

DR RAJNEESH KUMAR VERMA

ASSISTANT PROFESSOR

DEPARTMENT OF PHYSICS (SCHOOL OF PHYSICAL SCIENCES)

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I. AREA OF INTEREST

FIBER OPTIC SENSORS, PLASMONICS, BIOSENSORS, PLASMA PHYSICS, SURFACE PLASMONS

II. EDUCATION

- | | |
|-----------------------------------------------------------|-----------|
| 1. Ph.D., Indian Institute of Technology Delhi, New Delhi | 2006-2011 |
| Supervisor: Professor B. D. Gupta | |
| Date of Defense: 18 April 2011 | |
| 2. M.Sc. Physics, University of Lucknow, Lucknow | 2003-2005 |
| 3. B.Sc. University of Lucknow, Lucknow | 2000-2003 |

III. SPONSORED RESEARCH PROJECTS

1. Theoretical studies on surface plasmon resonance based fiber optic sensors utilizing meta materials and experimental realization of SPR based prism and fiber optic sensors UGC Start- up grant
2. Effect of swift heavy ion irradiation on the sensitivity of SPR based fiber optic sensors for biomedical applications IUAC New Delhi Jan 2017
3. Investigations of Porphyrin Coated Lossy mode Resonance based Fiber Optic Sensors, DST SERB Core Research Grant December 2020

IV PH.D. STUDENTS

1. Mr. Vikas Title of thesis, "Application of low dimension material in Surface plasmon/ Lossy mode resonance based fiber optic sensors" (Ph.D. Degree Awarded 2021); Joined City University of London as a Post-Doctoral Fellow Since October 2021
2. Ms. Kavita (joined in 2019)
3. Ms. Jyoti (joined in 2019)

V. PUBLICATIONS (H-INDEX-14: CITATIONS 1376 (GOOGLE SCHOLAR))

1. **Rajneesh K. Verma**, Anuj K. Sharma and B. D. Gupta, "Modeling of Tapered Fiber- Optic Surface Plasmon Resonance Sensor with Enhanced Sensitivity," *Photonics Technology Letters* **19** 22 (2007).
2. **Rajneesh K. Verma**, Anuj K. Sharma and B. D. Gupta, "Surface Plasmon Resonance based tapered fiber optic sensor with different taper profiles," *Optics Communications* **281** 1486 (2008).

3. **R. K. Verma** and B. D. Gupta, "Theoretical modelling of a bi-dimensional U-shaped surface plasmon resonance based fiber optic sensor for sensitivity enhancement," *Journal of Physics D: Applied Physics* **41** 095106 (2008). **IF 2.70**
4. Rajan, **Rajneesh K. Verma** and B. D. Gupta, "Surface Plasmon Resonance based Tapered Fiber Optic Sensor: Sensitivity Enhancement by the Introduction of a Teflon Layer between Core and Metal Layer," *Plasmonics* **3** 151 (2008).
5. Smita Singh, **Rajneesh K. Verma** and B. D. Gupta, "Surface Plasmon Resonance based Fiber Optic Sensor with Symmetric and Asymmetric Metallic Coatings: A Comparative Study," *Sensors and Transducers* **100** 116-126 (2009).
6. Sachin K Srivastava, **Rajneesh K. Verma** and B. D. Gupta, "Theoretical modeling of a localized surface plasmon resonance based intensity modulated fiber optic refractive index sensor," *Applied Optics* **48** (19) 3796-3802 (2009).
7. B. D. Gupta and **R. K. Verma**, "Surface Plasmon Resonance based Fiber Optic Sensors: Principle, Probe Designs and Some Applications," *Journal of Sensors: 2009,979761*, (2009). **IF 1.182**
8. **R. K. Verma** and B. D. Gupta, "Surface Plasmon resonance based fiber optic sensor for the IR region using conducting metal oxide film" *J. Opt. Soc. Am. A* **27**, 846 (2010).
9. Sarika Singh, **R. K. Verma** and B. D. Gupta, "LED based Fiber Optic Surface Plasmon Resonance Sensor" *Optical and Quantum Electronics* **42** (1) 15-28 (2010).
10. **R. K. Verma**, "Theoretical modeling of an end face reflection based tapered fiber optic sensor with different probe designs", *International Journal of Engineering Research and Technology* **3** (6) 1981-1985 (2014). **IF 1.76**
11. **Rajneesh K. Verma**, "Fabrication and characterization of SPR based fiber optic sensor using e beam deposition", *Sensors and Transducers* **182** (11) 53-56 (2014).
12. Nidhi Sharma, Angela Joy, Akhilesh K Mishra and **Rajneesh K. Verma**, "FuchsSondheimer–Drude Lorentz model and Drude model in the study of SPR based optical sensors: A theoretical study" *Optics Communications* **357** 120-126 (2015).
13. **Rajneesh K. Verma** and Akhilesh K Mishra, "Highest Achievable Detection Range for SPR Based Sensors Using Gallium Phosphide (GaP) as a Substrate: a Theoretical Study" *Photonic Sensors* **6** 181-186 (2016).
14. Akhilesh K. Mishra, Satyendra K. Mishra and **Rajneesh K. Verma**, "SPR based sensor with extremely large dynamic range of refractive index measurement in visible region" *Journal of Physics D: Applied Physics* **48** 435502 (2015).
15. Akhilesh K. Mishra, Satyendra K. Mishra and **Rajneesh K. Verma**, "Graphene and Beyond Graphene MoS₂: A New Window in Surface Plasmon Resonance Based Fiber Optic Sensing" *Journal of Physical Chemistry C* **120** 5 2893-2900 (2016).
16. Akhilesh K. Mishra, Satyendra K. Mishra and **Rajneesh K. Verma**, "Doped Single wall carbon nanotubes in propagating surface plasmon resonance based fiber optic refractive index sensor" *Plasmonics* **12** 1657-1663 2017
17. M.S. Sodha and **R. K. Verma**, "Nonlinear Electromagnetic propagation in ionosphere: Inclusion of electron temperature dependence of the collision parameter (δ)", *Physics of Plasmas* **25**, 022302 (2018).
18. **Rajneesh K. Verma**, Payal Suwalka and Jatin Yadav, "Detection of Adulteration in diesel and petrol by kerosene using SPR based fiber optic technique", *Optical Fiber Technology* **43** 95-100 (2018).
19. Vikas and **R. K. Verma**, "Sensitivity enhancement of a lossy mode resonance based tapered fiber optic sensor with optimum taper profile," *Journal of Physics D: Applied Physics* **51** 415302 (2018).
20. Vikas and **R. K. Verma**, "Design considerations of a surface plasmon resonance based fiber optic bio sensing probe with graphene and MoS₂ over layers," *Optik-International Journal of Light and Electron Optics* (2019) **180**, 330-343

21. **Rajneesh K. Verma**, Angela Joy, Nidhi Sharma and Vikas, "Performance study of surface plasmon resonance and lossy mode resonance based fiber optic sensor with silver and indium oxide layer: An Experimental Investigation," *Optics and Laser Technology* 12 420-425 (2019)
22. Vikas, S. Gupta, K. Tejavath, and **R. K. Verma**, "Urea detection using bio-synthesized gold nanoparticles: an SPR/LSPR based sensing approach realized on optical fiber," *Optical and Quantum Electronics* 52 278 2020
23. Vikas, K. Walia, and **R. K. Verma**, "Lossy mode resonance based uniform core tapered fiber optic sensor for sensitivity enhancement," *Communications in Theoretical Physics* 72 (9), 095502 2020
24. Vikas, M. K. Yadav, P. Kumar, and **R. K. Verma**, "Detection of adulteration in pure honey utilizing Ag-Graphene Oxide coated fiber optic SPR probes," *Food Chemistry* 332 127346 2020
25. Vikas, and **R. K. Verma**, "On the application of few layer Ti3C2 MXene on fiber optic SPR sensor for performance enhancement," *The European Physical Journal D* 75 (5), 1-11 2021
26. Keshav Walia, R. K. Verma, and Arvinder Singh, "Second harmonic generation of laser beam in quantum plasma under collective influence of relativistic-ponderomotive nonlinearities," *Optik* 225 165745 2021
27. Kavita and R.K. Verma, "Simulation of Localized Surface Plasmon Resonance of Silver Nanoparticles with Graphene Coating Utilizing Maxwell-Garnett Theory" *Journal of Nano and Electronic Physics* 13 2, 02022 (2021)
28. A. Kumawat, S. Chattopadhyay, R. K. Verma and K. P. Misra, "Eu Doped ZnO Nanoparticles with Strong Potential of Thermal Sensing and Bioimaging," *Materials Letters* 308 131221 2021
29. Vikas, S. Sharma and R. K. Verma, "Optical fiber SPR sensor for the detection of fluoride contamination in drinking water," *Journal of Optics* 1-6 (2022) <https://doi.org/10.1007/s12596-021-00803-x>
30. Vikas and R. K. Verma, "High figure of merit fiber optic surface plasmon resonance sensor with topological insulator (BSTS)," *Optical and Quantum Electronics* 54 (1), 1-14 (2021)
31. S. K. Mishra, A. K. Mishra and R. K. Verma, "Versatile Sensing Structure: GaP/Au/Graphene/Silicon," *Photonics* (2021) 8 (12), 547
32. Jyoti and R K Verma, "Application of Cavity Maxwell Garnett theory in SPR based fiber optic sensor with porous alumina structure," *Optical and Quantum Electronics* 54 223 (2022)

VI. CONFERENCES

1. **Rajneesh K. Verma** and B. D. Gupta, "Surface Plasmon Resonance based Tapered Fiber Sensor with the introduction of the Teflon layer between the metal and fiber core," *International Conference on Optoelectronics & Photonics (Photonics-2008)* at IITD, India, Dec., 2008.
2. Smita Singh, **Rajneesh K. Verma** and B. D. Gupta, "Surface Plasmon Resonance based Fiber Optic Sensor with symmetric and asymmetric metal layer coated on to the fiber core," *International Conference on Optoelectronics & Photonics (Photonics-2008)* at IITD, India, Dec., 2008.
3. B. D. Gupta and **Rajneesh K. Verma**, "Surface Plasmon Resonance based tapered Fiber Optic Sensor," *In Frontiers in Optics (FIO-08)* at Rochester, USA, Oct. 19-23, 2008.
4. **R. K. Verma** and B. D. Gupta, "Surface Plasmon Resonance based Fiber Optic Sensor with different taper profiles," *OECC -2009* at Hong Kong, July. 13-17, 2009.
5. **Rajneesh K. Verma** and B. D. Gupta, "Surface Plasmon Resonance based U-shaped fiber optic sensor," *International Conference on Optics & Photonics (ICOP-2009)* at CSIO, Chandigarh, India, October, 2009.

6. **Rajneesh K. Verma** and B. D. Gupta, "Surface Plasmon Resonance based Indium Tin Oxide (ITO) Coated Tapered Fiber Optic Sensor for IR Region," *Frontiers in Optics (FiO-2010)* at Rochester, New York (USA), 24-28 October, 2010.
7. **Rajneesh K. Verma** and B. D. Gupta, "Surface Plasmon Resonance based Indium Tin Oxide (ITO) Coated Fiber Optic Sensor for IR Region," (*Photonics-2010*), at IIT Guwahati, India, 11-15 December, 2010.
8. **Rajneesh K. Verma**, "Surface Plasmon Resonance based Multichannel Tapered fiber optic sensor", International conference on nanoscience and nanotechnology (ICNN) at BBAU, Lucknow, India, 18-20 November 2013.
9. **Rajneesh K. Verma**, "Fiber Optic Sensors", Winter School on Optics, at ICTP, Trieste, Italy 11 Feb, 2015
10. **Rajneesh K Verma**, Akhilesh K Mishra, and Satyendra K Mishra, "Modelling of surface Plasmon Resonance based gas sensor utilizing Gallium Phosphide/Gold/Graphene/Silicon structure", International Conference on Advances in Light Technologies and Spectroscopy of Materials ICALTSM-2016 at University of Lucknow, Lucknow, India, 16-18 January 2016.
11. Shiva Dixit, P. Kumar and **Rajneesh K Verma**, Localized Surface Plasmon Resonance Based Fiber Optic Ethanol and Methanol Sensor Using UV light based AgNO₃/ZnO Nanorods" International Conference on Fiber Optics and Photonics, IIT Kanpur, 04 Dec 2016 Th3A.58
12. Payal Suwalka, Shiva Dixit, and **Rajneesh K Verma**, SPR based fiber optic sensor for the detection of adulteration in petrol and diesel by kerosene" IONS-Dhanbad OSA 08 September 2016 IONS-DHN/2k16/110
13. Vikas and **R K Verma**, "A Comparative study of LMR/SPR based tapered fiber optic sensors:A mathematical modelling," OSI-International Symposium on Optics (OSI-ISO 2018) 19-22 September 2018 IIT Kanpur
14. Vikas and **R K Verma**, "A Comparative study of LMR/SPR based tapered fiber optic sensors:A mathematical modelling," Rajasthan Science Congress 12-25 October 2018 IIT Kanpur
15. Chandni Devi, Yagyadev Bhardwaj, Komal Agnihotri, Vikas, S. Kumar and R.K. Verma, "Experimental studies on localized surface plasmon resonance (LSPR) based fiber optic sensors utilizing indium arsenide (InAs) nanowires," Paper number FP 014 Proceedings of the Photonics-2018 ISBN 978-93-88653-41-1 Photonics-2018, *International Conference on Fiber Optics and Photonics December 12-15 2018 IIT Delhi New Delhi (India)*
16. Vikas and R. K. Verma, "Mathematical modeling of Graphene-MoS₂ based tapered fiber optic surface plasmon resonance (SPR) sensors," Paper number FP 013 Proceedings of the Photonics-2018 ISBN 978-93-88653-41-1 Photonics-2018, *International Conference on Fiber Optics and Photonics December 12-15 2018 IIT Delhi New Delhi (India)*
17. Vikas and R. K. Verma, "Detection of adulteration in pure honey using Surface Plasmon Resonance (SPR) based fiber optic sensors," *International Conference on Optics and Electro-Optics (ICOL) IRDE Dehradun October 12-22 2019*.
18. Vikas and R. K. Verma, "SPR Based Fiber Optic Bio-Sensor for the Detection of Urea Using Gold Nanoparticles on the Bulk Layer of Gold Film for Clinical Applications," *International Symposium on Photonics and Plasmonics (ISPP-2019)*, Central University of Rajasthan September 23-24 2019.
19. **Rajneesh K. Verma**, "Recent research activities in Fiber Optics and Plasmonics Laboratory at Central University of Rajasthan," *International Center for Theoretical Physics (ICTP), Italy 03-21 February 2020*.

1. Lectures in Refresher Course on Experimental Physics, Central University of Rajasthan March 10-25 2015.
2. Experiments Supervision in Refresher course on Experimental Physics, Central University of Rajasthan, March 10-25 2015.
3. Participated in one-day workshop on “Best Teaching Practices”, Central University of Rajasthan 04 Oct 2013
4. Felicitated by Central University of Rajasthan for receiving research grant/ Attending International Conference during March 2013-Feb 2014
5. Invited Talk on, “Surface Plasmon Waves: Principle and their application in chemical and biochemical sensing”, International Conference on Nano-biotechnology, Jamia Milia Islamia, New Delhi, Feb 5-6, 2018.
6. Felicitated by Central University of Rajasthan on Foundation day for obtaining second position in hand writing competition amongst teaching and nonteaching staffs of CURAJ
7. Appointed as a School Board member of School of Physical Sciences from July 2018 for two years.
8. Invited Talk on “Role of ICT in Teaching and Learning” in Three Days Training Workshop on Effective Teaching/Learning Methods for Science Teachers of Schools from 7-9 February, 2019
9. *Four Week Induction Training Programme for Faculty of Higher Education Institutes Teaching and Learning Center, Central University of Rajasthan 27th May 22 June 2019*
10. Invited Talk on “Role of ICT in Teaching and Learning” in *Four Week Induction Training Programme for Faculty of Higher Education Institutes Teaching and Learning Center, Central University of Rajasthan 27th May 22 June 2019*
11. Invited Talk on “Fiber Optics: Fundamentals, Recent Research and Probe Fabrication” in National e conference on Interdisciplinary Research in Science and Technology, NCIRTST-20, Department of Physics AIDC, University of Lucknow on 31st May 2020
12. Invited Talk on “Surface Plasmons: Basics and Applications” in an International Conference on Multifunctional Nanomaterials (ICMN-2020)” during December 28-30, 2020 organized by the Department of Physics, Manipal University, Jaipur
13. Invited Talk on “Role of ICT in Teaching and Learning” in Four Weeks Online Induction Training Program For Faculty Members of HEIs 20th Jan - 16th February, 2021

IX. EVENTS ORGANISED

1. Convener of one day event “Knowledge through light” as a celebration of International Year of Light 06 November 2015
Invited Speakers: Professor Ajoy Ghatak, Professor Y.K. Vijay
2. Organizing Committee Member, National Science Day
3. Convener, International Symposium on Photonics and Plasmonics (ISPP-2019) at Central University of Rajasthan 23-24 September 2020
4. Co-ordinator, “Four Week Induction Training Programme for Faculty of Higher Education Institutes” Teaching and Learning Center, Central University of Rajasthan 27th May 22 June 2019
5. Organizing Committee Member, DST-SERC School on Nonlinear Dynamics
6. Organized a two days workshop on Introductory Quantum Mechanics by Professor A.K. Ghatak at Department of Physics IIT Delhi 2009
7. Organized National Webinar
8. Series on Experimental &
9. Organized Online Conference, Computational Tools for Materials Research (ECTMR) June 01 – 08, 2020, jointly with Discipline of Natural Sciences, Indian Institute of Information Technology, Design

दुनिया के शीर्ष 2 % वैज्ञानिकों में सीयूआर के इस बार 9 शिक्षक शामिल आरयू और आरटीयू के शिक्षक भी सूची में, राजस्थान राज्य विद्युत प्रसारण निगम से भी एक नाम शामिल

साहित्यिक प्रवृत्ति | अजमेर

अमेरिका की स्टेनफोर्ड यूनिवर्सिटी ने 2021 की 2 फीसदी शीर्ष वैज्ञानिकों की सूची जारी की है। इसमें दुनियाभर के लगभग एक लाख वैज्ञानिकों को शामिल किया है, जिसमें भारत के करीब 3 हजार वैज्ञानिकों में से राजस्थान के अब तक 22 वैज्ञानिकों के नाम हैं। इनमें सेंट्रल यूनिवर्सिटी ऑफ राजस्थान (सीयूआर) के 9 शिक्षक, एमएनआईटी के 6, राजस्थान यूनिवर्सिटी के 2, राजस्थान टेक्निकल यूनिवर्सिटी के 2, एमपीटी यूनिवर्सिटी के एक शिक्षक के अलावा राजस्थान राज्य विद्युत प्रसारण निगम के एक इंजीनियर का नाम शामिल है। नवीन स्थापित 13 सेंट्रल यूनिवर्सिटीज में सीयूआर टॉप पर है। पिछले साल सीयूआर के 7 शिक्षकों को यह गौरव हासिल हुआ था। वैज्ञानिकों को उनके रिसर्च पेपर्स के आधार पर सूची में शामिल किया गया है। स्टेनफोर्ड यूनिवर्सिटी की ओर से 19 अक्टूबर 2021 को जारी की गई शीर्ष वैज्ञानिकों की सूची में 1 अगस्त

2021 तक डेटाबेस क्लिबेट किया गया था। इस आखिरी तारीख तक मिले वैज्ञानिकों के डेटा बैस के आधार पर इस साल यह सूची जारी की गई। राजस्थान के लिए अच्छी खबर है कि राजस्थान सेंट्रल यूनिवर्सिटी ने इस बार भी अपनी वेहतर एंटी दर्ज करवाई है। इस बार सीयूआर के 9 शिक्षकों को जगह मिली है। इनमें प्रोफेसर संजीव कुमार पांडा, डॉ. विरवनाथ तिवारी, डॉ. कैसर रजा, प्रोफेसर अमित के. गोयल, डॉ. उमेश गुप्ता, प्रोफेसर विपिन कुमार, डॉ. सुरेंद्र निमेश, प्रोफेसर सी.सी. मंडल और प्रोफेसर रजनीश कुमार वर्मा शामिल हैं। खास बात यह है कि प्रोफेसर संजीव कुमार पांडा, प्रोफेसर अमित गोयल, डॉ. रजनीश वर्मा, डॉ. कैसर रजा, डॉ. उमेश गुप्ता और डॉ. सुरेंद्र निमेश पिछले साल की सूची में भी शामिल थे। डॉ. विरवनाथ तिवारी, प्रोफेसर सी.सी. मंडल और डॉ. प्रोफेसर विपिन कुमार का नाम इस फेहरिस्त में इस साल शामिल हुआ है। पिछली सूची में शामिल रहे प्रोफेसर राजेश कुमार इस बार की सूची में शामिल नहीं हैं।



प्रो. अमित गोयल।



डॉ. कैसर रजा।



डॉ. उमेश गुप्ता।



प्रो. संजीव पांडा।



डॉ. रजनीश वर्मा।



डॉ. सुरेंद्र निमेश।



डॉ. विरवनाथ तिवारी।



प्रो. विपिन कुमार।



प्रो. सी.सी. मंडल।

13 सेंट्रल यूनिवर्सिटी का प्रदर्शन | सेंट्रल यूनिवर्सिटी ऑफ गुजरात गांधी नगर 2, सेंट्रल यूनिवर्सिटी ऑफ हरियाणा महेंद्रगढ़ 4, सेंट्रल यूनिवर्सिटी ऑफ हिमाचल प्रदेश कांगड़ा 00, सेंट्रल यूनिवर्सिटी ऑफ झारखंड रांची 1, सेंट्रल यूनिवर्सिटी ऑफ कर्नाटक गुलबर्गा 1, सेंट्रल यूनिवर्सिटी ऑफ कर्पमोर श्रीनगर 00, सेंट्रल यूनिवर्सिटी ऑफ केरला कसरागोड 1, सेंट्रल यूनिवर्सिटी ऑफ पंजाब भटिंडा 9, सेंट्रल यूनिवर्सिटी ऑफ राजस्थान अजमेर 9, सेंट्रल यूनिवर्सिटी ऑफ साउथ बिहार छत्रबुधन पटना 1, सेंट्रल यूनिवर्सिटी ऑफ तमिलनाडु तिरुवरूर 2, सेंट्रल यूनिवर्सिटी ऑफ ओडिशा कोरापुट 00, सेंट्रल यूनिवर्सिटी ऑफ जम्मू खास जम्मू के 3 फिलियेशन यानी तीन नामों को लिस्ट में शामिल किया गया है।

प्रदेश के इन संस्थानों से इनके नाम शामिल | राजस्थान यूनिवर्सिटी से देवेंद्र कुमार और अर्जुनी जैन, राजस्थान टेक्निकल यूनिवर्सिटी से पंकज शर्मा और हरिशा शर्मा, एमपीटी यूनिवर्सिटी राजस्थान से रणेश मिश्रा, राजस्थान टेक्नोलॉजिकल यूनिवर्सिटी से अशोक कुमार शर्मा और राजस्थान राज्य विद्युत प्रसारण निगम से ओम प्रकाश मेहता का नाम भी इस सूची में शामिल है।