Faculty Details proforma for DU Web-site

Title	Dr.	First Name	Ashutosh	Last Name	Bhardwaj	Photograph
Designation		**Assistant Professor**				
Address		Department of Physics and Asrophysics University of Delhi, Delhi-110007				
Phone No Office		+91-11-27667036				
Residence		H-1 Shanti Apartment Sector 13 Rohini Delhi 110085				
Mobile		9910124636				
Email		abhardwaj@physics.du.ac.in, ashutosh.bhardwaj@cern.ch				
Web-Page						

Educational Qualifications

Degree	Institution	Details	Year
Ph.D.	University of Delhi	Experimental High Energy Physics; Title: Some aspects of hadron-hadron collisions at the Large Hadron Collider, CERN	1997-2003
M.Sc.	Department of Physics & Astrophysics, University of Delhi	Physics	1993-95
B.Sc. (H) Physics	St. Stephen's College University of Delhi	Physics (Hons)	1993
Master of Science	Univ. of Houston, USA	Electrical Engineering	2005-08

Career Profile

Designation	Organisation/Institution	Role	Duration
Assistant Professor	Department of Physics & Astrophysics, University of Delhi	Teaching & Research	15th July 2010- till date
Associate Professor	Acharya Narendra Dev College, University of Delhi	Teaching & Research	July 2008- 14 July 2010
Reader	Acharya Narendra Dev College, University of Delhi	Teaching & Research	July 2005- July 2008
Lecturer	Acharya Narendra Dev College, University of Delhi	Teaching & Research	September 1996- July 2005

Administrative Assignments

1. **Officer on Special Duty (OSD), Admissions** of the University of Delhi for the academic year 2017-18, 2018-19.
2. **Deputy Dean (FSR)** of the University of Delhi for the academic year 2017-18, 2018-19.

Areas of Interest / Specialization

Experimental High Energy Physics

- Experimental High Energy Physics (HEP) & Detector physics with active participation in the Major International collaborations: Compact Muon Solenoid (CMS) experiment at the Large Hadron Collider (LHC), and RD50 collaboration at CERN, Switzerland.
- His research interests include development of silicon sensors for High Energy Physics experiments. This includes design & radiation damage modeling of sensors using TCAD tools.

Subjects Taught

July 1996 – July 2010 (Acharya Narendra Dev College, Delhi Univ.): Electricity & Magnetism, Mathematical Physics, Modern & Quantum Physics, Linear & Digital Integrated Circuits & Instruments, Mechanics, Thermal Physics, Optics and Opto-electronics, Physics Lab.

July 2010 – till date (Dept. of Physics & Astrophysics, Univ. of Delhi): Nuclear Radiation Detection and Experimental Techniques, Nuclear & Computational Physics, Nuclear & Particle Physics, Quantum Mechanics I, Quantum Mechanics II, Nuclear Lab.

Research Guidance

No. of Ph.D. students registered: 5
No. of Ph.D. students degree awarded: 1

Publications Profile

1. ***Research papers published in Refereed/Peer Reviewed Journals***

1. *Radiation Tolerance Study on Irradiated AC-coupled, Poly-silicon biased, p-on-n Silicon Strip sensors developed in India, G. Jain, C. Jain,* ***A. Bhardwaj*** *et. al., Nuclear Instruments and Methods in Physics Research Section A, 913 (2019) 97–102.*
2. *Development of AC-Coupled, Poly-silicon biased, p-on-n Silicon Strip Detectors in India for HEP Experiments by G. Jain, R. Dalal,* ***A. Bhardwaj****, et. al.,* **NIM A 882 (2018).**
3. *Measurement of the cross section for top quark pair production in association with a W or Z boson in proton-proton collisions at √s = 13 TeV by A. M. Sirunyan,* ***A. Bhardwaj*** *et al.,* **Journal of High Energy Physics 115 (2018).**
4. *Test beam demonstration of silicon microstrip modules with transverse momentum discrimination for the future CMS tracking detector by W. Adam, T. Bergauer,* ***A. Bhardwaj*** *et. al.* **, Journal of Instrumentation (JINST) 13 P03003 (2018).**
5. *TCAD simulation of Low Gain Avalanche Detectors by Ranjeet ....* ***A. Bhardwaj*** *…et. al.,* ***Nucl. Instr. and Meth. A 836 (2016).***
6. *Combined effect of bulk and surface damage on strip insulation properties of proton irradiated nplus-p silicon strip sensors by Ranjeet …* ***A. Bhardwaj*** *… et.al.,* ***Journal of Instrumentation P04007 (2014).***
7. *Search for a standard-model-like Higgs boson with a mass in the range 145 to 1000 GeV at the LHC by Serguei Chatrchyan …* ***A. Bhardwaj*** *… et. al.,* **Eur. Phys. J. C C73 (2013).**
8. *Observation of a new boson with mass near 125 GeV in pp collisions at sqrt(s) = 7 and 8 TeV by Serguei Chatrchyan …* ***A. Bhardwaj*** *… et. al.,* **JHEP 06 (2013).**
9. *A New Boson with a Mass of 125 GeV Observed with the CMS Experiment at the Large Hadron Collider by Serguei Chatrchyan …* ***A. Bhardwaj*** *… et. al.,* **Science 338 (2012).**
10. *Simulation studies of the n+n− Si sensors having p-spray/p-stop implant for the SiD experiment by P. Saxena, K. Ranjan,* ***A. Bhardwaj****, R. K. Shivpuri and S Bhattacharya,* **Nucl. Instr. and Meth. A 658 (2011).**
11. *Development of multi-guard ring-equipped p+–n Si microstrip sensors for the SiD detector at the ILC by P. Saxena, K. Ranjan,* ***A. Bhardwaj****, R. K. Shivpuri and S. Bhattacharya,* **Semicond. Sci. Technol. 25, 105012 (2010).**
12. *Computation of tri-axial induction logging tools in layered anisotropic dipping formations by Lili Zhong…* ***A. Bhardwaj*** *et. al.,* ***IEEE Trans. Geosci. & Remote Sensing, 46(4) (2008).***
13. *High-voltage planar Si detectors for high-energy physics experiments: comparison between metal-overhang and field-limiting ring techniques by K. Ranjan…* ***A. Bhardwaj*** *et. al.,* ***Solid State Electronics 48(9) (2004).***
14. *Comparison of p-plus n junction Formed by BF2plus and Boron Implantation in Silicon Microstrip Detector with Low and High Thermal Budget: Impact of Fluorine on Electrical Characteristics by Ajay K. Srivastava …* ***A. Bhardwaj*** *et. al.,* ***Material Science in Semiconductor Processing Vol.6 (2003).***

15. *Analysis of interstrip capacitance of Si microstrip detector using simulation approach by S. Chatterjee …* ***A. Bhardwaj*** *et. al.,* ***Solid State Electronics 47 (2003).***

2. *Research papers published in Refereed/Peer Reviewed Conferences*

International Conferences Published

1. *Radiation hardness investigation of thin and low resistivity bulk Si* detectors by G.Jain, S.Sharma, C.Jain, A.Kumar, **A.Bhardwaj**, K.Ranjan, Nucl. Instr. and Meth. A 936 (2019) 693-694.
2. *Development of an automated and programmable characterization system for silicon multi-strip sensors,* G.Jain, C.Jain, A.Kumar, A.Sisodia, S.Sharma, M.Saxena, A.Bhardwaj, K.Ranjan, Nucl. Instr. and Meth. A 936 (2019) 663-665.
3. *P-Type Silicon Strip Sensors for the new CMS Tracker at HL-LHC* by W. Adam … **A. Bhardwaj** …et. al., JINST 12 (2017) P06018.
4. *Dependence of charge multiplication on different design parameters of LGAD devices* by G. Jain, R. Dalal, **A. Bhardwaj**, K. Ranjan: JINST 12 (2017).
5. *Design Optimization of Pixel Sensors using Device Simulations for the Phase-II CMS Tracker Upgrade* by G. Jain, **A. Bhardwaj** …et. al., NIM A 824 (2016) 413-416.
6. *Characterization of Silicon Detectors Through TCT at Delhi University* by G. Jain, K. Lalwani, R. Dalal, **A. Bhardwaj**, K. Ranjan, NIM A 824 (2016) 411-412.
7. *Design, Fabrication and Characterization of multi-guard-ring furnished p+n-n+ Silicon Strip Detectors for future HEP experiments* by K. Lalwani, G. Jain, R. Dalal, **A. Bhardwaj**, K. Ranjan, NIM A 824 (2016) 428-431.
8. *Development of Silicon Sensor Characterization System for Future High Energy Physics Experiments* by P. Kumari, G. Jain, K. Lalwani, R. Dalal, **A. Bhardwaj**, K. Ranjan, Journal of Nuclear Physics, Material Sciences, Radiation and Applications 3, No. 1 (2015) 25-29.
9. *A Method to Simulate the Observed Surface Properties of Proton Irradiated Silicon Strip Sensors* by **A. Bhardwaj** … et. al., *16th International Workshop on Radiation Imaging Detectors,* ,Trieste, Italy, 22–26 June 2014, JINST, 2015, 10 C04025.
10. *Development of Radiation Damage Models for Irradiated Silicon Sensors Using TCAD Tools* by Ranjeet Dalal, A. Bhardwaj, R. Eber, T. Eichhorn, K. Lalwani, A. Messineo, T. Peltola, M. Printz, K. Ranjan, PoS (TIPP2014), 276 (2014).
11. *Simulations of Inter-Strip Capacitance and Resistance for the Design of the CMS Tracker Upgrade* by **A. Bhardwaj**, R. Eber, T. Eichhorn, Ranjeet Dalal, K. Lalwani, A. Messineo, T. Peltola, M. Printz, K. Ranjan, PoS (TIPP-2014), 279 (2014).
12. *Simulation of Irradiated Si Detectors* by R. Dalal, **A. Bhardwaj**, K. Ranjan, K. Lalwani, G. Jain, PoS 030 (2014) Vertex 2014.
13. *Simulation of Irradiated Si Detectors* by Ranjeet Dalal, **A. Bhardwaj**, G. Jain, K. Lalwani, K. Ranjan, POS (Vertex-2014) 030.
14. *Recent progress of the RD50 Collaboration – Development of radiation tolerant tracking detectors* by A. Affolder …. **Ashutosh Bhardwaj** *et. al.,* PoS (Vertex-2013) 026.

3. *Research papers Published in Conferences/Seminar other than Refereed/Peer Reviewed Conferences*

Publications in National symposiums

1. *Study of trapping probability in proton irradiated silicon pad detectors using Transient Current Technique simulations* by G. Jain, C. Jain, R. Dalal, **A. Bhardwaj**, K. Ranjan, Proceedings of XXII DAE High Energy Physics Symposium (2018), SPPHY, volume 203 293-296. Springer publisher. ISBN 978-3-319-73170- 4.
2. *Silicon Sensors in Experimental High Energy Physics* by **A. Bhardwaj**, G. Jain, K. Ranjan, Proceedings of

ADNHEAP (2017), SPPHY, volume 201 3-13. Springer publisher. ISBN 978-981-10-7665-7.

3. *Study the radiation damage effects in Si microstrip detectors for future HEP experiments* by K. Lalwani, G. Jain, R. Dalal, **A. Bhardwaj**, K. Ranjan, NIM B 379 (2016) 262-264.
4. *Development and Characterization of AC-coupled Si strip detectors for Nuclear & High Energy Physics Applications* by G. Jain, K. Lalwani, R. Dalal, **A. Bhardwaj**, K. Ranjan, Proceedings of the DAE Symp. on Nucl. Phys. 59 (2014) 954-955.

Conference Organization/ Presentations (in the last three years)

- "Challenges and the recent advancements in Silicon detectors for High Energy Physics Experiments", International conference on Physics, Society and Technology (ICPST-2019), held on 17-19th January, 2019 at the University Conference Hall, University of Delhi, organized by Deshbandhu College, University of Delhi, Kalkaji, New Delhi-110019.

Total Publication Profile optional

Year 2001-2018

Reviewed Journals ~ 600, Conferences and symposia ~ 30, Invited talks and Seminars ~ 10

Research Projects (Major Grants/Research Collaboration)

1. Radiation Damage Studies of Silicon Sensors, Funding Agency: DST, Grant: Rs. 408000/-, Sep 2012-14.
2. Utilization of ion accelerators for studying and modeling ion-induced radiation defects in semiconductors and insulators, Funding Agency: IAEA, 2014-15.
3. Compact Muon Solenoid (CMS) Upgrade, Operation and Utilization, Funding Agency: DST, Grant: Rs. 999 lakhs, 2014-19.
4. Simulation studies and tests to develop radiation tolerant silicon detectors for High luminosity colliders, Funding Agency: DST, Grant: Rs. 10.8 lakhs, 2017-20.

Awards and Distinctions

- Selected for the post of **Scientific Officer C** in **1995** at **Bhabha Atomic Research Centre**, Mumbai and worked there for a period of 6 months as Trainee Scientist.
- Qualified the Joint **National Eligibility Test** (NET) in **July, 1995** and awarded **Junior Research Fellowship** (JRF) in Physical Science under the Council for Scientific & Industrial Research (CSIR) Fellowship Schemes.
- Qualified Graduate Aptitude Test in Engineering (**GATE**)**-95** in **Physics** with percentile score of 91.43.
- Presented a paper entitled "**Free Electron Laser**" in paper reading contest in M.Sc. Physics in St. Stephen's College.
- Awarded **Merit Certificate** under **National Scholarship Scheme** of Govt. of N.C.T. of Delhi in **1988**.
- Awarded **Gold Medal** and **Certificate of Merit** by **CBSE** for securing **100% marks** in **Mathematics** of DSSE **1988**.
- Awarded **Certificate** in National Mathematics Olympiad Contest-1988 and 1989 in X and XI Class.

Association With Professional Bodies

- Student member of Society of Petroleum Engineers (SPE) 2007-2009
- Student member of Society of Geophysicists (SEG) 2007-2010
- Member of the CMS Collaboration, **http://cms.web.cern.ch/content/cms-collaboration**
- Member of the RD50 Collaboration, **https://rd50.web.cern.ch/rd50/**

Other Activities
Invited Talks and Seminars • Silicon Detectors in High Energy physics Experiments, Visitor's Program 2015, Department of Physics & Astrophysics, University of Delhi, 10th March 2015. • "Unraveling the Quantum Universe: the God Particle", Inaugural Lecture of Physics Society, Zakir Husain College, Delhi Unversity, 31st August 2012. • Observation of the God Particle at LHC, AND College, Delhi University, 5th September 2012. • Unraveling the Quantum Universe: The God Particle, Orientation Program, CPDHE, Delhi University, 14th July 2012. • Detectors and Reconstruction: International Workshop, "CERN Master classes", Jalandhar, Punjab, 18th December 2014. • Detectors for High Energy Physics Experiments, Short term course on advances in nuclear and Particle Physics, February 8-12, 2016, National Institute of Technology, Jalandhar, Punjab. • Particle Detection with Modern Detectors in Collider Experiments, Lecture to Physics Faculty and M.Tech. Students, March 22, 2016, UPES, Dehradun. • Unravelling the Quantum Universe using Modern Particle Hunters, Physics Festival Curiosity, Keshav Mahavidyalaya, Delhi University, April 6, 2016. • Simulation & Modeling of Silicon Detectors Using TCAD Tools, XXII DAE-BRNS High Energy Physics Symposium, December 12-16, 2016 - University of Delhi. • Silicon Sensors in Experimental High Energy Physics Experiments, National Conference on Advanced Detectors for Nuclear, High Energy and Astroparticle Physics, 15-17 February 2017, Bose Institute, Kolkata, India. • Looking Back Into Time: Exploring The Quantum Universe, DST sponsored Inspire Science camp for the session 2016-17, 16th to 20th March, 2017, H N B Garhwal University.

Signature of Faculty Member