*Dr. Rajeev K. Pathak* Brief Curriculum Vitae

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| ­ADDRESS  Dr. Rajeev K. Pathak  E-17, Apartment 205,  Brahma Memories , Bhosale Nagar  Pune-411007  Maharashtra State  India – 411007  Tel: **+91 992 191 5235** (CELL, INDIA)  Tel: **+91 202 556 0262** (LANDLINE, INDIA)  Tel: **+1 619 512 6975** (U.S.A.): when on visit  E-mail: **snehalandrajeev**[**@gmail.com**](mailto:iyengarpavan@gmail.com) | EDUCATION  1982-1987; 1992, 1997 **Postdoctoral Research**  ***University of North Carolina****, Chapel Hill, NC, USA;*  ***Tulane University****, New Orleans, LA, USA;*  ***University of New Brunswick****, Fredericton, NB, Canada;* (again---)  ***Tulane University****, New Orleans, LA, USA*  October 1982 **Ph.D.** in **Physics**  *Department of Physics, University of Poona, Pune, MH, India*  June 1978 **M.Sc.** in **Physics**  *Department of Physics, University of Poona*  June 1976 **B.Sc.** in **Physics**  *Fergusson College, University of Poona* |
| CAREER SUMMARY  • Physics teacher at the College and University levels with over 20 years experience in teaching core (basic) physics courses:  (i) Introductory physics at the undergraduate level in a liberal arts set-up, in U.S.A;  and  (ii) Basic physics courses and elective theoretical physics courses at the graduate and post-graduate (master’s and beyond) level, in India.  • Research experience of over 33 years in Atomic and Molecular physics, in the fields of: many-electron problems, density functional theory, electron momentum distributions, mathematical physics, molecules and molecular nano-clusters: hydration of clusters, hydrogen bonding, clusters interacting with external fields.    • Advising doctoral and master’s degree students; writing and obtaining grants for research projects.  ***Education***: Doctoral (Ph.D.); Postdoctoral Research (---chiefly in U.S.A.).  Computation  Fortran (conversant), C, C++; Linux, Windows | CAREER OBJECTIVE  • To educate; to elucidate; to bring out the excitement in learning physics. To apply effectively the maxims of physics to diversified problems and phenomena. Invoke physical thought process in students. To ‘instill’ a holistic viewpoint in studying physics.  • To demystify physics (most physics principles do not ‘fall in’ one’s lap serendipitously!). To add human element to teaching. Demonstrate what a theme *is* about and also what it is *not*  • Research in Atomic, Molecular and Optical Physics, Chemical Physics, Mathematical Physics; PT-symmetric systems. |

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| POSITIONS  **2007: Visiting Professor**  Department of Physics, Tulane University (TU), **New Orleans, LA, USA**  **1989-2017: Professor**  Department of Physics, Savitribai Phule Pune University (SPPU), **Pune, MH, India** | PUBLICATIONS  **Research Papers: *Sixty-five* (65) *Research articles*** *hitherto****,*** *i****n*** *peer-reviewed* ***International Journals*** *of high impact****.***  **Conference Proceedings:** Numerous Presentations at International Conferences  **Book---*“PSI”* of relief!:** ***“E”- Book*** in the form of compilation of a set of companion notes on interpreting the quantum mechanical wave function: For a beginner aspiring to step into the quaint domain of Quantum Mechanics (**FREEWARE!**)----  **Please follow the link:**  [**http://physics.unipune.ac.in/~pathak/Rajeev\_K\_Pathak\_Psi\_of\_Relief\_Complete\_Set\_2013\_OCT\_05.pdf**](http://physics.unipune.ac.in/~pathak/Rajeev_K_Pathak_Psi_of_Relief_Complete_Set_2013_OCT_05.pdf) |
| ACCOLADES  ***Member, International Advisory Board*** for Strongly Correlated Electron Systems: Density Functional Theory segment.  ***Senior Associate****,* ***International Center*** for Theoretical Physics, Trieste, Italy  ***Indo-US IUSSTF Visiting Professorship*** to the City University of New York, NY, U.S.A.; Awarded by the **American Physical Society (2010)**  ***National Career Award*** Awarded by **University Grants Commission, New Delhi, India**  PERSONAL  ***Nationality*** (East) Indian  ***Languages*** English (Excellent), Hindi (workable)  Marathi (Excellent: Mother tongue)  Sanskrit (feeble); German (feeble),  Italian (feeble)  ***Hobbies***  Hiking, Trekking, Jogging, Weight-training, Karate, Reading, Amateur Star gazing, studying Astronomy | REFERENCES  **1. Professor Dr. John P. Perdew**  ***Laura H. Carnell Professor of Physics and Chemistry***  Departments of Physics and Chemistry  Room 407, Barton Hall, Main Campus  Temple University  Philadelphia, PA 19122-6082  U. S. A.  *E-mail:* [perdew@temple.edu](mailto:perdew@temple.edu)  Tel: (856) 325-8302 [Cell Phone]  **2. Professor Dr. Libero J. Bartolotti**  Department of Chemistry,  East Carolina University  Science and Technology Building  Suite 300, Greenville,  North Carolina 27858-4533  U. S. A.  *E-mail:* [bartolottil@ecu.edu](mailto:bartolottil@ecu.edu)  Tel: (252)-328-9762 [Land Line]  **3. Professor Dr. James H. McGuire**  Department of Physics and Astronomy  Physics & Engineering Physics School  2001 Percival Stern Hall,  Tulane University,  New Orleans, Louisiana-70118  U. S. A.  *E-mail:* [mcguire@tulane.edu](mailto:mcguire@tulane.edu)  Tel: (941) 966 5632 [Cell Phone] |

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| ­MEMBERSHIP  ***American Physical Society***  ***American Chemical Society***  ***Maharashtra Academy of Sciences, Elected***  ***Indian Physics Association, Life Member***  ***Amateur Astronomers, (JVP) Pune, India: Life Member*** | |
| TEACHING  **Graduate (Master’s) level:**  Have been working as a Professor of Physics at the Department of Physics, University of Pune, Pune, India. Have taught 4 (four) full courses in Quantum Mechanics at introductory, intermediate and advanced levels and a special course on Introductory Quantum Electrodynamics. Further, have taught two full courses on Classical Electrodynamics. Also, have conducted a large number of problem solving sessions for Master’s Degree students for the subjects: Classical Mechanics, Quantum Mechanics, Statistical Mechanics and Electrodynamics  **Undergraduate level**:  ***\* Teaching carried out in the United States of America:***  During the Spring Semester of 2007 (January-July, 2007) I was offered a visiting professorship at the Department of Physics, Tulane University, New Orleans, Louisiana-70118, U.S.A. I taught undergraduate physics courses PHYSICS 122–Section 01, PHYSICS 122–Section 02, PHYSICS 122–Section 03, an algebra-based non-calculus course to the above three classes (sections). The prescribed text was Cutnell and Johnson’s Introductory Physics. The student community included a substantial contingent of pre-medical students.  American Physical Society’s Visiting Professorship award (IUSSTF) bestowed upon me in 2010, visited the City University of New York system; taught “Density Functional Theory” and allied aspects.  Visiting Research Scientist: Indiana University, IUPUI, Indianapolis, IN, U.S.A.: 2014, 2015 | RESEARCH  Engaged in research in theoretical Physics within the field “***Density Functional Theory***”, an exact general formalism for atoms, molecules and solids. Have been engaged in **formal**  **developments** as well as applications of theory.  Worked with Atomic and molecular ***Electron Momentum Densities***.  ***Positron States***: Rigorous Mathematical results, and applications.  ***Electronic exchange and correlation*** effects in atoms in both position and momentum spaces.  ***Rigorous inequalities*** in atomic and molecular physics.  ***Intermolecular potential energy surfaces***. Derived some exact Theorems and mapped the ***Electrostatic Potentials for molecules***.  Structure and properties of ***Density - Matrices in co-ordinate and momentum spaces***.    Estimated Critical Exponents in ***High-Tc superconductivity*** via a theoretical model.  “***Compton Defect***” **within** the Kohn-Sham approach.  ***New Koopmans’ Theorems*** and ***Indirect-paths*** for accurate atomic energies.  ***Ab initio*** studies on **Water anionic clusters**. **Hydrogen-bonded clusters** and their response to **external electric fields**.  ***Molecular Electronic Stark Effect***: Predicted for the first time  **PT**-***symmetric Hamiltonian*** with temporal periodicity and the Rabi problem: Signal growth and attenuation.    ***PT on a cylinder*** and ***Lattice*** with balanced gain-loss and Signal customization. |

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| GRANTS  **Seven (7) Major Research Grants were sanctioned:**  **University Grants Commission, New Delhi, India**  **Research Grant: (Major Research Project)**  **“Compton *Defect*:: a Density Functional Approach”**  **University Grants Commission, New Delhi, India**  **Career Award Research Grant: (Major**  **Research Project)**  **“*Density Matrices in Coordinate and Momentum Spaces*”**  ***Indo-US Collaborative Research Grant* with East Carolina University, with Professor Dr. Libero Bartolotti: Hydrogen-bonded Clusters; their Hydration and Molecular Cooperativity.**  **Special University Research Grants (University Potential for Excellence):**  **RG – 09**  **RG – 10**  **RG – 14**  **For investigations on “*Hydrogen-bonded nano-clusters, their stability, hydration and Interactions with an External Electric Field*”**  **Special Research Grant for *Supercomputing on PARAM Supercomputer*; Grant by The Center for Advanced Computing, Pune, MH, India.** | *MOST RECENT PAPERS*  *(Total Research Publications = 65)*  ***“#” implies ---serial number in the complete CV***  ***# 60.*** ***Exactly solvable PT symmetric models in two dimensions***  *\* K.S. Agarwal, R.K. Pathak, and Y. N. Joglekar*  ***Europhysics Letters******112(3),*** *31003 (2015).*  ***#61.******Encaged molecules in external electric fields: a molecular 'tug-of-war'***  *\* N.D. Gurav, S.P. Gejji, L.J. Bartolotti, and R.K. Pathak*  ***Journal of Chemical Physics******144****, 201101 (2016).*  ***#62. Growing the PT transition threshold by strong coupling to neutral chains*** *\* K. S. Agarwal, R. K. Pathak, and Y. N. Joglekar*  ***Physical Review-A 97****, 042107 (2018).*  ***#63. Electronic Stark Effect for a Single Molecule: Theoretical UV Response***  *\* N.D. Gurav, S.P. Gejji and R.K. Pathak*  ***Computational and Theoretical Chemistry (Elsevier) 1138,*** *23-28 (2018).*  ***#64. Rotatory Response of Molecular Electron Momentum Densities in Linear, Homogeneous Weak Electric Fields : A Topographical Analysis***  *\* M. Paul, R. K. Pathak, and B. Pananghat*  ***Journal of Physics Chemistry A:****,* ***Accepted Manuscript*** *•*  ***Journal of Physical Chemistry A 124****, 943-954 (2020).*  ***#65. ‘Striped’ Rectangular Rigid Box with Hermitian and***  ***non- Hermitian PT–Symmetric Potentials***  *\* S. Kulkarni and R. K. Pathak*  ***Journal of Mathematical Physics (AIP):*** *Accepted for publication (2021)*  **# Under preparation:**  *1. PT-Symmetry on a Lattice* *2. Current in Relativistic Density Functional Theory* **Kindly refer to the list of research publications as Appendix-A to the complete, EXTENDED CURRICULUM VITAE --- also available through following the LINK:**<http://physics.unipune.ac.in/~pathak/> |