# Curriculum Vitae*


1. **Name** : **Azher Majid Siddiqui**
2. **Present Position** : **Professor**
3. **Place of Work** : Department of Physics
   Jamia Millia Islamia
   New Delhi-110025
   e-mail: amsiddiqui@jmi.ac.in, azherms@yahoo.com
   http:// azhermajidsiddiqui.webs.com
4. **Previous Positions** : **Research Associate (RA)**, Inter-University Accelerator Centre (*formerly Nuclear Science Centre*) 03-10-2001 – 15-01-2004 (~ 2.5 years).


5. **Academic Record**

B.Sc. Honours (Phys.) - 1988 - Osmania University, Hyderabad

M.Sc.(Phys.) - 1991 - Aligarh Muslim University, Aligarh

M.Phil (Phys.) - 1993 - School of Physics, University of Hyderabad, Hyderabad.

Title of dissertation: Pion-Muon Channeling in Crystals with Imperfections

Ph.D - 2000 - School of Physics, University of Hyderabad, Hyderabad.

Under the supervision of Prof Anand P Pathak

Title of Thesis: **Effects of Defects and Strain on Ion Channeling in Solids**

6. **Research Guidance**

- Five students have finished Ph.D under my supervision and six students are currently working.
- Supervised about 10 M.Sc. Projects

7. **Teaching Experience**

- M.Sc. (Theory) : Characterization of Materials, Experimental Techniques
- B.Sc. (Theory) : Structure of Matter, Optics, Digital Electronics, Atomic & Molecular Physics, Mathematical Physics
- Pre-Ph.D. : Characterization of Materials
- Laboratory at the U.G and P.G. level
- M. Tech (Nano) : Thin Film Growth and Epitaxy, Characterization of Materials
- Designed the syllabus of the course "Characterization of Materials" for the M.Tech. (Nanotechnology), Pre-Ph.D. Course and "Experimental Techniques" for M.Sc., and "Atomic & Molecular Spectroscopy" for the B.Sc. (H) Course

8. **Publications**

- **50 Papers** in various International & National Journals/Proceedings/Reports {please refer to the publications list}.

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* Updated on Friday the 18th May, 2018

## 9. Research Projects Undertaken

Principal Investigator in a Major Research Project entitled Synthesis and Characterization of Transition Metal Doped Spinel Compounds, sponsored by University Grants Commission, New Delhi.

Co-Investigator in a UFUP project 37302 entitled Effects of SHI Irradiation on Conjugated Polymers, sponsored by Inter University Accelerator Centre, New Delhi.

## 10. Visits Abroad

- Participated in the International Workshop Charged and Neutral Particles Channeling Phenomena *Channeling 2004*, Istituto Nazionale di Fisica Nucleare (INFN) – Laboratori Nazionale di Frascati, Frascati (Roma) Italy, 2-6 November 2004.
- Participated in *The Islamic Golden Age of science for an actual knowledge-based society: The Ibn AI-Haytham example*" organized in the framework of the celebration of the 2015 United Nations International Year of Light and Light-Based Technologies (IYL2015), UNESCO Headquarters, Paris 14 - 16 September 2015.
- Presentation at the *3rd International Conference on Theoretical and Condensed Matter Physics*, New York, USA, October 19-21, 2017

## 11. Invited Lectures

- *Invited Lecture* at **Institute for Advanced Materials**, Devices and Nanotechnology, **Rutgers University, New Jersey, USA**, October 28, 2017.
- *Invited Lecture* at **Ion Beam Modifications & Analysis Laboratory**, Department of Physics, **University of North Texas, Denton, USA**, October 25, 2017
- *Invited Lecture* at **Abdul Ahad Azad Memorial Degree college of Bemina**, Cluster University, Srinagar, October 4-6, 2017
- *Invited Lecture* at the **First International Conference on Plasma Processing of Organic Materials and Polymers** (PPOMP 2011), Institute of Macromolecular Science and Engineering (IMSE), Mahatma Gandhi University, Kottayam – 686560, Kerala, 25-27 November 2011.
- *Invited Lecture* at the **National Seminar on Physics and Technology of Sensors. NSPTS – 14**, Jiwaji University, Gwalior, 1-3 March 2009.
- *Invited Lecture* at the **Recent Trends in Material sciences**, Post Graduate Department of Physics, DAV College Amritsar, 10-11 February 2009.
- *Popular Lecture* on **Accelerator Physics**, **Semiconductor Devices**, **Solid State Physics** and **Thermodynamics** for participating teachers in a Refresher Course organized by the *Institute of Advance Studies in Education*, Faculty of Education, Jamia Millia Islamia, New Delhi.
- *Invited Lecture* at the **National Seminar on Physics of Materials**, Department of Physics, University of Jammu, Jammu, November 23-24 2004.
- *Invited Lecture* at the Young Physicists Colloquium, Saha Institute of Nuclear Physics, Kolkatta, August 2001 (YPC 2001).
- Selected as *category B* speaker under the **Theoretical Physics Seminar Circuit (TPSC) program** 1999-2000.

## 12. Outreach Programme

- *Vetted/Reviewed* the Manuscripts Physics Textbooks for Class XI and XII (Urdu Version), organized by Department of Education in Science and Mathematics (DESM), National Council for Educational Research and Training (NCERT), New Delhi

## 13. Fellowships/ Scholarships Held

- **Extended SRF/Research Associate (RA),** Nuclear Science Centre from May 1, 2000 to 30 September 2001 (~ 1.2**5 years)**.

- **Senior Research Fellowship (SRF),** Council of Scientific & Industrial Research, (CSIR), from March 1, 1997 to April 30, 1999.

- **Junior Research Fellowship (JRF)**, IUC-DAEF Indore, from October 1993 to February 28, 1997.

## 14. Field of Research Interest

- Ion-Solid Interaction. The basic interest is in the Utilization of Accelerators for Materials Science Research. I have carried out a series of experiments to characterize Semiconductor Heterostructures using Rutherford Backscattering Spectrometry (RBS)/Channeling. The other characterization technique that has been used as complimentary to RBS/C is High Resolution X-Ray Diffraction.

## 15. Organizing Conferences/Workshops

- Involved in *organizing* several International/National Conferences ($21^{st}$ International Conference on Nuclear Tracks in Solids, $20^{th}$ International Conference on Atomic Collisions in Solids, $14^{th}$ National Laser Symposium, etc.). Actively participated in the **Editing of the Proceedings** of the above events.

- **Joint Secretary**, ***XV International Workshop on Physics of Semiconductor Devices***, $15^{th}$ – $19^{th}$ December 2009, Department of Physics, Jamia Millia Islamia, New Delhi.

- **Joint Secretary**, **National Seminar on Condensed Matter, Nuclear and High Energy Physics**, $18^{th}$ - $19^{th}$ February, 2011, Department of Physics, Jamia Millia Islamia, New Delhi

## 16. Responsibilities in the Department

- Computer Committee Member, Department of Physics, Jamia Millia Islamia.

- Time-Table In-Charge, Department of Physics, Jamia Millia Islamia.

- Pre-Ph.D. Course Coordinator, Department of Physics, Jamia Millia Islamia.

**17. Referee**, (i) Radiation Effects & Defects (ii) Advances in Applied Research, India.

# List of Publications

## A. Review Articles

- **Ion Beam Modifications and Characterisation of Semiconductor Heterostructures,** Azher M. Siddiqui, S. Dhamodaran, S.V. S. Nageseswara Rao, N. Sathish and Anand P. Pathak *Proc. International Conf. on Adv. in Surface Treatment: Research & Applications* (*ASTRA*), Ed. T.S. Sudershan, G. Sunderarajan, G. Totten and S.V. Joshi, 633-641, 2004.

## B. Refereed Publications

1. **Double Screening Problem in Dechanneling by Point Defects**, Azher M. Siddiqui, V. Harikumar and A.P. Pathak, *Phys. Stat. Sol*. **B**, 185, 77-85, 1994.
2. **Scattering of Pions and Channeled Muons by Impurities in Single Crystals**, Azher M Siddiqui, V. Harikumar, L.N.S. Prakash Goteti and A.P. Pathak, *Modern Physics Letters* (**B**) 10, 745-751, 1996.
3. **Dechanneling by Ionized Point Defects in Solids: Double Screening Effects**, Azher M. Siddiqui, A. Kiran and A.P. Pathak, *Modern Physics Letters* (**B**), 11, 1231-1239, 1997.
4. **Lattice Strain Measurement of Strained $In_{0.1}Ga_{0.9}As/GaAs$ heterostructures by RBS and Channeling**, Azher M. Siddiqui, A.P. Pathak, B. Sundarvel, Amal K. Das, K. Sekar, B.N. Dev and B.M. Arora, *Nucl. Inst. And Meth*. (**B**), 142, 387-392, 1998.
5. **Quantum Models For Dechanneling By Point Defects And Extended Defects**, A.P. Pathak, L.N.S. Prakash Goteti and Azher M. Siddiqui, American Institute of Physics (AIP), 475, 765-768, 1999, Conf. Proc *CAARI 15*.
6. **Defects and Strain Studies in Semiconductor Multilayers**, A.P. Pathak, S.V.S.N. Rao and Azher M. Siddiqui, *Nucl. Inst. And Meth*. (**B**), 161-163, 488-491, 2000.
7. **Ion channeling, High Resolution X-Ray Diffraction and Raman Spectroscopy in Strained Quantum Wells**, Azher M. Siddiqui, S.V.S.N. Rao, A.P. Pathak, V.N. Kulkarni, R. Keshav Murthy, Eric Williams, Daryush Ila, Claudiu Muntele and B.M. Arora, *Journal of Applied Physics*, 90, 2824-2830, 2001.
8. **Strain Measurements in Multi-layers by Ion Channeling, High Resolution XRD and Raman Spectroscopy**, Azher M. Siddiqui, S.V.S.N. Rao and A.P. Pathak, American Institute of Physics (AIP), 576, 476-479, 2001, Conf. Proc *CAARI 16*.
9. **Ion Beam Studies in Strained Layer Superlattices**, A.P. Pathak, Azher M. Siddiqui, G.B.V.S. Lakshmi, S.V.S.N. Rao, S.K. Srivastava, S. Ghosh, D. Bhattacharya, D.K. Avasthi, Dipak K. Goswami, P. Satyam, B. N. Dev and A. Turos, *Nucl. Inst. And Meth*. (**B**), 193, 319-323, 2002.
10. **Automation of Channeling Experiment for Lattice Strain Measurements Using High Energy Ion Beams**, S.V.S.N. Rao, D.K. Avasthi, E.T. Subramanyam, Kundan Singh, G.B.V.S. Lakshmi, S.A. Khan, Azher M. Siddiqui, A. Tripathi, S.K. Srivastava, Sarvesh Kumar, T. Srinivasan, Umesh Tiwari, S.K. Mehta, R. Muralidharan, R.K. Jain and A.P. Pathak, American Institute of Physics (AIP), 680, 94-97, 2003, Conf. Proc *CAARI 17*.
11. **Ion Beam Studies of Strains/Defects in Semiconductor Multilayers**, A.P. Pathak, S.V.S. N. Rao, D.K. Avasthi, Azher M. Siddiqui, S.K. Srivastava, F. Eichhorn, R. Groetzschel, N. Schell and A. Turos, American Institute of Physics (AIP), 680, 593-596, 2003, Conf. Proc *CAARI 17*.
12. **Electronic Sputtering from Semiconducting HOPG: A Study of Angular Dependence**, A. Tripathi, S.A. Khan, S.K. Srivastava, M. Kumar, S. Kumar, S.V.S.N. Rao, G.B.V.S. Laxmi, N. Bajwa, H.S. Nagaraja, Azher M. Siddiqui, V.K. Mittal, A. Szokefalvi, M. Kurth, A.C. Pandey, D.K. Avasthi, and H.D. Carstanjen, *Nucl. Inst. And Meth*. (**B**), 212, 402-406, 2003.

13. **Ion Beam Characterization and Engineering of Strain in Semiconductor Multi-layers**, S.V.S.N. Rao, A.P. Pathak, Azher M. Siddiqui, D.K. Avasthi, Claudiu Muntele, D. Ila, B.N. Dev, R. Muralidharan, F. Eichhorn, R. Groetzschel and A. Turos, *Nucl. Inst. and Meth*. (**B**), 212, 442-450, 2003.
14. **Ion Beam Induced Modification of Lattice Strains in $In_{0.1}Ga_{0.9}As/GaAs$ system**, S.V.S.N. Rao, A.K. Rajam, A.P. Pathak, Azher M. Siddiqui, D.K. Avasthi, T. Srinivasan, Umesh Tiwari, S.K. Mehta, R. Muralidharan and R.K. Jain, *Nucl. Inst. and Meth*. (**B**), 212, 473-476, 2003.
15. **Development of a Large Area Two Dimensional Position Sensitive ΔE-E Detector Telescope for Materials Analysis**, S.V.S.N. Rao, A. Kothari, G.B.V.S. Lakshmi, A. Tripathi, Azher M. Siddiqui, S.A. Khan, A.P. Pathak and D.K. Avasthi, *Nucl. Inst. and Meth*. (**B**), 212, 545-550, 2003.
16. **Swift Heavy Ion Induced structural and optical modifications in LiF Thin Films**, M. Kumar, F. Singh, S.A. Khan, V. Baranwal, S. Kumar, D.C. Agarwal, Azher M. Siddiqui, A. Tripathi, A. Gupta, D.K. Avasthi, A.C. Pandey, *Journal of Physics* (**D**): *Appl. Phys*., 38, 1-5, 2005.
17. **Ion Beam Irradiation and Characterization of GaAs Based Hetero-structures**, S. Dhamodaran, N. Satish, A.P. Pathak, S.V.S.N. Rao, Azher M. Siddiqui, S.A. Khan, D.K.Avasthi, T. Srinivasan, R. Muralidharan, C. Muntele, D. Ila, and D. Emfietzoglou, *Nucl. Inst. and Meth*. (**B**), 242, 538-541, 2006.
18. **Electrical and spectroscopic Characterization of p-toluene sulphonic acid doped poly (o-toluidine) and poly (o-toluidine) blends**, G.B.V.S. Lakshmi, Vazid Ali, Pawan Kulriya, Azher M. Siddiqui, M.Husain and M. Zulfequar, *Physica B* 392, 259-265, 2007.
19. **Optical Studies of SHI Irradiated Poly (o-Toluidine) – PVC blends**, G.B.V.S. Lakshmi, Vazid Ali, Azher M. Siddiqui, Pawan Kulriya and M. Zulfequar, *Eur. Phys. Jour. Appl. Phys.*, 39 (3), 251-256, 2008.
20. **60 Mev $C^{5+}$ Ion Irradiation Effects on Conducting Poly (O-Toluidine)-Poly Vinyl Chloride Blend Films**, G.B.V.S. Lakshmi, Vazid Ali, Azher M. Siddiqui, Pawan Kulriya, M. Husain and M. Zulfequar, *Rad. Eff. & Defects in Solids* 163 (2), 127 – 134, 2008.
21. **Effects of 60 Mev $C^{5+}$ Ion Irradiation on Pmt–PVC and P-TSA Doped Pot–PVC Blends,** G. B. V. S. Lakshmi, Azher M. Siddiqui, Vazid Ali, Pawan K Kulriya and M. Zulfequar, *Nucl. Inst. and Meth.* (**B**), 266, 1685–1691, 2008.
22. **Studies on Structural, Optical and Cluster Size Of Poly(M-Toluidine)–Polyvinyl Chloride Blends,** G.B.V.S. Lakshmi, Vazid Ali, Azher M. Siddiqui, Pawan K. Kulriya and M. Zulfequar, *Radiation Eff. & Defects in Solids*, 164 (3) 162–169, 2009.
23. **RF-Plasma Polymerization and Characterization of Polyaniline**, G. B. V. S. Lakshmi, Anju Dhillon, Azher M. Siddiqui, M. Zulfequar and D. K. Avasthi, *European Polymer Journal*, 45(10), 2873-2877, 2009.
24. **Synthesis and Characterization of Se doped Polyaniline,** Shumaila, G.B.V.S. Lakshmi, Azher M. Siddiqui, Masood Alam, M.Zulfequar, M.Husain, *Current Applied Physics* 11, 217-222, 2011.
25. **Effects of $Si^{5+}$ Ion Irradiation on Poly(3-Methyl Thiophene) Films,** G. B. V. S. Lakshmi, Azher M. Siddiqui and M. Zulfequar, *International Journal of Polymeric Materials*, 59(12), 970, 2010.
26. **Synthesis and Characterization of Thin Films of Poly(3-Methyl Thiophene) by Rf-Plasma Polymerization**, G. B. V. S. Lakshmi, Anju Dhillon, D. K. Avasthi, Azher M. Siddiqui and M. Zulfequar, *Materials Letters*, 64, 1672-1673, 2010.

27. **Structural, optical and electrical properties of 60 MeV $C^{5+}$ ion-irradiated poly(3-methylthiophene) films**, G.B.V.S. Lakshmi, Azher M. Siddiqui and M. Zulfequar, *Radiation Effects & Defects in Solids*, 166, 427-434, 2011.
28. **Structural, optical and Gas evolution studies of 60 MeV $Si^{5+}$ ion irradiated PoT-PVC blends**, G. B. V. S. Lakshmi, D. K. Avasthi, Jai Prakash, Azher. M. Siddiqui, Vazid Ali, S.A. Khan and M. Zulfequar, *Advanced Materials Letters*, 2(2), 125-130, 2011.
29. **Modifications induced by swift heavy ion beam of 60 MeV $Si^{5+}$ in poly (3-octyl thiophene)** G.B.V.S. Lakshmi, Jai Prakash, S. A. Khan, Azher M. Siddiqui, M. Zulfequar, *Science of Advanced Materials*, 4, 1–7, 2012.
30. **Influence of Aging on Electrical, Optical and Morphological Properties of Polyaniline**, Shumaila, G. B. V. S. Lakshmi, Masood Alam, Azher M. Siddiqui, M. Zulfequar, and M. Husain, *Science of Advanced Materials*, 4, 227–231, 2012.
31. **Tin Oxide Thin Films Prepared by Thermal Evaporation Technique Under Different Vacuum Conditions**, Parveen Jain, Sukhvir Singh, Azher M. Siddiqui and Avanish Kumar Srivastava, *Advance Science Engineering and Medicines*, 4(3), 230-236, 2012.
32. **Samarium Chloride ($SmCl_3$) Doped Poly(o-Toluidine): Synthesis and Characterization**, Shumaila, G. B. V. S. Lakshmi, Masood Alam, Azher M. Siddiqui and M. Husain, *Science of Advanced Materials*, 5, 1–7, 2013.
33. **Synthesis, Electrical Conductivity and Dielectric Properties of PANI/$V_2O_5$ Composites**, Shama Islam, Azher M. Siddiqui, Mushahid Husain and M. Zulfequar, *International Journal of Polymer Science Volume 2013, Article ID 307525, 7 pages.*
34. **Synthesis, characterization and properties of Se nanowires intercalated polyaniline/Se nanocomposites**, Shumaila, M. Alam, A. M. Siddiqui, M. Husain, *eXPRESS Polymer Letters* 7(9), 723–732, 2013.
35. **Synthesis, DC conductivity and dielectric properties of rf-plasma polymerized poly (3-methyl thiophene) thin films**, Shama Islam, M. Zulfequar and Azher M. Siddiqui, *Int. Journal of Advance Research in Science and Technology*, 2(3), 150-154, 2013.
36. **Study of curious spiral like features in inverse spinel compound ($Mg_2TiO_4$),** Alok Kumar Singh, Anju Dhillon, T. D. Senguttuvan and Azher M. Siddiqui, *Int. Journal of Advance Research in Science and Technology*, 2(2), 63-66, 2013.
37. **Synthesis, Microstructural and thermal analysis of inverse spinel compound ($Mg_2TiO_4$),** Alok Kumar Singh, T. D. Senguttuvan and Azher M. Siddiqui, *Int. Journal of Advance Research in Science and Technology*, 2(2), 95-97, 2013.
38. **A study on the Synthesis, Characterization and Properties of Polyaniline/Magnesium Boride Nanocomposites,** Shumaila, Masood Alam, Azher M. Siddiqui and Musahid Hussain, *Polymer International*, 63 (8), 1465-1470, 2014.
39. **Synthesis, Characterization and Dc Conduction Mechanism in inverse spinel compound ($Mg_2TiO_4$),** Alok Kumar Singh, Anju Dhillon, T. D. Senguttuvan and Azher M. Siddiqui, *Int. Journal of Current Engineering and Technology*, 4(1), 399-404, 2014.
40. **Structural Phase Stability, Morphological and Magnetic Characterization of a New Orthorhombic Spinel ($MgZn_2O_4$) Nano-Particle Prepared via Citrate-Gel Auto Combustion Method**, Alok Kumar Singh, Anju Dhillon, T. D. Senguttuvan, and Azher M. Siddiqui, *Advanced Science Letters*, 20, 1662–1665, 2014.
41. **Effect of Oxidation Temperature on the Structural, Optical and Electrical Properties of $SnO_2$ Films**, Riti Sethi, Anver Aziz, and Azher M. Siddiqui, *Advanced Science Letters*, 20, 1307–1310, 2014.

42. **Zinc oxide (ZnO) Doped Poly (o-toluidine): Synthesis and Characterization,** Shama Islam, Mohsin Ganaie, Shabir Ahmad, Azher M. Siddiqui and M. Zulfequar, *Advanced Science Letters*, 20, 1710-1714, 2014.
43. **RF Plasma polymerization and Electrical, Optical and Structural Properties of thin films of poly (o- toluidine),** Shama Islam, G. B. V. S. Lakshmi, M. Zulfequar, M. Husain, and Azher M. Siddiqui, *Indian Journal of Pure and Applied Physics*, 52, 486-490, 2014.
44. **Field emission characteristics of PAni/Se nanocomposites** Shumaila, S. Parveen, M. Alam, Azher M.Siddiqui, M. Husain, *J. Nanoscience & Nanotechnology* 15(4), 2835-2839, 2015.
45. **Relevance of Microstructure on Optical Properties of Thermally Evaporated Indium Oxide Thin Films,** P. Jain, S. Singh, A.K. Srivastava, S.K. Pundir, and Azher M.Siddiqui, Open Access Library Journal, 2: e1200, 2015.
46. **Comparative Studies of Chemically Synthesized Poly (o-toluidine) and RF Plasma Polymerization of (o-toluidine),** Shama Islam, G. B. V. S. Lakshmi, M. Zulfequar, M. Husain, and Azher M. Siddiqui, *Paramana Journal of Physics*, 84 (4), 653-665, 2015.
47. **Structural, Optical and Electrical Properties of Semiconducting Indium Oxide Thin Films Grown by Thermal Evaporation Technique,** Riti Sethi, Shabir Ahmad, Azher M. Siddiqui and Anver Aziz, *Invertis Journal of Renewable Energy*, 5(3),1-5, 2015.
48. **Structural, Optical and Electrical properties of Tin Oxide Thin Films for Application as a Wide Band Gap Semiconductor**, Riti Sethi, Shabir Ahmad, Azher M. Siddiqui and Anver Aziz, AIP Conference Proceedings,1675, 030039, 2015.
49. **Effect of Nitrogen Ion Implantation on the Structural and Optical Properties of Indium Oxide Thin Films**, Riti Sethi, Pravin Kumar, Sameen Ahmed Khan, Anver Aziz, and Azher M. Siddiqui, AIP Conference Proceedings, 1742, 030016, 2016.
50. **Ion Induced Controlled Modifications in Structural and Optical Properties of Indium Oxide Thin Films–Studies with 25-keV $Co^-$ and $N^+$ Beam Implantations**, Riti Sethi, Priya Darshni Kaushik, Anver Aziz, Azher M. Siddiqui and Pravin Kumar, *Surface and Interface Analysis*, 49, 910-918, 2017.
51. **Electromagnetic and Absorption Properties of U-type Barium Hexaferrite-Epoxy composites**, Vivek Pratap, A.K. Soni, S.M. Abbas, Azher M. Siddiqui and N.E. Prasad, *Journal of Magnetism and Magnetic Materials*, 465, 540-545, 2018.
52. **Swift heavy ion induced modifications in the structural, optical and methane sensing properties of indium oxide thin films - A comparative study using $Ag^{9+}$ and $O^{7+}$ ion irradiation,** Riti Sethi, Anver Aziz, G.B.V.S. Lakshmi, D.K. Avasthi and Azher M. Siddiqui, *Advanced Materials Letters* 9(7), 481-487, 2018.

## C. In Proceedings and Preprints

1. **Ion beam mixing in Au/Si system by Nitrogen ions**, D. K. Sarkar, S. Choudhary, Azher M. Siddiqui, S.K. Sinha, P. Magudapathy, K. Sekar, K.G.M. Nair, S. Panchapakesan, N.S. Thampi and K. Krishan, *Emerging trends of thin films*

*Technology and device fabrication*, 27-29 Nov, 1995, Cochin University of Science and Technology, Cochin, India.

2. **Development of RBS facility with 2MV Tandem Van de Graff accelerator at IGCAR, Kalpakkam**, S.K. Sinha, D.C. Kothari, P. Magudapathy, S. Panchapakesan, Azher M. Siddiqui and K.G.M. Nair, *The 4th National Seminar of Physics and Technology of Particle Accelerator and their Applications* (PATPAA) 26-29 Nov, 1996, IUC-DAEF, Calcutta, India.
3. **Catastrophic Dechanneling Resonance Study of $In_{0.1}Ga_{0.9}As/GaAs$ Multilayers**, Azher M. Siddiqui and Anand P. Pathak, *Preprint IC/98/168*, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy.
4. **Characterization of OMVPE Grown Strained-Layer Superlattices by Ion Channeling**, Azher M. Siddiqui, V.N. Kulkarni, Anand P. Pathak and B.M. Arora, *Preprint IC/98/169*, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy.
5. **Swift Heavy Ion Mixing in $In_{0.12}Ga_{0.88}As/GaAs$ Strained Layer Superlattice**, S.V.S. Nageswara Rao, G.V.B.S. Lakshmi, Azher M. Siddiqui, S. Ghosh, S.K. Srivastava, D.K. Avasthi, R.K. Jain, F. Eichhorn and Anand P. Pathak, Proc. *The Forty fourth DAE Solid State Physics Symposium*, (DAE SSPS 2001), 26-30 December 2001, Bhaba Atomic Research Centre, Mumbai, India, Editors: S.L. Chaplot, P.S.R. Krishna and T. Shakuntala, Conference Proceedings No. **44**, 505-506, 2001.
6. **XRD and FTIR Studies Of P-Toluine Sulphonic acid doped Poly (m-Toluidine) and Poly (m-Toluidine)-PVC Blends,** G.B.V.S. Lakshmi, Vazid Ali, Azher M. Siddiqui and M. Zulfequar, Proc. of *Second International Conference on Electroactive Polymers*, 19-24 February, 2007, Goa, University, Goa.
7. **Synthesis of Thin Films of Poly (3-methyl Thiophene) By RF-Plasma Polymerization**, G. B. V. S. Lakshmi, Anju Dhillon, D. K. Avasthi, M. Zulfequar and Azher M. Siddiqui**,** Proc. of *Third International Conference on Electroactive Polymer*s, 12-17 October, 2008, Rajasthan University, Jaipur.
8. **Engineering the Optical Properties of insitu Polymerized poly (o-toluidine/$V_2O_5$) Composites**, Shama Islam, G.B.V.S. Lakshmi, M. Zulfequar, M. Husain and Azher M. Siddiqui, Proc. *International Workshop on Physics of Semiconductor Devices:* Environmental Science and Engineering, December 10-13, 2013, Amity University, NOIDA, India.

## D. Contributed Chapters in Books

1. **Channeling and Channeling Radiation in Semiconductor Superlattices**, Anand P. Pathak, Azher M. Siddiqui, L.N.S. Prakash Goteti and V. Harikumar in Semiconductor Materials and Devices edited by O.P. Agnihotri and V.K. Jain, *Narosa Publishing House, New Delhi*, 241-258, 1998.
2. **Ion Channeling in Semiconductor Superlattices**, Azher M. Siddiqui and Anand P. Pathak in Condensed Matter Physics edited by Bal Krishna Agrawal and Hari Prakash, *Narosa Publishing House, New Delhi*, 89-94, 1999.
3. **Effects of Defects and Strain on Ion Channeling**, Azher M. Siddiqui, Physics Teachers, **43**, S35, 2001.
4. **Theory of Charged Particle Probes to Modern Advanced Materials**, Anand P. Pathak, S.V.S. Nageswara Rao, Azher M. Siddiqui, L.N.S. Prakash Goteti and G.B.V.S. Lakshmi in Accelerator Based Research in Basic and Applied Sciences edited by Amit Roy and D.K. Avasthi, *Phoenix Publishing House Pvt. Ltd, New Delhi*, 173-184, 2002.

5. **Thin Films: Polyaniline and Poly(3-methylthiophene)**, G.B.V.S. Lakshmi, Shumaila, Sameen Ahmed Khan, Azher M. Siddiqui, *Encyclopedia of Plasma Technology* DOI: 10.1081/E-EPLT-120053953, 1142-1451, 2016.
6. **Need to Create International Science Centres in Arab Countries,** Azher M. Siddiqui and Sameen Ahmed Khan, Light-Based Science, CRC Press, Taylor & Francis Group, DOI: https://10.1201/9781315155081-15, 207-219, 2017.

### E. Popular Article

- **Ion Beam Channeling Studies and Accelerator Programmes in India**, Azher M. Siddiqui and Sameen Ahmed Khan, MRSI Newsletters, Vol. **B 02**, No. 4, 3-5, 2002.

### Conferences/Workshops/Schools Attended:

1. Participated in Workshop *Ion Beam Applications With Low Energy Accelerator Facility at MSD, IGCAR*, Particle Irradiation Facility, MSD, Indira Gandhi Centre for Atomic Research, Kalpakkam, 26 February-3 March, 1994.
2. Participated in International Conference on *Defects in Condensed Media* (*DCM 95*), Materials Science Division, Indira Gandhi Centre for Atomic Research, Kalpakkam, 20-22 September, 1995.
3. Participated in SERC School on *Computational Condensed Matter Physics*, Department of Physics, Himachal Pradesh University, Shimla, 30 October - 18 November, 1995.
4. Poster Presented at the International Conference on *Frontiers in Materials Modelling and Design* (*MATMOD'96*), Materials Science Division, Indira Gandhi Centre for Atomic Research, Kalpakkam, 20-23 August, 1996.
5. Participated in National Conference on *Ion Beams in Materials Research* Department of Physics, University of Poona, Pune, 17-19 February, 1997.
6. Participated in SERC School on *Materials for Advanced Research and Technology* (*SMART'97*), Crystal Growth Centre, Anna University, Chennai, 3-17 October, 1997.
7. Posters Presented (*Proxy*) at the *15th International Conference on Applications of Accelerators in Research and Industries* (*CAARI'98*), Department of Physics, University of North Texas, Denton, TEXAS, USA, 4 -7 November, 1998.
8. Poster Presented at the Seminar on *Semiconductor Physics and Devices*, School of Physics, University of Hyderabad, Hyderabad, 5-7 March 1999.
9. Oral Presentation at the Mini-User Workshop on *Interface Engineering using Energetic Heavy Ions*, Department of Physics, Indian Institute of Technology, Kanpur, 3- 4 April, 2000.
10. Posters Presented (*Proxy*) at the *16th International Conference on Applications of Accelerators in Research and Industries* (*CAARI'2000*), Department of Physics, University of North Texas, Denton, TEXAS, USA, 1 – 4 November 2000.
11. Posters Presented (*Proxy*) at the *19th International Conference on Atomic Collisions in Solids* (*ICACS'2001*), Laboratoire des Collisions Atomiques et Moleculaires, Universite Paris Sud, bat, 351, Orsay, France, 29 July – 3 August 2001.
12. Invited Lecture at the *Colloquium for Young Physicists, 2001* (*YPC'2001*), Saha Institute of Nuclear Physics, Kolkatta, 23-24 August, 2001.
13. Posters Presented at the *44th DAE Solid State Physics Symposium* (*DAE SSPS'2001*), Bhabha Atomic Research Centre, Trombay, Mumbai, 26 - 30 December, 2001.
14. Oral and Poster Presentation at the *20th International Conference on Atomic Collisions in Solids* (*ICACS'2003* ), Puri, India, 19 - 24 January, 2003.
15. Participated in the International Workshop Charged and Neutral Particles Channeling Phenomena *Channeling 2004*, Istituto Nazionale di Fisica Nucleare (INFN) – Laboratori Nazionale di Frascati, Frascati (Roma) Italy, 2 - 6 November, 2004.
16. Invited Lecture at the *National Seminar on Physics of Materials*, Department of Physics, University of Jammu, Jammu, 23-24 November, 2004.

17. Oral Presentation at the *National Conference on Physics of Materials*, 19 - 20 March, 2008 Department of Physics, Pondicherry University, Puducherry, Pondicherry.
18. Invited Lecture at the *Recent Trends in Material sciences*, Post Graduate Department of Physics, DAV College Amritsar, 10 - 11 February, 2009.
19. Invited Lecture at the *National Seminar on Physics and Technology of Sensors NSPTS – 14*, Jiwaji University, Gwalior, 1 - 3 March, 2009.
20. Oral Presentation at the Seminar on *Physics at Small Scales*, School of Physics, University of Hyderabad, Hyderabad, 18 - 19 March, 2011.
21. Invited Lecture at the *First International Conference on Plasma Processing of Organic Materials and Polymers PPOMP 2011*, Institute of Macromolecular Science and Engineering (IMSE), Mahatma Gandhi University, Kottayam – 686560, Kerala, 25-27 November 2011.
22. *Invited Lecture* at Abdul Ahad Azad Memorial Degree college of Bemina, Srinagar, Cluster University, Srinagar, October 4-6, 2017.
23. *Invited Lecture* at Ion Beam Modifications & Analysis Laboratory, Department of Physics, University of North Texas, Denton, USA, October 25, 2017.
24. *Invited Lecture* at Institute for advanced Materials, Devices and Nanotechnology, Rutgers University, New Jersey, USA, October 28, 2017.

## REFERENCES


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## Memberships of Scientific Societies

- **Indian Physical Society**
  Life Membership No. LM/0632
  Indian Association for Cultivation of Science Jadavpur
  **KOLKATA (CALCUTTA) 700 032**

- **Indian Laser Association**
  Life Membership No. LM/518
  Laser Research & Development Block-D Centre for Advanced Technology (**CAT**) **INDORE 452 013**

- **Indian Physics Association**
  Life Membership No. DEL/LM/11888
  Tata Institute of Fundamental Research
  **MUMBAI (BOMBAY) 400 005**

- **Materials Research Society of India**
  Life Membership No. LMB 160
  Defence Metallurgical Research Laboratory P.O Kanchanbagh
  **HYDERABAD 500 258**

## Research Outline and Plans

(For details, please see the PUBLICATIONS list)

Ion channeling is widely used to study the defect densities and their location in crystalline materials; it also allows determination of the strain in epitaxial layered structures. A detailed knowledge of inter-atomic potentials for such channeled particles is needed for proper understanding and interpretation of various observations in the field of channeling. Utilization of the ion channeling for characterizing synthetically modulated structures like semiconductor superlattices is another area of special interest. Strained Layer Superlattices (SLS) have unique electronic and opto-electronic properties and find wide ranging applications in many frontier areas of science and technology. These are layered structures of alternating composition of materials having lattice mismatch (~0.1% to 2.0%) which is accommodated by biaxial (compressive or tensile) strains in the plane of the layers; each layer acquires a perpendicular lattice constant due to strain accommodation. Beyond a critical thickness, the strain in the layers relaxes giving rise to misfit dislocations. The presence of defects deteriorates the performance of these devices and thus it is important to characterize strain and strain-relief mechanisms and also the limits of strained-layer growth in the structures. My thesis work is an effort to address these two problems and hence is divided into two parts; (i) theoretical work on the interatomic potential for a positively charged particle channeled in a crystal with point defects and (ii) characterization of Strained-Layer Superlattices by Ion Channeling in comparison with other characterization techniques like XRD and Raman Spectroscopy.

An important class of organic polymeric materials is electrically conducting polymers also known as organic semiconductors, which have many applications in optical, electronic and optoelectronic and sensory devices. Polyaniline is the most studied polymer of this class. Dramatic modifications have been observed in Swift Heavy Ion irradiated polymers as a result of large energy deposition to the polymer. These changes in the macro-properties like structural, electrical, optical and thermal properties can be traced to transformations at the micro-level through cross-linking, chain scissoring, bond breaking and cluster formation due to the energy deposited by SHI beam. We have also taken up a systematic study of synthesis, characterization and SHI Irradiation of Conjugated Polymers in a research project (***UFUP 37302*** sponsored by Inter University Accelerator Centre, New Delhi).

Presently, I am working in the area of the most promising and upcoming field, that of Nanotechnology. Owing to their unique physical, chemical, thermal and mechanical properties carbon nanotubes have been one of the most studied nanostructures in the recent times. These nano-materials are very promising for the development of several device applications. However, despite the outstanding properties of the individual CNTs their insolubility hinders the transfer of those properties into the bulk. In order to improve the interaction of CNTs and foreign molecules it is necessary to modify (functionalize) the surface of nanotubes. In the last few years studies have shown the excellent potential of carbon nanotubes (CNTs) as sensitive material for detecting biological and chemical molecules.