – 4, 2011. pp. 20.
- S. Sen and S. Kumar, "On the Photoluminescence of Annealed In_xGa_{1-x}N/GaN Quantum Wells", National Conference on Frontiers in Electronics, Communication & Instrumentation technology (FECIT 2011), held at Indian School of Mines, Dhanbad, Jharkhand, India, during November 3 – 4, 2011. pp. 91.
- S. Kumar and S. Sen, "A Brief Review on the Photoluminescence of Interdiffused III-V Quantum Dots", National Conference on Electronics, Communication & Signal Processing (NCECS-2011), held at Siliguri institute of Technology, Siliguri, West Bengal, India, on September 19, 2011.
- S. Kumar and Dharamvir Kumar, "Dependence of the Propagation Delay of Silicon Nanowire Metal-Oxide-Semiconductor Field-Effect Transistors on Some Important Parameters" International Conference on Nanoelectronics (ICONE 2011) held in the Department of Electronics and Communication Engineering College, Rasipuram, Tamilnadu, India from 24th to 26th February, 2011. pp 17
- S. Kumar and Soumen Sen, "Dependence of the Photoluminescence of annealed III-V Semiconductor Quantum Dots on the Fundamental Parameters", *Tenth International Conference on Fiber Optics and Photonics – PHOTONICS 2010,* held at Indian Institute of Technology Guwahati, Guwahati, Assam, India, during December 11 – 15, 2010.
- Sanjib Kabi, S. Kumar, Dipankar Biswas and Tapas Das, "Further support to the large band gap 1.95 eV of InN", National workshop on Advanced Optoelectronic Materials and Devices, held at BHU, Varanasi during 22 – 24 Dec, 2008. pp. 260.
- S. Kumar and Sanjib Kabi, "Dependence of the Absorption Spectra of III-V Semiconductor Quantum Dots on the Fundamental Parameters", 5th International Conference on Materials for Advanced Technologies (ICMAT 2009 & IUMRS-ICA 2009), Singapore, 2009. [also published in International Journal of Nanoscience]
- Sanjib Kabi, Siddhartha Panda, S. Kumar and Dipankar Biswas, "Complexities in the Interpretation of the Optical Measurements on InGaN/GaN Quantum Wells of High Indium Content", 5th International Conference on Materials for Advanced Technologies (ICMAT 2009 & IUMRS-ICA 2009), Singapore, 2009.
- S. Kumar, Sanjib Kabi, Tapas Das, and Dipankar Biswas, "Curious changes in the photoluminescence of In_xGa_{1-x}N/GaN quantum wells explained", Ninth International Conference on Fiber Optics and

Photonics (PHOTONICS 2008), held during December 13-13, 2008 at IIT Delhi and Habitat World Convention Center, New Delhi, India. pp. 462.

- Tapas Das, S. Kumar and Dipankar Biswas, "Effects of interdiffusion on the Photoluminescence of ternary and quaternary semiconductor nanostructures interpreted", Proc. of the Fourteenth International Workshop on The Physics of Semiconductor Devices (IWPSD 2007), held during December 16-20, 2007, Mumbai, India.
- S. Kumar, Sanjib Kabi and Dipankar Biswas, "Effects of Shape, Dimension and Interdiffusion on the Photoluminescence of III-V Semiconductor Quantum Dots", Proc. of the Fourteenth International Workshop on The Physics of Semiconductor Devices (IWPSD 2007), held during December 16-20, 2007, Mumbai, India.
- Dipankar Biswas, Tapas Das and S. Kumar, "Conspicuous Presence of Higher Order Transitions in the Photoluminescence of In_xGa_{1-x}N / GaN Quantum Wells", *Abs. Proc. of the 4th International Conference on Materials for Advanced Technologies*, 1 – 6 July 2007, Singapore. [also published in *Advanced Materials Research*]
- Dipankar Biswas, S. Kumar and Tapas Das, "Dependence of the Absorption Spectra of III-V Semiconductor Quantum Dots on the Size Distribution" Abs. Proc. of the 4th International Conference on Materials for Advanced Technologies, 1 – 6 July 2007, Singapore. [also published in Advanced Materials Research]
- S. Kumar, Dipankar Biswas and Tapas Das, "Effects of Size Distribution on the Absorption Spectra of III-V Semiconductor Quantum Dots" Abs. Proc. of the International Conference on Computers and Devices for Communication (CODEC-06), organized by Institute of Radio Physics and Electronics (C. U), held during 18th – 20th December, 2006 at Kolkata, India. EDM pp. 136.
- Tapas Das, S. Kumar, and Dipankar Biswas, "Effects of Interdiffusion on Band Offset Ratios of Ternary and Quaternary Semiconductor Nanostructures" Abs. Proc. of the International Conference on Computers and Devices for Communication (CODEC-06), organized by Institute of Radio Physics and Electronics (C. U), held during 18th – 20th December, 2006 at Kolkata, India. EDM pp. 135.
- S. Kumar, Tapas Das, and Dipankar Biswas, "A Comparative Study of Wet and Dry Capacitance-Voltage (C-V) Profiling of Semiconductor Quantum Wells", Abs. Proc. of PHOTONICS 2006 organized jointly by University of Hyderabad, Optiwave Photonics and Defence Research Development Organization of India, held during December 13 – 16, 2006 in Hyderabad, India. pp. 208.
- Tapas Das, S. Kumar, and Dipankar Biswas, "Dependence of the Photoluminescence from InGaN/GaN Quantum Wells on the Fundamental Parameters", Abs. Proc. of PHOTONICS 2006 organized jointly by University of Hyderabad, Optiwave Photonics and Defence Research Development Organization of India, held during December 13 16, 2006 in Hyderabad, India. pp. 202.
- S. Kumar, Tapas Das, and Dipankar Biswas, "Studies on Capacitance-Voltage (C-V) Profiling of Semiconductor Quantum Wells" Proc. of the National Seminar on Devices, Circuits & Communication, held during 2nd – 4th November, 2006 at Birla Institute of Technology, Mesra, Ranchi (Jharkhand), India. pp. 77.
- Tapas Das, S. Kumar, and Dipankar Biswas, "Effect of the bowing parameter and band offset ratio on the photoluminescence of In_xGa_{1-x}N/GaN nanostructures" *Proc. of the National Seminar on Devices, Circuits & Communication,* held during 2nd – 4th November, 2006 at Birla Institute of Technology, Mesra, Ranchi (Jharkhand), India. pp. 85.
- Dipankar Biswas, Tapas Das and S. Kumar, "Extraordinary photoluminescence changes observed in InGaN/GaN Quantum Wells interpreted" Abs. Proc. of the XXVIIIth General Assembly of International Union of Radio Science (URSI) October 23-29, 2005, New Delhi, India, pp. 208.
- Dipankar Biswas, S. Kumar and Tapas Das, "Studies on Interdiffusion Induced Changes in the Photoluminescence of In_xGa_{1-x}As based Quantum Wells and Dots", Abs. Proc. of the XXVIIIth General Assembly of International Union of Radio Science (URSI 2005) October 23-29, 2005, New Delhi, India, pp. 207.
- Dipankar Biswas, S. Kumar and Tapas Das, "Band Offsets of In_xGa_{1-x}N /GaN Quantum Wells Reestimated" Abstracts, 3rd International Conference on Materials for Advanced Technologies and 9th International Conference on Advanced Materials, 3 – 8 July 2005, Singapore. [Also published in Thin Solid Films]
- Dipankar Biswas, S. Kumar and Tapas Das, "Explanations of the interdiffusion induced changes in the photoluminescence of In_xGa_{1-x}As/GaAs Quantum Dots" Abstracts, 3rd International Conference on

Materials for Advanced Technologies and 9th *International Conference on Advanced Materials*, 3 – 8 July 2005, Singapore.

- S. Kumar, "Influence of annealing and interdiffusion on the luminescence of Quantum Dot Nanostructures", Abs. Proc. of the 23rd IPS Colloquium for Young Physicist (YPC 2005), Saha Institute of Nuclear Physics, Kolkata, India (25 – 26 August, 2005).
- Dipankar Biswas, Tapas Das and S. Kumar, "Explanations for the strange photoluminescence changes in InGaN/GaN quantum wells on annealing" Proc. of the 7th International Conference on Optoelectronics, Fiber Optics & Photonics, Cochi, India (9 – 11 Dec, 2004), OMD6.4.
- Dipankar Biswas, Tapas Das and S. Kumar, "Interdiffusion induced changes in the photoluminescence of III-V nanostructures" Proc. of the 7th International Conference on Optoelectronics, Fiber Optics & Photonics, Cochi, India (9 – 11 Dec, 2004), OMDP17.
- Dipankar Biswas and S. Kumar, "Effects of Interdiffusion on the Photoluminescence of III-V Nanostructures" Proc. of National conference on Microwaves and Optoelectronics (June 29 – 30, 2004), Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra, India. pp. 416.