



Dr. Vikas Tayal, Assistant Professor



Department of Physics
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Curriculum Vitae

RESEARCH INTERESTS

Atomic and Molecular Collision Physics, Atomic Structure Calculations, Relativistic and Semi-Relativistic Structure Calculations of Atoms and Ions

BIOSKETCH

EDUCATION

- 2008 **Ph.D. in Atomic Physics**, *Sanatan Dharm College*, Muzaffarnagar (U.P.) India
- 2000 **Masters in Physics**, *Sanatan Dharm College*, Muzaffarnagar (U.P.) India
- 1998 **Bachelors in Science (Physics, Chemistry & Mathematics)**, *D.A.V.(P.G.) College*, Muzaffarnagar (U.P.) India

EXPERIENCE

Current

31 Oct'19-
Till Date **Assistant Professor**, Department of Physics, Harsh Vidya Mandir (P.G.) College, Raisi (Haridwar)

Previous

19 March'18 -
30 Oct' 19 **Associate Professor & Head**, Department of Physics, Keral Verma Subharti College of science, Swami Vivekanand Subharti University, Meerut

25 July'13-
15 March'18 **Associate Professor**, IIMT College of Engineering, Greater Noida (U.P.)

01 Jan'11-
15 June'13 **Associate Professor**, Dronacharya College of Engineering, Greater Noida (U.P.)

05 Feb'09-
31 Dec'11 **Assistant Professor**, Dronacharya College of Engineering, Greater Noida (U.P.)

15 July'07-
04 Feb'09 **Lecturer**, Echelon Institute of Technology, Faridabad

Awards/ Grants

- 2023 Partial financial support also sanctioned by the INSA (Indian National Science Academy, New Delhi) for presenting one research paper in “33rd International Conference on Photonic, Electronic and Atomic Collisions” (XXXIII-ICPEAC) held at **Ottawa, Canada**, from July 25, 2023- August 1, 2023
- 2021 Awarded IUPAP grant by conference organizer to participate in the 32nd International Conference on Photonic, Electronic and Atomic Collisions (ViCPEAC 2021) held at **Ottawa, Canada**, from July 20, 2021 – July 23, 2021
- 2011 Travel grant sanctioned by the Department of Science & Technology (DST) vide letter No. SR/ITS/1816/2011-2012 dated June 14, 2011 for the participation and presented one research paper in “27th International Conference on Photonic, Electronic and Atomic Collisions” (XXVII-ICPEAC) held from July 27 to August 2, 2011 at Queen's University of Belfast, **Northern Ireland, United Kingdom**
- 2011 Partial financial support also sanctioned by the INSA (Indian National Science Academy, New Delhi) for presenting one research paper in “27th International Conference on Photonic, Electronic and Atomic Collisions” (XXVII-ICPEAC) held from July 27 to August 2, 2011 at Queen's University of Belfast, **Northern Ireland, United Kingdom**

MEMBERSHIPS

- Indian Society of Atomic and Molecular Physics (ISAMP), Life member
- Neutron Scattering society of india, Mumbai (Life member)

PHD THESIS

Title Energy Levels, Oscillator Strengths and Lifetimes in ions of Mg- isoelectronic sequence

Supervisor **Dr. G. P. Gupta**, Reader & Head, Department of Physics, *Sanatan Dharm College*, Muzaffarnagar (U.P.) India

PUBLICATIONS

Books

- 1 “Optical Fiber Communications Principles and Practice” **Vikas Tayal** and Nirdesh Kumar, AMIGA Publication 2022, ISBN-978-93-91670-31-3
<https://drive.google.com/file/d/1zJRaV3myxHtWeczND44xsbpBIKpfu7wU/view?usp=sharing>
- 2 “Microwave Circuit Design using Linear and Non Linear Techniques” Nirdesh kumar and **Vikas Tayal**, AMIGA Publication, ISBN-978-93-91670-40-5
<https://drive.google.com/file/d/1GwwkD49rfLD1Mwr2jIN-1vLTDkYbaEB7/view?usp=sharing>

Patents

- “A system and method for providing Mathematical model for blood flow in artery having multiple stenosis in the presence of externally imposed magnetic field”
Patent Filed: 01 June, 2023, Patent Published: 07 July 2023,
Indian Patent – 202311037719, The Patent Office Journal No. 27/2023
- “A system and method for providing Computational model for the blood flow in stenosed artery with complete bypass graft”
Patent Filed: 06 June, 2023, Patent Published: 07 July 2023,
Indian Patent – 202311038915, The Patent Office Journal No. 27/2023
- “A mobile wireless video surveillance robot for constant sighting check”
Patent Filed: 21 February, 2023, Patent Published: 17 March, 2023,
Indian Patent – 202311011880, The Patent Office Journal No. 11/2023
- “Nanotechnology based drug delivery system of nano-carriers”
Patent Filed: 06 February 2023, Patent Published: 17 February 2023,
Indian Patent – 202321007521, The Patent Office Journal No. 07/2023

Refereed Journals Papers

9. G.P. Gupta, **Vikas Tayal** and A.Z. Msezane, “Fine-Structure Energy Levels and Radiative Rates in Si-Like Chlorine” *Indian Journal of Physics*, **86**(1), 1-8(2012)
<https://link.springer.com/article/10.1007/s12648-012-0006-5>
8. **Vikas Tayal** and G. P. Gupta, “Excitation Energies and Radiative Rates in Mg-Like Copper” *Physica Scripta* **80**, 055301 (2009)
<https://iopscience.iop.org/article/10.1088/0031-8949/80/05/055301>
7. **Vikas Tayal**, G. P. Gupta and A.N. Tripathi, “Energy Levels, Oscillator Strengths and Lifetimes in Ar V” *Indian Journal of Physics* **83** (9), 1271-1288 (2009)
<https://link.springer.com/article/10.1007/s12648-009-0108-x>
6. **Vikas Tayal** and G. P. Gupta, “Fine-Structure Energy Levels, Oscillator Strengths and Lifetimes in Mg-Like Chromium” *European Physics Journal D***44**, 449-457 (2007)
<https://link.springer.com/article/10.1140/epjd/e2007-00217-3>
5. **Vikas Tayal** and G. P. Gupta, “Energy Levels, Oscillator Strengths and Lifetimes in Si-Like Ca VII” *Physica Scripta* **75**, 331-339 (2007)
<https://iopscience.iop.org/article/10.1088/0031-8949/75/3/019>
4. K.M. Aggarwal, **Vikas Tayal**, G.P. Gupta and F.P. Keenan, “Energy Levels and Radiative Rates for Transitions in Mg-Like Iron, Cobalt and Nickel” *Atomic Data and Nuclear Data Tables* **93**, 615-710 (2007)
<https://www.sciencedirect.com/science/article/abs/pii/S0092640X07000253>
3. **Vikas Tayal** and G.P. Gupta “Fine-Structure Energy Levels and Lifetimes in Br XXIV” *Journal of Physics B: At. Mol. Opt. Phys.* **38**, 4135-4144 (2005)
<https://iopscience.iop.org/article/10.1088/0953-4075/38/22/016>
2. **Vikas Tayal**, G.P. Gupta and A.N. Tripathi, “Calculated Energy Levels, Oscillator Strengths and Lifetimes in Mg-Like Argon” *Indian Journal of Physics* **79**(11), 1243-1251 (2005)
1. **Vikas Tayal**, G.P. Gupta and A.Z. Msezane, “Excitation Energies, Oscillator Strengths and Lifetimes in Ca IX” *Physica Scripta* **71**, 627-637 (2005)
<https://iopscience.iop.org/article/10.1088/0031-8949/71/6/009>

Refereed Conferences

International

- 13 **Vikas Tayal** "Fine-Structure Energy levels, oscillator strengths and lifetimes in Ca VII" in Spatially Resolved Spectroscopy with ELTs held at Department of Physics, University of Oxford, **London (United Kingdom)**, from Sep 20, 2021 – Sep 24, 2021
- 12 **Vikas Tayal** "Correlation Effects on Fine-Structure Energy Levels, Oscillator Strengths and Lifetimes in Cr XIII" in "32nd International Conference on Photonic, Electronic and Atomic Collisions" (VICPEAC 2021) held at **Ottawa, Canada**, from July 20, 2021 – July 23, 2021
- 11 **Vikas Tayal**, G.P. Gupta and A.Z. Msezane, "Fine-Structure Energy Levels, Radiative Rates and Lifetimes in Fe XIII" Presented in 27th International Conference on Photonic, Electronic and Atomic Collisions (XXVII-ICPEAC-2011) was held at Queen's University Belfast, Northern Ireland (**United Kingdom**), from 27 July - 2 August 2011
- 10 **Vikas Tayal**, G.P. Gupta and M.K. Sharma, "Correlation Effects in Fine-Structure Energy Levels, Oscillator Strengths in Ca VI" Presented in 26th International Conference on Photonic, Electronic, and Atomic Collisions (XXVI ICPEAC) was held at Kalamazoo, Michigan, **USA**, from July 22-28, 2009
- 9 G.P. Gupta, **Vikas Tayal** and A.Z. Msezane, "Energy Levels, Oscillator Strengths and Lifetimes in Ar V" Presented in 25th International Conference on Photonic, Electronic, and Atomic Collisions (XXV ICPEAC) was held at Freiburg, **Germany**, from July 25-31, 2007
- 8 **Vikas Tayal** and G.P. Gupta, "Excitation Energies and Radiative Rates in Mg-Like Copper" Presented in 25th International Conference on Photonic, Electronic, and Atomic Collisions (XXV ICPEAC)" was held at Freiburg, **Germany**, from July 25-31, 2007
- 7 **Vikas Tayal** and G. P. Gupta, "Large Scale CIV3 Calculations of Fine-Structure Energy Levels and Lifetimes in Mg-Like Iron, Cobalt and Nickel" Presented in 37th Conference of the European Group for Atomic Systems (EGAS) was held at Dublin City University, **Dublin** (Ireland), August 3rd – 6th, 2005

National

- 6 **Vikas Tayal** and G.P. Gupta, "Fine-Structure Energy Levels, Oscillator Strengths and Lifetimes in Si-Like Calcium" Presented in 2nd DAE-BRNS Symposium on Atomic, Molecular and Optical Physics" (XVIIIth National Conference on Atomic and Molecular Physics) was held at Karnata University (Dharwad) **Karnatak**, from February 22-25, 2011
- 5 **Vikas Tayal** and G.P. Gupta, "Fine-Structure Energy Levels, Oscillator Strengths and Lifetimes in Si-Like Argon" Presented in DAE-BRNS Symposium on Atomic, Molecular and Optical Physics was held at Inter University Accelerator Centre, **New Delhi**, from February 10-13, 2009
- 4 **Vikas Tayal** and G.P. Gupta, "Fine-Structure Energy Levels, Oscillator Strengths and Lifetimes in Cu XVIII" Presented in Topical Conference on Atomic and Molecular Physics (TC2008) was held at Vallabh Vidyanagar, **Gujarat** (India), from January 3-5, 2008

- 3 **Vikas Tayal** and G.P. Gupta, "Energy Levels, Oscillator Strengths and Lifetimes in Si-Like Ca VII" Presented in *XVI National Conference on Atomic and Molecular Physics* (NCAMP) was held at Tata Institute of Fundamental Research, **Mumbai** (India), from Jan. 08-11, 2007
- 2 **Vikas Tayal** and G.P. Gupta, "Fine-Structure Energy Levels and Lifetimes in Fe XV, Co XVI and Ni XVII" Presented in *2nd International Conference on Current Developments in Atomic, Molecular and Optical Physics with Applications* (CDAMOP) was held at **New Delhi** (India), from March 21-23, 2006
- 1 **Vikas Tayal** and G.P. Gupta, "Excitation Energies, Oscillator Strengths and Lifetimes in Mg-Like Calcium" Presented in *XV National Conference on Atomic and Molecular Physics* (NCAMP) was held at P.R.L. Navrangpura, **Ahmedabad** (India), from December 20-23, 2004

MISCELLANEOUS

- 9 Webinar series on "*Application of advanced Nanocomposites*" organized by Department of Science Alliance University, **Bengaluru** March 15-17, 2023
- 8 Online Faculty Development Programme on "*AI Driven Next Generation Wearable Technologies*" organized by Centre for Innovation and Product Development (CIPD) from 13th to 15th March, 2023 at Vellore institute of Technology, **Chennai**.
- 7 One-Week Faculty Development Programme on "*Recent Advancements in Science and Technology*" organized by Department of Science, Alliance University, **Bengaluru** March 06-10, 2023
- 6 Two Days National Workshop on "*Recent Trends in Energy Harvesting and Storage Technologies*" organized by Department of ECE, Koneru Lakshmaiah Education Foundation, **Andhra Pradesh** from Jan 19-20, 2023
- 5 "*7th Conference on Neutron Scattering (CNS-2021)*" was held at Bhabha Atomic Research Centre & Neutron Scattering Society of India, in **Mumbai** from 25-27 November 2021.
- 4 *Delivered a Invited talk in the webinar on "Advanced Materials in Nanotechnology"* organized by Department of Physics, Keral verma Subharti College of Science, **Meerut** on 2nd November 2021
- 3 Two Days National Conference on "*Advances in Theoretical Physics, Material and Atmospheric Sciences*" was held at Govt. P. G. College Dakpatthar, **Dehradun**, Uttarakhand from July16-17 2021.
- 2 Virtual Symposium on "*Recent Technological Advancement in Wide/Ultra-wide Band Gap Semiconductor Materials, Devices and Applications*": A Step towards Atma Nirbhar Bharat was held at BITS, **Pilani** on 10th April, 2021
- 1 One-Week Faculty Development Programme on "*Open Source Tools For Research*" organized by Teaching Learning Centre, Ramanujan College, University of **Delhi** under the aegis of Ministry of Education Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching from 03-09 April, 2021

Research Skills

- Currently, I am performing “Large Scale Calculations on Atomic Structure & Electron-Ion Collision Processes” and using very well established “Configuration-Interaction (CIV3)” computer code of Professor Alan Hibbert, Queen’s University of Belfast, Northern Ireland (UK) to generate extensive wave functions in both LS as well as intermediate coupling scheme. These wave functions are used to calculate the energy levels, oscillator strengths, transition probabilities and lifetimes of the ions. The calculated atomic data such as energy levels, oscillator strengths and the lifetimes are required to interpret the observations now becoming available from a number of missions, recently, launched by National Aeronautics and Space Administration (NASA) and have wide applications in many astrophysical studies. These are useful for estimating the energy loss through impurity ions in fusion plasmas, and for diagnostic and modeling of the plasmas.

TEACHING ENGAGEMENTS

Mathematical Physics	Autumn
Atomic and Molecular Physics	Spring
Partical Physics	Autumn
Laser and Fiber Optics	Spring
Elements of Modern Physics	Autumn
Electronics –I (Network Theorems, solid state devices, Rectifier and filters) Quantum Mechanics	Autumn
Quantum Mechanics	Spring