

## Curriculum vita

1. Broad Subject Area : **Nanosciences**
2. Specialization : **Condensed Matter Physics, Nanoscience**
3. Name : **Dr. Lalit Kumar Saini**
4. Mailing Address :

**Dr. Lalit Kumar Saini**  
**Assistant Professor,**  
**Department of Applied Physics,**  
**S. V. National Institute of Technology,**  
**Surat-395007 (Gujarat).**  
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**sainilalit75@yahoo.co.in**

5. Date of Birth : **10<sup>th</sup> November 1977**

6. Educational Qualifications :

<b>Sr. No.</b>	<b>Degree</b>	<b>University</b>	<b>Year</b>	<b>Subjects</b>	<b>%age</b>
1	PH. D.	P. U. Chandigarh	2006	Condensed Matter Physics	-
2	M. Sc.	C C S University, Meerut	1998	Physics	70
3	B. Sc.	C C S University, Meerut	1996	PHY,MATH, CHE	61

7. (a) Details of Professional training and research experience, specifying period

**SEE ANNEXURE-A**

- (b) List of significant publication during last 5 years.

**SEE ANNEXURE-B**

8. Details of employment.

<b>Name of the institute</b>	<b>Post</b>	<b>Period</b>
DAV College, Chandigarh	Lecturer	Session 2001-02
NIT Kurukshetra	Lecturer	23 <sup>rd</sup> Aug. 2005-31 <sup>st</sup> May 2006
JMIT-Radaur (Y. Nagar)	Asst. Prof. (Permanent)	23 <sup>rd</sup> July 2006-18 <sup>st</sup> July 2007 Permanent
S. V. N.I. T-SURAT (Gujarat)	Asst. Prof. (Permanent)	23 <sup>rd</sup> July 2007–Till Now Continue

9. Professional recognitions, awards, fellowships received.

**Membership of Scientific/ Professional Societies/ Associations**

- a) The Indian Science Congress Association.  
(Life Member, Membership No. L14551)
- b) Indian Association of Physics Teachers (IAPT).  
(Life Member, Membership No. 8299L4877)
- c) Indian Physics Association (IPA).  
(Life Member, Membership No. SUR/LM/12579)

**Fellowship**

- (a) Teacher Associate ship of IMSC-Chennai, (From, 2009-2012)

**10. Administrative Duties:**

- (1) Co-Chairman, Social & Cultural activities Committee, SVNIT Surat, for Session 2007-2008 and 2008-2009.
- (2) Warden, Hostel No. 4, SVNIT, Surat, From 1 Feb. 2008-2011.
- (3) Member, CRC Committee, SVNIT, Surat, for session 2007-2008.

**11. Research Skills:**

As my work is primarily analytic in nature, various analytic techniques I have become familiar with are

- (1) Field Theories of Condensed Matter Systems (Chern Simons, NLSM etc.)
- (2) Bosonisation of 1D electronic and spin systems
- (3) Renormalisation Group methods
- (4) Strong Coupling Effective Hamiltonians
- (5) Random Phase Approximation calculations
- (6) Landauer-Buttiker formulations of transport in mesoscopic systems

(7) Linear response (Kubo) formulations applied to electronic transport.

I am also comfortable with programming in the C language as well as in the use of standard packages like MATHEMATICA, MATLAB and MAPLE.

## 12. **Research Interests**

(i) Low-dimensional Strongly Correlated Electron and Spin Systems: charge and spin ordering phenomena, effects of frustrating correlations, commensurate incommensurate transitions, quantum magnetism, spin chain/ladder systems

(ii) Quantum Hall physics: Edge state transport in constricted quantum Hall systems, novel edge states arising from Chern Simons Ginzburg Landau theory of bulk with variable filling fraction, shot noise as indicator of quasiparticle statistics

(iii) Low-dimensional non-Fermi liquids: Tomonaga-Luttinger liquids (TLLs), quantum impurity models, Kondo effect in low-dimensions, physics of carbon nanotubes.

(iv) Critical Phenomena in low-dimensional systems: Quantum criticality, deconfinement transitions, dimensional crossover in coupled low-dimensional systems, novel gapless phases, boundary critical phenomena.

## ANNEXURE-A

### Professional Training

- (1) Induction Training Programme, S. V. National Institute Of Technology, Surat (Gujarat), 21<sup>st</sup> -23<sup>rd</sup> Jan. 2008.
- (2) Pedagogy Training Programme, S. V. National Institute of Technology, Surat (Gujarat), 12<sup>th</sup> -15<sup>th</sup> May. 2008.
- (3) Training on Research Methodology in Engineering, S. V. National Institute of Technology, Surat (Gujarat), 16<sup>th</sup> –18<sup>th</sup> May 2008
- (4) SCRC School on Organic and Molecular Electronics: Materials and Technology, Indian Institute of Technology (IIT) Kanpur, 7<sup>th</sup> - 18<sup>th</sup> July 2008.
- (5) Short Term Training Programme on Advances in Condensed Matter Physics, S. V. National Institute of Technology, Surat (Gujarat), 31 Aug.-4<sup>th</sup> Sept. 2009.
- (6) International Conference on Quantum Effects in Solids of Today, NPL New Delhi, 20-23 December, 2010.
- (7) International Conference on Advances in Condensed And Nano Materials, Panjab University, Chandigarh, 22-26 February, 2011.
- (8) ISTE Workshop on Introduction to Research Methodologies-For Coordinators, IIT Bombay, 09-15 June, 2012.
- (9) 58<sup>th</sup> DAE-Solis State Physics Symposium, Thapar University, Patiala (Panjab), 17-21 December, 2013.
- (10) Workshop on Invisible Matter: Dark Matter and Neutrinos, IIT Hyderabad, 29-31 October, 2014.
- (11) Management Capacity Enhancement Programme, IIM Udaipur, 7-12 September, 2015.
- (12) PRL Conference on Condensed Matter Physics-2016, Physical Research Laboratory, Ahmedabad, 11-13 April, 2016,

### Research Experience:

Name of the Institution	Position Held	Period	
		From	To
Deptt. of Physics, P.U. Chandigarh	Senior Research Fellow on DST Project	Mar.2003	Jan. 2004

## ANNEXURE-B

### LIST OF PUBLICATIONS

#### In International Journals

1. Dynamic Correlations in Symmetric Electron-Electron and Electron-Hole Bilayers, R.K. Moudgil, **L.K. Saini**, and Gaetano Senatore, **Physical Review B** **66**, 205316 (2002).
2. Dynamic Correlations in Coupled Electron-Electron and Electron-Hole Quantum Wires, **L.K. Saini**, K. Tankeshwar, and R.K. Moudgil, **Physical Review B** **70**, 75302 (2004).
3. Spin Polarization Transition in the Symmetric electron-electron and electron-hole Bilayers, **L.K. Saini**, **J Low Temp. Phys.** **158**, 515-522 (2010).
4. Static Local-Field Correction in Electron-electron Quantum Bilayers, Mukesh G Nayak and **L. K. Saini**, **American Institute of Physics (Proceedings)** **1313**, 310-312 (2010).
5. Ground-State Properties of Electron-Electron Quantum Bilayers, Mukesh G Nayak and **L. K. Saini**, **J Low Temp. Phys.** **162**, 516-523 (2011).
6. Wigner Crystallization in Electron-Hole Quantum Bilayers: Mass-Asymmetric Effect, **L. K. Saini** and Mukesh G Nayak, **American Institute of Physics (Proceedings)** **1393**, 315-316 (2011).
7. Spin-polarized electron-electron quantum bilayers: Finite Width Effects, G Nayak and **L. K. Saini**, **Physica-E** **44** (2011) 196-201.
8. Spin-Polarized Symmetric Electron-Hole Quantum Bilayers: Finite Width Effect, 3. Mukesh G. Nayak and **L. K. Saini**, **Contrib. Plasma Phys.** **52**, No. 3, 211-218 (2012).
9. Wigner Crystallization in Electron-Hole Quantum Bilayers: Mass-Asymmetric Effect, 4, **L. K. Saini** and Mukesh G. Nayak, **American Institute of Physics (Proceedings)** **1447**, 143-144 (2012).
10. Spin-polarized electron-hole quantum bilayers: Finite width and mass asymmetric effects, Mukesh G. Nayak and **L. K. Saini**, **Eur. Phy. J. B** (2013) **86:84 PP 1-6**.
11. Independently Tunable coupled electron Quantum layer, Mukesh G. Nayak and **L. K. Saini**, **Solid State Phenomenon (SSP)** , Vol., 209 (2014), PP 98-101.
12. Unequal density effect on static structure factor of coupled electron layers, **L. K. Saini** and Mukesh G Nayak, **American Institute of Physics (Proceedings)** **1591**, 1060-1061 (2014).

13. Correlation Effects on Spin-Polarized Electron-Hole Quantum Bilayers, **L. K. Saini** , Mukesh G. Nayak and R. O. Sharma, **American Institute of Physics (Proceedings) Accepted (2015)**.
14. The LDA+U Calculation of Electronic Band Structure of GaAs. B. P. Bahuguna, R. O. Sharma and **L. K. Saini**, **American Institute of Physics (Proceedings) Accepted (2015)**.

### **In National Conferences / Symposia/ Seminars**

15. Ground State Properties of a two-Dimensional Spin Polarized Electron Gas, **L.K. Saini** and R.K. Moudgil, in *Solid State Physics*, edited by R. Mukhopadhyay, B.K. Godwal, and S.M. Yusuf (Universities Press Ltd., Hyderabad, **1999**), Vol. **42**, p. 393.
16. Wigner Crystallization in Coupled electron-Hole Quantum Wire System, **L.K. Saini**, K. Tankeshwar, and R.K. Moudgil, in *Solid State Physic*, edited by S. M. Sharma, P.U. Sastry, and H.G. Salunke (Allied Publishers Pvt. Ltd., New Delhi, **2003**), Vol. **46**, P. 189.
17. Dynamic Excitation Modes of Coupled Electron-Hole Quantum Well Structure, **L.K. Saini** and R.K. Moudgil, in *Materials and their Applications*, edited by Nafa Singh, R.K. Moudgil, and Sanjeev Aggarwal (Kurukshetra University Press, Kurukshetra, **2005**), p. 89
18. Spin Effects in coupled Electron-Electron and Electron-Hole Bilayers, **L.K. Saini** and R.K. Moudgil, in National Conference on Recent Advances in Material Scinece. Kurukshetra University, Kurukshetra - 136119, **2007**.
19. Ground state properties of the spin-polarized electron-electron and electron-hole bilayers, **L.K. Saini** and R.K. Moudgil, in National Conference on Disorder, Complexity and Biology II, Banaras Hindu University, Varanasi-221005, **2009**, P. 67.
20. Study of spin polarization effects in electron-electron and electron-hole bilayers, **L.K. Saini** and R.K. Moudgil, in National Conference on Spintronic and Magnetoelectronic Materials and Devices, Toshali Sands, Puri, **2009**, P. 49.
21. Spin polarization effects in electron-electron and electron-hole bilayers, **L.K. Saini** and R.K. Moudgil, in International conference on Non-Hermitian Hamiltonians in Quantum Physics, BARC Mumbai, 2009, P. 61. Proceeding of this conference will be published in Parmana in **2009**.
22. **L. K. Saini**, Mukesh. G. Nayak, and R. K. Moudgil, Spin-Polarized Electron-Electron and Electron-Hole Bilayers, Proc. of 54th DAE Solid State Physics Symposium 54, 771-772 (**2009**) (**ISBN: 978-81-8372-054-0**).
23. Mukesh G. Nayak and **L. K. Saini**, Wigner Crystallization in Coupled Electron Quantum Layers: Unequal Density Effect, International Conference on Mesoscopic Physics and Spectroscopy, S. N. Bose

- National Centre for Basic Sciences, Kolkata, India, November 22-24 (2010) (Poster Presentation).
24. Mukesh G. Nayak and **L. K. Saini**, Density Imbalance Effects on Pair Distribution Function of Coupled Electron Layers, International Conference on Statistical Physics (STATPHYS VII), Saha Institute of Nuclear Physics, Kolkata, India, November 26-30 (2010) (Poster Presentation).
  25. Mukesh G. Nayak and **L. K. Saini**, Spin-Polarized Symmetric Electron-Hole Quantum Bilayers: Finite Width Effect, International Conference on Strongly Coupled Coulomb Systems (SCCS 2011), **Budapest, Hungary**, July 24-29 (2011) (Oral Presentation).
  26. Mukesh G. Nayak and **L. K. Saini**, Unequal Density Effect on Static Structure Factor of Coupled Electron Layer, National Conference on Recent Trends in Materials Sciences (RTMS-11), Jaypee University of Information Technology, Waknaghat, India, October 8-10 (2011) (Poster Presentation).
  27. Mukesh G. Nayak and **L. K. Saini**, Wigner Crystallization in Independently Tunable Electron-Hole Quantum Bilayers, 14th International Conference of International Academy of Physical Science on Physical Sciences Interface with Humanity (**CONIAPS-XIV**), S. V. National Institute of Technology, Surat, India, December 22-24 (2011) (Oral Presentation).
  28. Mukesh G. Nayak and **L. K. Saini**, Mass-Asymmetric Effect on Wigner Crystallization in the Spin-Polarized Electron-Hole Quantum Bilayers, **99th Indian Science Congress (ISC2012)**, KIIT University, Bhubaneswar, India, January 3-7 (2012) (Poster Presentation).