

Waseem Bari

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Born: December 01, 1973—Anantnag, India

Nationality: Indian

Current position

Associate Professor, Department of Physics, University of Kashmir, Srinagar–190 006, India

Areas of specialization

• High Energy Physics • Heavy ion collisions • Neutrino Physics

Appointments held

2015-present	Associate Professor, Department of Physics, University of Kashmir, Srinagar, India
2007-2015	Senior Assistant Professor, Department of Physics, University of Kashmir, Srinagar, India
2003-2007	Assistant Professor, Department of Physics, University of Kashmir, Srinagar, India
2002-2003	Research Associate, Saha Institute of Nuclear Physics, Kolkata, India
2000-2002	Senior Research Fellow, DST, Govt. of India (At AMU, Aligarh, India)
1998-2000	Junior Research Fellow, DST, Govt. of India (At AMU, Aligarh, India)

Education

2002	PH. D. in Physics, Aligarh Muslim University, Aligarh–202 002, India
1996	M. Sc in Physics (64%), Aligarh Muslim University, Aligarh–202 002, India
1994	B. Sc Honors in Physics (63%), Aligarh Muslim University, Aligarh–202 002, India
1991	SSE-II (12TH) with Physics, Chemistry, mathematics and English (83%), J & K Board of School Education, Srinagar, India
1989	SSE-I(11TH) with Physics, Chemistry, mathematics and English (71%), J & K Board of School Education, Srinagar, India
1988	SSE (10TH) with Science, Maths, Social Science, English and Urdu (63%), J & K Board of School Education, Srinagar, India

Teaching (2003–Present)

Courses taught at M. Phil./Ph. D. level

Numerical Methods in Physics: Research Methodology
Heavy ion collisions
Neutrino Physics

COURSES TAUGHT AT POST-GRADUATION LEVEL

Atomic and Molecular Physics
Computational Methods and Programming
Nuclear and Particle Physics
Advanced Particle Physics
Electrodynamics and Plasma Physics
Classical Mechanics
Physics Education
Laboratory courses

Research (1997–Present)

Research Projects undertaken

1. **India-based Neutrino Observatory (INO) Project** (ongoing). Total Grant for 05 years: 48.84 Lakhs, Funding agency: Department of Science and Technology, Govt. of India, New Delhi.
2. **Monitoring of Geochemical Precursory Signals for Earthquake Predictions** (completed). Total Grant: >100 Lakhs), Funding agency: Department of Science and Technology, Govt. of India, New Delhi.
3. **Swift Heavy Ion Induced Modifications of Pure and Doped ZnO Based Nanostructures** (completed). Total Grant: 6.5 Lakhs, Funding agency: University Grants Commission, Govt. of India.

Ph. D. Theses Supervising presently

1. Neutrino-nucleus interactions
2. Timing and Tracking Performances of RPCs and their effects on the ICAL Experiment
3. Effect of Surface Resistivity of Graphite on RPC Characteristics and Performance
4. Multiplicity Distribution Studies of Heavy Ion Collisions
5. On Forward-backward Correlations in Multiparticle Production in High Energy Nucleus-Nucleus Collisions

M. Phil. Theses Supervised

1. Design, Development and Characterization of Glass Resistive Plate Chambers for Muon Detection
2. Synthesis and Modification Of Zinc Oxide (ZnO) based Nanostructures
3. Pion Production In Neutrino-Nucleus Interactions

4. Entropy Generation In Relativistic Heavy Ion Collisions
5. A Study Of Multifractal Moments In Relativistic Heavy Ion Collisions

M. Sc. Theses Supervised

1. Particle Detectors (2005)
2. Quark Gluon Plasma (2006)
3. Erraticity Behaviour in Relativistic Heavy Ion Collisions (2006)
4. A Study of Geochemical Precursors at Tatta Pani, Jammu (2007)
5. Multifractality in Relativistic Heavy-ion Collisions (2007)
6. Entropy Production in High Energy Heavy Ion Collisions (2008)
7. Geochemical Precursors for Earthquakes (2009)
8. Intermittency in Relativistic heavy ion collisions (2012)
9. Neutrino Mass Measurements (2013)
10. Some aspects of neutrino mixing and oscillations (2014)

Publications & talks

Journal articles

1. Qudsia Gani and **Waseem Bari**, "Neutrino interaction cross-sections from MeV to GeV scales of energy", *International Journal of Applied physics* Vol. 4, Issue 4-6 (2017)
2. Qudsia Gani and **Waseem Bari**, Cross-sections for ν_μ and $\bar{\nu}_\mu$ induced single pion production processes in the few GeV using NuWro, *IOSR Journal of Applied Physics* Vol. 9, Issue 6 (2017)
3. Shakeel Ahmad, M. Sajjad Athar, ..., **Waseem Bari**, ..., "Invited Review: Physics Potential of the ICAL detector at the India-based Neutrino Observatory (INO)", *Pramana J. of Phys.* Vol. 88, No. 79 (2017)
4. **Waseem Bari**, "Sensitivity of multiplicity fluctuations to rapidity in high-energy nucleus-nucleus interactions", *Ukrainian Journal of Physics* Vol. 62, No. 1, (2017)
5. **Waseem Bari** and Qudsia Gani, "Measurement of neutrino-nucleus interaction cross-sections", *Journal of Scientific Research in Physical and Mathematical Sciences* Vol. 2, Issue 11, (2016)
6. **Waseem Bari**, Qudsia Gani, Shamsul H. Thoker and Muzamil A. Teli, "Forward-Backward Multiplicity Correlations in Relativistic Heavy Ion Collisions", *Acta Physica Polonica B*, Vol. 26, No. 10 (2015)
7. Qudsia Gani, **Waseem Bari**, Shamsul H. Thoker and Muzamil A. Teli, "Pion production in neutrino-nucleus interactions", *Journal of Scientific Research in Physical and Mathematical Sciences* Vol. 2, Issue 4, (2015)
8. **Waseem Bari**, Muzamil A. Teli, Shamsul H. Thoker and Qudsia Gani, "Study of Levy Stability in Relativistic Heavy-Ion Collisions", *Journal of Modern Physics*, 6, (2015) 912-920.
9. M.Mohsin Khan, N. Ahmad, M.D. Azmi, **W. Bari**, A.R. Khan, M.I. Haque, M. Zafar, M. Irfan, "Evidence of entropy scaling in relativistic nucleus-nucleus collisions", *Int. J. Mod. Phys.*, E21 (2012) 1250068
10. Sebiha Rehman, R.G. Singh, J.C. Pivin, **Waseem Bari**, Fouran Singh, "Structural and spectroscopic modifications of nanocrystalline zinc oxide films induced by swift heavy ions", *Vacuum*, Vol. 86, (2011) pp 87
11. M.Mohsin Khan, **W. Bari**, M.D. Azmi, Vipin Gaur, A.R. Khan, M. Zafar, M. Irfan., "Entropy and specific heat as a measure of fluctuations in multiparticle production in relativistic nuclear collisions", *Indian J. Phys.*, 85 (2011) 195-199
12. Hirok Chaudhuri, **Waseem Bari**, Naseer Iqbal, Rakesh K. Bhandari, Debasis Ghose, Prasanta Sen and Bikash Sinha, "Long range gas-geochemical anomalies of a remote earthquake recorded simultaneously at distant monitoring stations in India", *Geochemical Journal*, Vol. 45, pp. 137 to 156, 2011

13. B Alessandro, F Antinori,, **W Bari**, M Irfan, U A Wiedemann, "ALICE: Physics performance report, volume II", *J. Phys. G*, 32 (2006) 1295-2040
14. F. Carminati, P. Foka,, **W. Bari**, U A Wiedemann, "ALICE: Physics performance report, volume I", *J. Phys. G*, 30 (2004) 1517-1763
15. S. Ahmad, **W. Bari**, N. Ahmad, M.M. Khan, M. Zafar, M. Irfan, "Maximum charged particle density fluctuations in relativistic heavy ion collisions", *J. Phys. Soc. Jap.*, 71 (2002) 1059-1064
16. **W. Bari**, N. Ahmad, M.M. Khan, S. Ahmad, M. Zafar, M. Irfan, "Intermittency in 4.5-A and 14.5-A-GeV/c Si-28 nucleus interactions", *Int. J. Mod. Phys. E*, 11 (2002) 131-141
17. A. Shakeel, **W.B. Tak**, N. Ahmad, A.R. Khan, M. Zafar, M. Irfan, A. Tufail, A. Ahmad, "Cluster production in 14.5-A-GeV/c Si nucleus collisions", *Int. J. Mod. Phys. E*, 8 (1999) 121-129

Books/Book Chapters

1. S. A. Mir, Naseer Iqbal, **Waseem Bari**, N K Das, R K Bhandari, Debasis Gosh, P Sen and Bikash Sinha, "Radon times series measurement facility for Seismotectonic observations at Tatapani Jammu", *Geochemical Precursors for Earthquakes*, Macmillan advanced Series (2007). Macmillan India Ltd.

Conference Presentations

1. Weibull model description of multiplicity distributions in relativistic heavy ion collisions: **Waseem Bari** and Nisar A. Rather, 11th JK Scienc Congress, University of Kashmir, Srinagar, October 12 – 14, 2015
2. Multiplicity and compound multiplicity in 14.5A GeV/c 28Si-emulsion nuclei: Shakeel Ahmad , **W .Bari** , N. Ahmad, M. Zafar and M. Irfan *DAE Symposium on nuclear physics*, Bangalore University, Dec.26-30, 1997, Bangalore, India.
3. **W. Bari**, A Tufail, A. Ahmad and A.R. Khan, "Angular characteristics of charged shower particles produced in 4.5A and 14.5A GeV/c 28Si-nucleus collisions", *X111 DAE Symposium on high energy physics*, Punjab University , Chandigarh, Dec. 26-30,1998 , Chandigrah, India.
4. P.Battacharya, S .Bose , S. Chattopadhyay, N . Majundar, S. Sarkar , P . Sen, T .Sen , T. Sinha, A Bhasin, A. Gupta , L.K Mangotra, N. Ahmad and **W .Bari**, "Fabrication and testing of a large area cathode pad chamber", *DAE Symposium on nuclear physics* , Punjab University , Punjab, Chandigrah Dec.27-31, 1999, Chandigrah, India.
5. P.Battacharya, S .Bose , S. Chattopadhyay, N . majundar ,S. Sarkar , P. Sen , S. Sen, T.Sinha, B.C.Sinha, N. Ahmad and **W. Bari**, "Position resolution studies of a cathode chamber pad chamber", *DAE symposium on Nuclear physics* , Dec.27-31, 1999, Punjab University , Chandigrah, India.
6. Shakeel Ahmad, **W. Bari**, N. Ahmad , A. Tufail, and A.R .Khan, "Characteristics of event accompanied by hadrons in the back ground hemisphere in relativistic nucleus-nucleus collisions", *DAE Symposium on Nuclear Physics*, Punjab University , Chandigrah, Dec. 1999, Chandigrah India.
7. **W. Bari**, M.M .Khan, N. Ahmad, Shakeel Ahmad and A. R. Khan. , "Multifractals in relativistic heavy-ion collisions", *International Symposium on Nuclear physics*, Dec.18-22, 2002, Bhaba Atomic Research Centre, Mumbai, India.
8. Design and Fabrication of ultra thin cathode pad chamber (CPC) Muon Arm Project in ALICE SINP, Kolkata, AMU Aligrah and Jammu University, Jammu. *International Symposium on Nuclear Physics*, Bhaba Atomic Research Centre, Mumbai, Dec.18-22, 2002, Mumbai, India.
9. Multiparticle response of cathode pad chamber (CPC) Muon Arm Project in ALICE: SINP, Kolkata, AMU, Aligrah and Jammu University, Jammu. *International Symposium on Nuclear Physics*, Bhaba Atomic Research Centre, Mumbai, Dec.18-22, 2002 ,Mumbai, India.
10. Shakeel. Ahmad , **W. Bari**, N. Ahmad , M.M. Khan , M .Zaferand M. Irfan, "Multiplicity fluctuations in high energy heavy ion collisions", *X1V DAE Symposium on high energy physics*, Hyderabad University, Hyderabad, Dec. 18-22, 2000, Hyderabad, India.

11. **W. Bari**, N. Ahmad, T. Ahmad, S. Ahmad and M. Zafar, "Intermittency in relativistic heavy –ion collisions", *IV International Conferences on Physics and Astrophysics of QGP*, Jaipur (India) Nov. 26-30, 2001.
12. **W. Bari**, N. Ahmad, M.M Khan, Shakeel Ahmad and A. Tufail, "Multiracial analysis of multiplicity production at relativistic energies", *DAE Nuclear physics Symposium*, SINP Kolkata, Dec. 26-30, 2001, Kolkata, India.
13. N. Ahmad, **W. Bari**, M.M Khan and Shakeel Ahmad, "Evidence of clusterization in ^{28}Si -nucleus collisions at $14.5\text{A GeV}/c$ ", *DAE Nuclear physics Symposium*, SINP Kolkata, Dec.26-30, 2001, Kolkata, India.
14. **W. Bari**, N. Ahmad, M.M Khan, Shakeel Ahmad, Tufail Ahmad and A.H.Naqvi, "Dependence of multiplicity on target mass in relativistic nuclear collisions", *XIV DAE Symposium on high energy Physics*, University of Jammu, Jammu, Nov. 11-15, 2002, Jammu, India.
15. **W. Bari**, N. Ahmad, M.M Khan, and Shakeel Ahmad, M.Zafer, and M.Irfan, "Dominance of erraticity behavior over fluctuations in relativistic heavy- ion collisions", *Quark-Matter*, 2002. Nantes, July18-24, 2002, France.
16. **Waseem Bari**, "Levy stability and fractal spectrum in relativistic heavy ion collisions", *2nd J and K Science Congress*, University of Kashmir, Srinagar, July 25-27, 2006
17. **Waseem Bari**, "Geochemical Precursory signal for seismic events", *2nd J and K Science Congress*, University of Kashmir, Srinagar, July 25-27, 2006.
18. Sajad Ahmad Mir, Naseer Iqbal, **Waseem Bari**, Nisith K. Das, R.K.Bhandari, Debasis Ghose, Prasanta Sen and Bikash Sinha, "Radon Time Series Measurement Facility for Seismotectonic Observations at Tattapani, Jammu", *International Brainstorming Session on Geochemical Precursors for Earthquakes*, September 11 – 13, 2006.
19. N. Ahmad, M. M. Khan, **W. Bari**, M. D. Azmi, A. Kamal and M. Irfan, "Rapidly density fluctuations in $14.5\text{A GeV}/c$ ^{28}Si -nucleus interactions", *Quark Matter 2008, 20th International Conference on Ultra-relativistic Nucleus-Nucleus Collisions*, February 04 – 10, 2008, Jaipur, India.
20. M. M. Khan, **W. Bari**, M. D. Azmi, A. R. Khan and M. Irfan, "Entropy and specific heat as a measure of fluctuations in multiparticle production in relativistic nuclear collision", *Quark Matter 2008: "20th International Conference on Ultra-relativistic Nucleus- Nucleus Collisions*, February 04 – 10, 2008, Jaipur, India.
21. Sajad Ahmad Mir, **Waseem Bari** and Naseer Iqbal, "Radon Time Series Measurement at Tatta Pani, Jammu, India", *5th International Conference on Seismology and Earthquake Engineering*, Tehran, Iran, May 13 – 17, 2007.

Orientation Courses/Winter Schools/Workshops

1. *National Level Workshop on Mathematics and its Applications*, October 05–11, 2015, Department of Mathematics, University of Kashmir, Srinagar.
2. *One Week Workshop on Research Methodology for Science Scholars/College and University Teachers*, August 25–31, 2015, UGC-HRD Centre, University of Kashmir, Srinagar.
3. *KU-IUCAA Workshop on Astronomical Techniques and Science with Virtual Observations*, September 23–26, 2013, Department of Physics, University of Kashmir, Srinagar.
4. *Science Exhibition Workshop*, August 12–21, 2009, Ministry of Earth Sciences i Collaboration with the University of Kashmir, Srinagar
5. *45th Winter School in Theoretical Physics*, February 02–11, 2009, University of Wroclaw, Institute of Nuclear Physics, Wroclaw, Poland
6. *Fourth DAE-BRNS Workshop on Hadron Physics*, February 18–23, 2008, Department of Physics, AMU, Aligarh
7. *Root@Heavy-Ions: international Workshop on Physics and Analysis of Hot and Dense Matter*, Febru-

- ary 12–16, 2008, Department of Physics, University of Jammu, Jammu.
8. *QGP Winter School, 2008*, February 01–03, 2008, Jaipur, India.
 9. *Orientation Course*, December 18, 2006–January 13, 2007, Academic Staff College, University of Rajasthan, Jaipur
 10. *Interantional Nathiagali Summer College*, June 26–July 08, 2006, Nathiagali, Pakistan.
 11. *National Workshop on Simulation Techniques in Physics*, March 20–25, 2006, Department of Physics, AMU, Aligarh.
 12. *Training Program for State-of-the-art Radon Monitoring System*, November 29–December 01, 2005, Genitron Instruments GmbH, Frankfurt, Germany.

Invited Lectures

1. **The World inside atom**, January 01, 2012, delivered at UGC-HRD Centre, University of Kashmir, Srinagar

Conference Convener

- 2008 **Earthquake Prediction: Recent Developments and Challenges**, August 06 – 07, 2008, A two day national level conference convened at the University of Kashmir, Srinagar

Visits outside the country

- 2009 Poland, *45th Karpacz Winter School in Theoretical Physics*
 2006 Pakistan, *International Nathiagali Summer College on Physics*
 2005 Germany, *Training for running various equipments for Geochemicla Precursory Signals*
 2003 Switzerland, *Experiment at CERN, Geneva*
 2001 Switzerland, *Experiment at CERN, Geneva*
 2001 France, *Collaborative work with IPN, Orsay, France*

Contribution to the Research and Development

While working on the Project "Monitoring of Geochemical Precursory Signals for Earthquake Predictions", I played a mJOR role in establishing an observatory at Tatta Pani, District Rajouri, Jammu. The laboratory is now a well equipped establishment with the stat-of-the-art infrastructural facilities for monitoring the emission of various gases from the hot spring at the site. The monitoring of these gases is presently providing data 24x7 for detecting earthquake precursory signals. This has been a join venture of the Department of Science and Technology, Govt of India through Saha Institute of Nuclear Physics, Kolkata, Department of Atomic Energy (DAE), Govt. of India through Variable Energy Cyclotron Centre (VECC), Kolkata and the University of Kashmir through the Department of Physics. I was the Principal Investigator from the University of Kashmir for the project.

Contribution to Academic Administration

In addition to the teaching and research at the Department, I have been very actively involved in the various administrative jobs at the Department which include framing the various curricula for graduate as well as post-graduate courses in physics. As such I am *Member: Board of Post Graduate Studies, Department of Physics, University of Kashmir, Srinagar* and *Member, Board of Undergraduate Studies, University of Kashmir, Srinagar*. The assignment demands detailed deliberations on the academic requirements of the various courses offered at these two levels and then finalizing the course structure.

I have been handling the examination related matters of the Department on regular basis for many years now. This would include all the administrative procedures beginning from framing the examination schedule upto making the various teachers/evaluators submit the respective evaluations. In between the conduct of examination is one typical academic as well as administrative exercise which I have been handling for quite some time now.

In the recent times, I have been very deeply involved in introducing the Choice Based Credit System in the University.

Contribution to Administration in the University

I held the charge of *Warden* of one of the Boys Hostels for more than three years. The assignment in addition to looking after the student affairs of the students would include all the administrative responsibilities related with the Hostel.

I am holding presently the charge of *Nodal Officer* of the Department for Directorate of Internal Quality Assurance (DIQA) of the University. The main responsibility pertaining to this assignment is to keep the online portal pertaining to the academic career of the faculty members up-to-date.

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