# CURRICULUM VITAE

## General Information

**Name:** Chavda Narendrasinh Dushayantsinh
**Date of Birth:** 25th March, 1973
**Place of Birth:** Miyagam-Karjan, Gujarat (India)
**Gender:** Male
**Marital Status:** Married.
**Nationality:** Indian.

## Present Position and Address

Assistant Professor (senior scale),
Department of Applied Physics,
Faculty of Technology and Engineering, Kala Bhavan
The Maharaja Sayajirao University of Baroda
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**Residential Address:**

**Present:**
A/204, Akshat Icon, Near Sargasan Cross road,
Sargasan, Gandhinagar, Gujarat (India), Pin-382421
**Permanent:**
Bhagat Faliya, Juna Bazar, Miyagam Karjan,
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## Academic Qualification:

**Ph. D. Applied Physics**, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India, 2005
**Thesis title:** Study of Radom Matrix Ensembles for Bosonic systems
**Thesis Supervisor:** Prof. Vijay N. Potbhare, Emeritus Professor (retiered), Department of Applied Physics, Faculty of Technology and Engineering, The Maharaja Sayajirao University of Baroda , Vadodara, Gujarat.

**PG Diploma in Computer Applications**, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India, 1996.

**M.Sc. Physics**, Department of Physics, The Maharaja Sayajirao University of Baroda , Vadodara, Gujarat, India, 1995.

**B.Sc. (Hons.) Physics**, Department of Physics, The Maharaja Sayajirao University of Baroda , Vadodara, Gujarat, India, 1993.

Qualified **UGC-CSIR National Eligibility Test** for Junior Research Fellow and lectureship (Dec, 1997) Examination, conducted by Council of Scientic and Industrial Research (CSIR), Govt. of India.

Qualified **Graduate Aptitude Test in Engineering (GATE)** 1998 conducted by Ministry of Human Resource Development, Govt. of India.

## Work Experience: Teaching – 23 years, Research – 18 years

| Sr.No. | Positions held | Name of the Institute | From | To |
|---|---|---|---|---|
| 1 | Teaching Assistant | Physics Department, Faculty Of. Science, MSU, Baroda | 05-02-1996 | 28-06-1997 |
| 2. | Lecturer | App. Physics Department, POLYTECHNIC, MSU, Baroda | 10-11-1997 | 03-07-2003 |
| 3. | Lecturer | Department of Physics Faculty Of. Science, MSU, Baroda | 14-07-2003 | 13-02-2006 |
| 4. | Assistant Professor | Department of Physics Institute of Technology Nirma University, Ahmedabad | 14-02-2006 | 28-04-2008 |
| 5. | Assistant Professor (senior scale) | Dept. of Applied Physics Faculty of Tech. & Engg., MSU, Baroda | 29-04-2008 | Till date |

## Research areas of interest

Random matrix ensembles and its application to Mesoscopic physics, Quantum Chaos, Many-body Physics, Entanglement and non-equilibrium physics

## Research Projects:

### Completed:

**Statistical properties of finite interacting Boson systems with spin**
Duration: 3-1/2 Years (**July 2011- March 2014**).
Fund and Funding Authority: **Rs. 10.38 lakh**, University Grants Commission, Govt. of India, New Delhi, India.

### Ongoing:

**Thermalization and statistical relaxation in finite interacting many-body quantum systems**
Duration: 3 Years (**approved Nov-2016, implemented March 2017**).
Fund and Funding Authority: **Rs. 19.56 lakh**, SCIENCE & ENGINEERING RESEARCH BOARD (SERB), Department of Science & Technology, Govt. of India, New Delhi, India.

## Research Guidance:

**Ph.D Completed:**

1. Harshal Deota, Ph. D.( M S University of Baroda, **Nov-2016**).
   Title: Random matrix study for Bosonic and fermionic systems

**Present students:**

1. Priyanka N Rao
2. Umangi Prajapati

## Membership of National/International bodies

Life Membership:
The Indian Society for Technical Education (ISTE)
Indian Physics Association (IPA)
Indian Association of Physics Teachers (IAPT)

Member of Board of Studies, M S University of Baroda, Vadodara (2008-2011), (2014-till date)
Member of Board of Studies, K S K V Kachchh University, Bhuj (2013-2015)
Subject Coordinator (Physics), SANDHAN, Knowledge Consortium of Gujarat, Govt. of Gujarat, Gandhinagar (2013-till date)

## List of publications

1. **N. D. Chavda**, V. Potbhare, V. K. B. Kota, "Statistical properties of dense interacting boson systems with one plus two-body random matrix ensembles", **Physics Letters A** 311 (2003) 331.
2. **N. D. Chavda**, V. Potbhare, V. K. B. Kota, "Strength functions for interacting bosons in a mean-field with random two-body interactions", **Physics Letters A** 326 (2004) 47.
3. V. K. B. Kota, **N. D. Chavda**, R. Sahu, "Bivariate t-distribution for transition matrix elements in Breit-Wigner to Gaussian domains of interacting particle systems", **Physical Review E** 73 (2006) 047203.
4. V. K. B. Kota, **N. D. Chavda**, R. Sahu, "One plus two-body random matrix ensemble with spin: analysis using spectral variances", **Physics Letters A 359** (2006) 381.
5. RJ Leclair, RU Haq, VKB Kota, **ND Chavda**, "Power spectrum analysis of the average–fluctuation density separation in interacting particle systems", **Physics Letters A 372** (2008) 4373.
6. Manan Vyas, V.K.B. Kota, **N.D. Chavda**, "One- plus two-body random matrix ensembles with spin: Results for pairing correlations", **Physics Letters A** 373 (2009) 1434.
7. Manan Vyas, V.K.B. Kota, **N.D. Chavda**, "Transitions in eigenvalue and wavefunction structure in (1+2)-body random matrix ensembles with spin", Accepted for publication, **Physical Review E** 81 (2010) 1.

8. Manan Vyas, **N. D. Chavda**, V. K. B. Kota and V. Potbhare, "One- plus two-body random matrix ensembles for boson systems with F-spin: analysis using spectral Variances", J. Phys. A: Math. Theor. 45 (2012) 265203.
9. H. N. Deota, **N D Chavda**, V Potbhare, "Onset of Chaos in Finite Interacting Boson Systems with F-spin", **EPJ ST** 222 (2013) 953–960
10. **N. D. Chavda**, V. K. B. Kota and V. Potbhare, "Thermalization in one- plus two-body ensembles for dense interacting boson systems", **Physics Letters A** 376 (2012) 2972–2976; arXiv:1205.6758.
11. H. N. Deota**, N D Chavda**, V. K. B. Kota, V Potbhare and Manan Vyas, "Random matrix ensemble with random two-body interactions in presence of a mean-field for spin one boson systems", **Phys. Rev. E** 88, 022130 (2013); arXiv:1207.7225.
12. H. N. Deota, **N D Chavda**, V Potbhare, "Shape transition of State Density for bosonic systems", Pramana j Phy 81 (2013) 1045.
13. **N D Chavda**, V. K. B. Kota, "Probability distribution of the ratio of consecutive level spacings in interacting particle systems", **Physics Letters A** 377 (2013) 3009–3015.
14. S. K. Haldar, B. Chakrabarti, **N. D. Chavda**, T. K. Das, S. Canuto, V. K. B. Kota, "Level spacing statistics and spectral correlation of the diffuse van der Waals clusters", **Physical Review A** 89 (2014) 043607; arXiv: 1311.2277v1.
15. **N D Chavda**, H. N. Deota, V. K. B. Kota, "Poisson to GOE transition in the distribution of the ratio of consecutive level spacings", **Physics Letters A** 378 (2014) 3012–3017..
16. **N D Chavda**, "Distribution of level spacing ratios using one plus two-body random matrix ensembles", **Pramana j Phy** 84 (2015) 309.
17. S. K. Haldar, **N. D. Chavda**, Manan Vyas and V. K. B. Kota, "Fidelity decay and entropy production in many-particle systems after random interaction quench", **Journal of Statistical** Mechanics 2016 (2016) 043101.
18. **N D Chavda**, V. K. B. Kota, "Localization-Delocalization Transitions in Bosonic Random Matrix Ensembles", Annalen der Physik (Berlin) (2017), doi: 10.1002/andp.201600287; arXiv:1611.01970.
19. Kamalika Roy, Barnali Chakrabarti, **N. D. Chavda**, V. K. B. Kota, M. L. Lekala and G. J. Rampho, "Spectral analysis of molecular resonances in erbium isotopes: Are they close to semi-Poisson?", EPL, 118 (2017) 46003.
20. V. K. B. Kota and **N D Chavda**, "Embedded random matrix ensembles from nuclear structure and their recent applications", International Journal of Modern Physics E 27 (2018) 1830001; DOI: 10.1142/S0218301318300011.
21. V. K. B. Kota and **N D Chavda**, "Random k-Body Ensembles for Chaos and Thermalization in Isolated Systems", Entropy 2018, 20, 541; doi:10.3390/e20070541

## Publications in conference Proceedings:

1. **N. D. Chavda**, V. Potbhare, "Strength function of dense interacting boson systems (Using one plus two body random matrix ensembles)", National Conference on Nonlinear systems and Dynamics (NCNSD) 1 (2003) 251.
2. **N. D. Chavda**, "Two body random matrix ensemble for boson systems with spin", in the proceedings of the National Seminar on "New Frontiers in Nuclear, Hadron and Mesoscopic Physics", editors: V.K.B. Kota, Arun Pratap (Allied Publishers, 2010) ISBN 978-81-8424-590-5.
3. **N D Chavda**, V Potbhare, "Study of von Neumann entropy for interacting particle systems in presence of pairing interaction." National Conference on Nonlinear systems and Dynamics (NCNSD) 1 (2009).
4. **N. D. Chavda** and Digish Patel, "Ground State Energy Levels in Hydrogen Like Structures in Low Dimensional Systems", Presented at seminar on 'Recent Advances in Condense Matter and Material Physics', held on Feb-28 2009, conducted by Dept. of Applied Physics, Faculty of Tech and Engg., The M S University of Baroda, Vadodara.
5. **N. D. Chavda**, "Effect of Pairing on Ground State Magnetization in Finite Interacting Fermion Systems", in the proceedings of the DAE Solid State Physics Symposium, Editors: A K Ranjarajan, Alka B Garg and G P Kothiyal**,** Vol**.** 55 (2009) 1049**.**
6. V. K. B. Kota, **N. D. Chavda**, R. Sahu, "Chaos and random interaction in nuclei to mesoscopic systems", to appear in proceedings of the National seminar on "Nuclear Structure Physics at the Extremes: New Directions", Edited by S. K. Dhiman and R. Shyam (Narosa, New Delhi, in press), ISBN 978-81-7319-897-7.
7. V. K. B. Kota, **N. D. Chavda**, R. Sahu, "Chaos, Two-body Ensembles and Inputs for Nuclear Astrophysics", in the proceedings of the DAE-BRNS symposium on Nuclear Physics, Editors : S. Kailas, S. Kumar and S. Santra, Vol. **51** (2006) 163 (ISBN: 81-8372-029-3).

## Talks/Presentations in National/International Conferences and Seminars:

| Sr. No. | Title of the paper presented | Title Place & Date of Conference/ Seminar etc. | Organized by |
|---|---|---|---|
| 1 | Transition from Regularity to Chaos in Quantum Domain | Inter-Chapter meeting organized by Indian Physics Association (IPA), Baroda chapter; on 20'th April 2002 | Physics Department, Faculty of Science, MSU Baroda |
| 2 | NNSD for map functions in the chaotic domain | Seminar on 'Theoretical Physics for Condensed Matter Atoms-Molecules and Particles', held on March 21-22 2003 | Dept. of Physics, S P University, VVNagar, Gujrat |
| 3 | Strength function of dense interacting boson systems (Using one plus two body random matrix ensembles) | National Conference on Nonlinear systems and Dynamics, IIT Khargpur, (2003) | IIT Khargpur, |
| 4 | Study of random matrix ensembles for Bosonic systems | Theoretical Physics Seminar Centre , 24 May 2004 | Physical Research Laboratory, Ahmedabad |

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| 5 | Study of von Neumann entropy for interacting particle systems in presence of pairing interaction | National Conference on Nonlinear systems and Dynamics, SINP (2009) | SINP, Kolkata |
| 6 | Onset of Chaos in Finite Interacting Boson Systems with F-spin | National Conference on Nonlinear systems and Dynamics, IISER (2012) | IISER, Pune |
| 7 | Ground State Energy Levels in Hydrogen Like Structures in Low Dimensional Systems | Recent Advances in Condense Matter and Material Physics', held on Feb-28, 2009 | Applied Physics Department, faculty of Tech & Engg. MSU |
| 8 | Transition in State Density of k-body embedded ensembles for Bosonic systems | XXVI Gujarat Science Congress, Sunday, 26'th February, 2012. | M S University of Baroda |
| 9 | Thermalization in dense boson systems | WCMM12, Germany | Max-Plank, Germany |
| 10 | Probability of distribution of ratio of consecutive level spacings using one- plus two-body random matrix ensembles | Perspectives in Nonlinear Dynamics: a satellite to STATPHYS-25 Korea, 15-18 July 2013 | University of Hyderabad |
| 11 | Random matrix ensemble for bosonic systems with spin | CNSD-2013 | IIT Indore |
| 12 | Random matrix ensemble with random two-body interactions in presence of a mean-field for spin one boson systems | Perspectives in Nonlinear Dynamics: a satellite to STATPHYS-25 Korea, 15-18 July 2013 | University of Hyderabad |
| 13 | Order to chaos transition and Thermalization in finite interacting dense boson systems | 3rd International Symposium on Complex Dynamical Systems and Applications (CDSA-2014), 10-12 March 2014 | Indian statistical institute, Kolkata |
| 14 | One- plus Three-body random matrix ensembles with spin | CDSA-2014 | Indian statistical institute, Kolkata |
| 15 | Regular to chaos transition in chains of interacting spins-1/2 | XXVIi Gujarat Science Congress, 22-23 February, 2014. | North Gujarat Hemchandracharya University, Patan |
| 16 | Study of order to chaos transition in finite quantum systems of interacting particles using the ratio of consecutive level spacing | CNSD-2015 | IISER Mohali |
| 17 | Fluctuation measures of complex systems | 21-2-2015, STTP on Statistical analysis | Academic staff college, S P University, VVNagar |
| 18 | Statistical properties of finite interacting boson systems with F-spin | 4th International Symposium on Complex Dynamical Systems and Applications (CDSA-2016), 15-17 Feb 2016 | NIT Durgapur |
| 19 | Distribution of level spacing ratios for k-body embedded ensembles for Boson systems | Recent Scenarios in Science and Technology, 14 March 2016 | MSU, Vadodara |
| 20 | 1/f noise in spectral fluctuations of interacting spin-1/2 chains | National Conference on Material Characterization 21 March 2016 | MSU, Vadodara |
| 21 | Fidelity decay and entropy production in many-particle systems after random interaction quench | Conference on Entanglement and Non-Equilibrium Physics of Pure and Disordered Systems 25 - 27 July 2016 | The Abdus Salam International Centre for Theoretical Physics |
| 22 | Entanglement in two-body random ensembles | Conference on Nonlinear Systems & Dynamics, 16-18 December 2016 | IISER Kolkata |

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| 23 | Poisson to GOE transition in the distribution of the ratio of consecutive level spacings | International Conference on Complex Quantum Systems,<br>February 20-23, 2017. | BARC, Mumbai. |
| 24 | Localization-delocalization transitions in bosonic random matrix ensembles | Conference on Many-Body-Localization: Advances in the Theory and Experimental Progress ICTP, Trieste, 10 - 14 July 2017 | The Abdus Salam International Centre for Theoretical Physics |
| 25 | Time evolution of interacting many-particle quantum systems after random quench | 5th International Symposium on Complex Dynamical Systems and Applications (CDSA-2017), 10-14 Dec 2017 | IIT Gauhati, Assam |
| 26 | Nonequilibrium dynamics of finite interacting quantum system after random interaction quench | Complex quantum systems out of equilibrium in many-body physics and beyond, 3-7June, 2019 | Alikhanyan National Laboratory (Yerevan Physics Institute) 2 Alikhanian Brothers street, Yerevan 036, Armenia |