



VINEET KUMAR RAI

ASSISTANT PROFESSOR

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Qualification: M. Sc. (Physics), M.Sc. (Mathematics),

Ph. D. (Physics) – Banaras Hindu University

Nine years of research experience. Post doctoral research experience of working at UFPE, Recife, PE-Brasil.

Interactions with: B.H.U. Varanasi India; UFPE, Recife, PE- Brasil; Université Rennes France; Laboratoire de Photonique Quantique et Moleculaire, Institut d'Alembert, Ecole Normale Supérieure de Cachan, Cachan, France; Mechanical Engineering Department, Chung-Ang University, Seoul, Korea.

Specialization: Atomic & Molecular Physics, Laser Physics, Phosphors, Nanophotonics

Research Interests: (1) Two / three photon absorption and Optical Limiters (2) Optical properties of rare earth doped glasses with / without nanoparticles: (a) Upconversions (b) Absorption, Fluorescence and Lifetime analysis of the levels involved (c) Sensors, Nanomaterials, Nanophosphors and their applications (3) Overtone spectroscopy (4) Thermal Lensing (5) Photoacoustic Spectroscopy.

CURICULAM VITAE OF DR. VINEET KUMAR RAI

1. **Name:** Dr. Vineet Kumar Rai
2. **Designation:** Assistant Professor
3. **Date of Birth:** July 12, 1976
4. **Address (Office):** Dr. Vineet Kumar Rai
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5. Educational Qualifications:

Sl.No.	Name of Exam.	Name of Board/ University	Class/ Division (%)	Year	Subject
1	Ph.D.	Banaras Hindu University, India		2003	Physics
2	NET(National Eligibility Test)	C.S.I.R., India		2001	Physics
3	M.Sc.	Purvanchal University Jaunpur, India	I	1998	Mathematics
4	M.Sc.	Purvanchal University Jaunpur, India	I	1996	Physics
5	B.Sc	Purvanchal University Jaunpur, India	I	1994	Maths, Physics, Chemistry
6	Intermediate	U.P.Board Allahabad, India	I	1991	Hindi,English,Maths, Physics,Chemistry
7	High School	U.P.Board Allahabad, India	I	1989	Hindi,English,Maths, Science, Soc. Sc., Bio.

6. **Awards and Professional record :**(a) RET Fellowship, B. H. U., Varanasi, India (b) Senior Research Fellowship, C.S.I.R. India (c) Research Associate,

C.S.I.R. India (d) Post Doctoral Fellow in CNPq, Departamento de Fisica, UFPE, 50670-901 Recife, PE - Brasil.

7. Other Awards:

- (i). Qualified the prestigious '*National Eligibility Test (NET)*' Conducted by "Council of Scientific & Industrial Research (C.S.I.R.), New Delhi, India.
- (ii). Awarded by BK-21 fellowship, South Korea (not joined).
- (iii). **Young Scientist Award: *DST-FAST TRACK***

8. Membership of Professional Societies: (1) Laser and Spectroscopy Society of India (LASSI) (2) Optical Society of America (OSA).

9. Thesis guided: (i) Dissertation: M. Phil. (01) & M.Sc. (03)

10. P.I. of Research Projects: (i). One from DST under FAST TRACK - On going from 23-09-2009.

(ii). One from Indian School of Mines-On going.

11. Experience: More than nine years research experience.

(i) 5 years research experience during Ph. D. program

(ii) More than four years Post doctoral research experience

12. Research Expertise / interest: (1) Two / three photon absorption and Optical Limiters (2) Optical properties of rare earth doped glasses with / without nanoparticles: (a) Upconversions (b) Absorption, Fluorescence and Lifetime analysis of the levels involved (c) Sensors, Nanomaterials, Nanophosphors and their applications (3) Overtone spectroscopy (4) Thermal Lensing (5) Photoacoustic Spectroscopy.

13. Experimental skills: (1). Alignment of various experimental setup for the above mentioned research expertise (2) Handling of various kinds of CW (Ar⁺-Argon ion, Nd: YVO₄ etc.), Pulsed (nano/picoseconds) Nd: YAG, Dye lasers, Ti-Sapphire laser etc. (3). Familiar with the handling of various sophisticated detection systems as PMTs, Oscilloscopes, sensitive detectors, etc.

14. Other activities: Reviewed several articles for the refereed Journals viz. Spectrochimica Acta A, Journal of Pharmaceutical Biology, Bulletin of the Chemical Society of Ethiopia, Journal of Luminescence, Journal of Fluorescence, Journal of American Ceramic Society, Optica Applicata and others.

Publications

A) Research papers published in reputed journals: *Total number: 44*

1. **Rai, V. K.**, Rai, D.K. and Rai, S.B. (2003): Overtone bands in aniline and its chloroderivatives-a low concentration study. *Spectrochim. Acta A* 59, 1299-1306.
2. **Rai, V. K.** and Rai, S.B. (2003): Overtone absorption spectra of some aliphatic amines. *Ind. J. Phy. B* 77, 351-354.
3. **Rai, V.K.**, Rai, A. K., Rai, D.K. and Rai, S.B. (2004): Overtone spectra of aniline derivatives. *Spectrochim. Acta A* 60, 53-56.
4. **Rai, V.K.**, Rai, S.B., Singh, I. D. and Siyaram (2004): Spectroscopic studies of some aliphatic alcohols. *Ind. J. Phy. B* 78, 1-6.
5. **Rai, V.K.**, Rai, D. K. and Rai, S. B. (2004): Optical properties of Tb³⁺ doped in tellurite glass. *J. Material Science Letter* 39, 4971-4975.
6. **Rai, V.K.** and Rai, S. B. (2004): Optical transitions of Dy³⁺ doped in tellurite glass-Observation of upconversion. *Solid State Communications* 132, 647-652.
7. Tripathi, G., **Rai, V.K.** and Rai, S.B. (2004): Overtone bands in Phenol derivatives. *Ind. J. Phys. B* 78, 1377-1380.
8. **Rai, V.K.**, Rai, D. K. and Rai, S. B. (2005): Spectroscopic properties of Pr³⁺ doped in tellurite glass. *Spectrochim. Acta A* 62, 302-306.
9. Tripathi, G., **Rai, V.K.** and Rai, S.B. (2005): Spectroscopy and upconversion of Dy³⁺ doped in Sodium Zinc phosphate glass. *Spectrochim Acta A* 62, 1120-1124.
10. Rai, A. and **Rai, V.K.** (2005): Optical properties and upconversion in Pr³⁺ doped in Aluminium, Barium, Calcium Fluoride glass-II. *Ind. Chemical Society*, 82, 697-700.
11. Rai, A. and **Rai, V.K.** (2006): Optical properties and upconversion in Pr³⁺ doped in Aluminium, Barium, Calcium Fluoride glass-I.. *Spectrochim. Acta A* 63, 27-31.
12. **Rai, V.K.**, Rai, S. B. and Rai, D.K. (2006): Optical properties of Dy³⁺ doped in tellurite glass. *Optics Communications* 257, 112-119.

13. **Rai, V.K.**, Rai, S.B. and Rai, D.K. (2006): Pr³⁺ doped tellurite glass as temperature sensor. *Sensors and Actuators A* 128, 14-17.
14. Tripathi, G., **Rai, V.K.** and Rai, S.B. (2006): Spectroscopic studies of Eu³⁺ doped calibo glass: Effect of the addition of barium carbonate, energy transfer in the presence of Sm³⁺. *Optics Communications* 264, 116-122.
15. Tripathi, G., **Rai, V.K.** and Rai, S.B. (2006): Optical properties of Sm³⁺: CaO-Li₂O-B₂O₃-BaO glass and codoped Sm³⁺:Eu³⁺. *Appl. Phys. B* 84, 459-464.
16. **Rai, V.K.** and Rai, S.B. (2006): Experimental validation of fluorescence intensity ratio/fluorescence lifetime temperature sensing technique *Sensors & Transducers Journal* 74, 839-843.
17. **Rai, V.K.** and Rai, A. (2007): Temperature sensing behaviour in Eu³⁺ doped tellurite and calibo glasses. *Appl. Phys. B* 86, 333-335.
18. **Rai, V.K.**, Kumar, K. and Rai, S. B. (2007): Upconversion in Pr³⁺ doped in tellurite glass. *Optical Materials* 29, 873-878.
19. Rai, N. and **Rai, V.K.** (2007): Lifetime based temperature sensing. *Sensors & Transducers Journal* 77, 1040-1044.
20. **Rai, V. K.** and Rai, S.B. (2007): A comparative study of FIR and FL based temperature sensing schemes: An example of Pr³⁺. *Appl. Phys. B* 87, 323-325.
21. Tripathi, G., **Rai, V.K.**, Rai, D.K. and Rai, S.B. (2007): Upconversion in Er³⁺ doped Bi₂O₃-Li₂O-BaO-PbO tertiary glass. *Spectrochim. Acta A* 66, 1307-1311.
22. **Rai, V.K.** and Rai, S.B. (2007): Frequency upconversion in Pr³⁺:Li₂O-TeO₂ binary glass by decay curve analysis. *Spectrochim. Acta A* 68, 460-462.
23. Tripathi, G., **Rai, V.K.** and Rai, S.B. (2007): Upconversion and Temperature sensing behavior in Er³⁺ doped tertiary glass. *Optical Materials* 30, 201-206.
24. **Rai, V.K.** (2007): Sm³⁺ as a Fluorescence lifetime temperature sensing. *IEEE Sensors Journal* 7, 1110-1111.
25. **Rai, V.K.**, Menezes, L. S. and Araujo, C. B. de (2007): Stokes luminescence and frequency upconversion in Pr³⁺ doped TeO₂-PbO glass. *J. Appl. Phys.*, 101, 123514 (1-3).
26. **Rai, V.K.** (2007): Temperature Sensor and Optical Sensor. *Appl. Phys. B* 88, 297-303.
27. **Rai, V.K.**, Menezes, L. S. and Araujo, Cid B. de (2007): Spectroscopy, energy transfer and frequency upconversion in Tm³⁺ doped TeO₂-PbO glass. *J. Appl. Phys.*, 102, 43505 (1-4).

28. **Rai, V.K.** and Rai, S.B. (2007): Temperature sensing behavior of the Stark sublevels. *Spectrochim. Acta A* 68, 1406-1409.
29. **Rai, V.K.** and Araujo, C. B. de (2008): Fluorescence intensity technique for Sm^{3+} doped calibo glass. *Spectrochim Acta A*, 69 509-512.
30. **Rai, V.K.**, Menezes, L. S. and Araujo, Cid B. de (2008): Infrared –to- green and blue upconversion in Tm^{3+} doped TeO_2 - PbO glass. *J. Appl. Phys.*, 103 53514 (1-4).
31. **Rai, V.K.** and Araujo, C. B. de (2008): Limit of accuracy for fluorescence lifetime temperature sensing. *Spectrochim. Acta A*, 71 116-118.
32. Tripathi, G., Rai, V.K. and Rai, S.B. (2008): Energy transfer between Er^{3+} : Sm^{3+} codoped binary tellurite glass. *Spectrochim. Acta A*, 71 486-489.
33. **Rai, V.K.**, Menezes, L. S. and Araujo, Cid B. de (2008): Two photon absorption in TeO_2 - PbO glass excited at 532 and 590nm. *Appl. Phys. A*, 91 441-443.
34. **Rai, V.K.**, Araujo, C. B. de, Ledemi, Y., Bureau, B., Poulain, M., Zhang, X. H. and Messaddeq, Y. (2008): Frequency upconversion in a Pr^{3+} doped chalcogenide glass containing silver nanoparticles. *J. Appl. Phys.*, 103, 103526 (1-4).
35. **Rai, V.K.**, Menezes, L. S., Araujo, Cid B. de, Kassab Luciana R. P., Silva Davinson M. da, Kobayashi Renata A. (2008): Surface-plasmon-enhanced frequency upconversion in Pr^{3+} doped tellurium-oxide glasses containing silver nanoparticles. *J. Appl. Phys.*, 103, 093526 (1-4).
36. Singh, V., **Rai, V. K.**, Ledoux, I., Watanabe, S., Gundu Rao, T. K., Chubaci, J.F.D., Badie, L., Pelle, F., Ivanova, S. (2009): NIR to Visible up-conversion, Infrared luminescence, thermoluminescence and defect centers in Y_2O_3 : Er phosphor phosphor. *J. Phys. D*, 42 65104 (1-9).
37. **Rai, V. K.** (2009): Upconversion due to Energy transfer involving Pr^{3+} ions in pairs. *Appl. Phys. B*, 95 329-333.
38. Singh, V., **Rai, V. K.**, Ledoux-Rak, I., Kwak, Ho-Young (2009): Visible upconversion and NIR luminescence studies of LiAl_5O_8 : Er phosphor co-doped with Yb^{3+} and Zn^{2+} . *Appl. Phys. B*, 97 103-107.
39. Singh, V., **Rai, V. K.**, Ledoux-Rak, I., Badie, L., Kwak, Ho-Young (2009): Visible upconversion and infrared luminescence investigations of Al_2O_3 powders doped with Er^{3+} , Yb^{3+} and Zn^{2+} ions. *Appl. Phys. B*, 97 805-809.

40. **Rai, V.K.**, Araujo, C. B. de, Ledemi, Y., Bureau, B., Poulain, M., Zhang, X. H. and Messadeg, Y. (2009): Optical spectroscopy and upconversion luminescence in Nd³⁺ doped Ga₁₀Ge₂₅S₆₅ glass. *J. Appl. Phys.*, 106103512.
41. Rai, Nirupama, Jha, Y., Kamal, K. P., Kumar S. and **Rai, V. K.** (2010): Conversion of orange light into blue light, *Spectrochim. Acta A*, 76, 311-314.
42. **Rai, V. K.** (2010): Local field effect of the host matrix on the decay time of the doped emitters, *Appl. Phys. B*, 100, 871-874.
43. Singh, V., **Rai, V. K.**, Ledoux, I., Watanabe, S., Gundu Rao, Kwak, Ho-Young (2010): Infrared emissions, visible upconversion, thermoluminescence and defect centers in Er₃Al₅O₁₂ phosphor obtained by solution combustion reaction. *Appl. Phys. B* (accepted) DOI 10.1007/s00340-010-4199-z.
44. Singh, V., **Rai, V. K.**, Watanabe, S., Gundu Rao, Ledoux-Rak, I., Kwak, Ho-Young (2010): Infrared emission and defect centers in Er and Yb co-doped Y₃Al₅O₁₂ phosphors. *Appl. Phys. A- Materials Science & Processing*, 100, 1123-1130.

B) Contributions to academic National / International conferences: 20

1. **Rai, V.K.**, Rai, D. K. and Rai, S. B. (2001): Overtone bands in aniline and its chloroderivatives. National Symposium on Atomic, Molecular, Structure, Interactions and Laser Spectroscopy held at B.H.U. Varanasi India.
2. **Rai, V.K.**, Rai, D. K. and Rai, S. B. (2004): Overtone bands in aliphatic aniline derivative. National Symposium on Atomic, Molecular, Structure, Interactions and Laser Spectroscopy held at B.H.U. Varanasi India.
3. **Rai, V.K.**, Rai, D. K. and Rai, S. B. (2004): Optical studies of Dy³⁺ doped in tellurite glass. The 15th National Conference of the ISAMP held at Physical Research Laboratory, Ahmedabad India.
4. **Rai, V.K.**, Rai, D. K. and Rai, S. B. (2004): Optical properties of Tb³⁺ doped tellurite glass. 7th Conference of the International Academy of Physical Sciences (CONIAPS-VII,) held at University of Allahabad India, December 21-23,.
5. Tripathi, G., **Rai, V. K.** and Rai, S. B. (2004): Overtone bands in Phenol derivatives. 7th Conference of the International Academy of Physical Sciences (CONIAPS-VII, 2004) held at University of Allahabad India, December 21-23.
6. **Rai, V.K.** and Rai, S. B. (2005): Upconversion in triply ionized praseodymium doped tellurite glass' International conference- Humboldt Kollege, Structure and

Characterization of Physical, Chemical, Bio and Geo Materials, held at BHU India, November 28-30.

7. **Rai, V.K.**, Rai, D. K. and Rai, S. B. (2005): Triply ionized praseodymium as a temperature sensor. National Symposium on Recent Trends in Fluorescence Spectroscopy and its applications, held at Kumaun University Nainital Uttarakhand India, December 1-3.
8. Tripathi, G., **Rai, V.K.** and Rai, S. B. (2005): Spectroscopy and Upconversion of Dy^{3+} doped in phosphate glass. National Symposium on Recent Trends in Fluorescence Spectroscopy and its applications, held at Kumaun University Nainital Uttarakhand India December 1-3.
9. **Rai, V.K.**, Rai, D. K. and Rai, S. B. (2006): Triply ionized praseodymium as temperature sensor. INDO-US workshop on Future Trends in Spectroscopy: Application to National Security held at BHU Varanasi India, January 9-11.
10. Tripathi, G., **Rai, V.K.** and Rai, S. B. (2006): Spectroscopic studies of Eu^{3+} doped calibo glass. 2nd International Conference on 'Current Developments in Atomic, Molecular & Optical Physics with applications 'CDAMOP' held at K. M. College, Delhi University India, March 21-23.
11. **Rai, V.K.** (2006): Pr^{3+} doped lithium tellurite glass as a temperature sensor. International Symposium on Non-oxide Glasses 'ISNOG' held at Indian Institute of Science Bangalore India, April 10-14.
12. Y. Ledemi, Y. Messaddeq, B. Bureau, M. Poulain, X. H. Zhang, Rai, V. K., Araujo, Cid B. de (2007): 'Upconversion in Pr^{3+} doped chalcogenide glasses containing silver nano structures' IV International Symposium on Non-Crystalline Solids / VIII Brazilian Symposium on glass and related materials, Aracaju, Sergipe, Brasil, October 21-25.
13. Y. Ledemi, B. Bureau, M. Poulain, X. H. Zhang, Y. Messaddeq, Rai, V. K. and Araujo, Cid B. de (2008): 'Enhancement of rare-earth ions luminescence in sulphide based glasses for low energy lighting' 16th International Symposium on Non Oxide and New Optical Glasses (ISNOG), Montpellier, France, April 21-25.
14. Rai, V.K., Menezes, L. S. and Araujo, Cid B. de (2008): 'Linear and nonlinear optical properties of TeO_2 -PbO glass samples pure and singly doped with Pr^{3+} and Tm^{3+} ', XXXI ENCONTRO NACIONAL DE FÍSICA DA MATÉRIA CONDENSADA, Águas de Lindóia, Sao Paulo Brasil, May 5-9.

15. Rai, V. K. (2009): 'Upconversion Due to Energy Transfer Involving Pr^{3+} ions in pairs' National Symposium on Advances in Lasers and Spectroscopy, Department of Physics & Electronics and Department of Chemistry, Dr. Hari Singh Gour Vishwavidyalaya Sagar (M. P.), India, February 27-28.
16. Rai, V. K.. (2009): 'Optical limiting behavior in lead based binary glass' Meghnad Saha Memorial Symposium on "Emerging Trends in Laser & Spectroscopy and Applications" MMSETLSA-2009, (delivered an invited talk) Department of Physics, Allahabad University, Allahabad, India, March 23-25.
17. Rai, V. K.. (2010): 'Effect of the local field on the lifetime of the emitters' SPECTROSCOPIC SIGNATURES OF MOLECULAR COMPLEXES/IONS IN OUR ATMOSPHERE AND BEYOND' (oral presentation) International workshop organized by Department of Physics, Udai Pratap Autonomous College, Varanasi at Dr. K. N. Udupa Auditorium, IMS, Banaras Hindu University, Varanasi, February 2-4, 2010.
18. Mohanty, D. K., Rai, V. K.. (2009): 'Upconversion in Pr^{3+} doped PGO glass' SPECTROSCOPIC SIGNATURES OF MOLECULAR COMPLEXES/IONS IN OUR ATMOSPHERE AND BEYOND' International workshop organized by Department of Physics, Udai Pratap Autonomous College, Varanasi at Dr. K. N. Udupa Auditorium, IMS, Banaras Hindu University, Varanasi, February 2-4, 2010.
19. Rai, V.K. (2010): 'Optical glasses as temperature sensors and optical limiters' National Seminar on Photonics and Materials -NASPAM-2010 (Invited talk), Department of Applied Physics, ISM Dhanbad-826004, Jharkhand India, March 25-27.
20. Rai, V.K. (2010): 'Enhanced Upconversion emission in Er^{3+} - Yb^{3+} codoped TPO glass' International conference on Recent Frontiers in Applied Spectroscopy (ICORFAS-10) (oral presentation), Department of Physics, Annamalai University, Annamalai Nagar, 608002, Tamil Nadu, India, September 22-24, ISB 93-80697-14-7; 9789380697147.