



University Faculty Details Page on DU Web-site

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Title	Prof.	First Name	BRAJESH CHANDRA	Last Name	CHOUDHARY	Photograph
Designation		PROFESSOR				
Department		Department of Physics & Astrophysics				
Address (Campus)		Room No: 189/159/180, Multistoried Block Department of Physics & Astrophysics University of Delhi, Delhi – 110 007				
(Residence)		A1/2, Maurice Nagar, Delhi – 110 007				
Phone No (Campus)		+91 - 11 – 2766 7725 (Ext. – 1431) (Office)				
(Residence)		+91- 11 – 2766 2012 (Home)				
Mobile		+91 – 11 – 9810662609 (Mobile)				
Fax		+91 – 11 - 27667093				
Email		brajesh@fnal.gov , brajesh.choudhary@cern.ch				
Web-Page						
Education						
Subject		Institution		Year		Details
Ph.D.		University of Delhi, Delhi		1992		Thesis topic: A Study of High Transverse Momentum Direct Photon Production in Interactions of 500 GeV/c piminus and proton beams on a Beryllium Target
M.Sc. (Physics)		Patna University, Patna		1984		Subjects: Physics (Special Paper – Advanced Quantum Mechanics)
B.Sc. (Physics – Hons.)		Patna University, Patna		1981		Subjects: Physics(Hons.), Mathematics & Statistics
Career Profile						
Organization / Institution		Designation		Duration		Role
University of Delhi, Delhi		Professor		Since 27.1.2004 - Present		Teaching, Research, Administration, Mentoring & guiding PhD students
Fermi National Accelerator Laboratory, Batavia, IL, USA		Associate Scientist		2002 – 2006		Research, Accelerator Development and Operation, Detector Development
California Institute of Technology, Pasadena, CA, USA		Research Faculty		1997-2002		Research, Detector Development, Mentoring PhD Students
Institute of Physics, Bhubaneswar, India		Senior Lecturer		1996 - 1997		Teaching, Research, Guiding PhD students
University of California, Riverside, USA		Post-Doctoral Fellow		1992-1996		Research, Mentoring PhD students
University of Delhi, Delhi, India		PhD Student		1987-1992		Research

O.N.G.C	Geo Physicist	1985	Oil and Natural Gas Exploration
Research Interests / Specialization			
<u>Experimental High Energy Particle Physics and Astrophysics. Detector and Accelerator Development.</u>			
<u>Since 2006</u>			
<ol style="list-style-type: none"> 1. Proton - anti-Proton Collider (D0 Experiment at Fermilab, USA - 1992-1997 and October 2003 - 2012) 2. Proton-Proton Collider (CMS Experiment at CERN, Switzerland since 2004) 3. Atmospheric Neutrino Oscillation Experiment (INO in Theni (near Madurai) in Tamil Nadu, India since 2004) 4. Neutrino Experiments/Projects at Fermilab (LBNE since 2010, NOvA since 2012) 			
<u>In Past (1987-2006)</u>			
<ol style="list-style-type: none"> 5. Fixed Target Hadron-Hadron Collider (E706 at Fermilab, USA, 1987-1991) 6. Proton Anti-Proton Collider (D0 Experiment at Fermilab, USA, 1992-1997) 7. Monopole, Astrophysics and Cosmic Ray Observatory (MACRO, LNGS, Italy, 1997-2002) - Search for Monopoles and Atmospheric Neutrino Oscillations 8. Long Baseline Neutrino Oscillation and Atmospheric Neutrino Oscillation (MINOS, Fermilab & Soudan, USA, (1997-2006) 9. NOvA - Long Baseline $\nu(\mu)$ to $\nu(e)$ Oscillation Experiment (2002-2006) 10. Detector Development for High Energy Physics Experiments (E706, MINOS, NOvA) and Accelerator Beam lines SY120, Recycler Ring and Main Injector at Fermilab, USA. 11. Accelerator Development and Operation of Main Injector, Recycler and Switch Yard 120 at Fermilab, USA, 2002 to 2006. 			
<u>Teaching Experience (Subjects/Courses Taught)/ Research Guidance:</u>			
<ol style="list-style-type: none"> 1. Statistical mechanics (Core Course in 2nd Semester) - 2013 2. Nuclear Physics & Particle Physics (Core Course in 3rd Semester) 2004, 2006, 2007, 2008, 2009 3. Nuclear Physics & Particle Physics (Core Course in 1st semester) 2011, 2012 4. Atomic & Molecular Physics (Core course in 2nd semester) - 2010 5. Radiation Theory (Core Course in 4th Semester) 2004 6. Electronics Lab (Final year) 2004 7. Nuclear Physics (Previous) Laboratory (Both Semesters) 2004-5, 2006-7, 2007-8, 2008-9, 2009-10, 2010-11, 2011-12, 2012-13, 2013-2014 8. Masters Project with final year students – only two in last 5 years. 			
<p>At the University of Delhi we only teach MSc students. At present about 300 students are admitted every year in the first year of two years Masters course. The teaching is done in sections and at times the classes are as large as 130 students. I have always taught core or main papers rather than elective ones and the average class size over last 10 years has varied from a minimum of 75 to a maximum of 130 students.</p>			
<u>RESEARCH GUIDANCE:</u>			
<p>I have provided either partial or complete guidance to the following students on various experiments:</p>			
<p>As a postdoctoral fellow from UC, Riverside (1992-1996), I was actively involved in supervising research work of several students from different collaborating universities working on electroweak physics at the D0 experiment of the Tevatron collider Run I. I was closely involved in the thesis analyses of these four students.</p>			
<ol style="list-style-type: none"> 1. Greg Landsberg of SUNY, Stonybrook, on Zγ search from D0 Run 1A. Advisor – Paul Grannis, SUNY, Stonybrook, USA. – Professor of Physics – Brown University and Physics Coordinator – CMS experiment. 2. Tom Fahland of Brown University, on Wγ in the muon channel from D0 Run 1B. Advisor – Dave Cutts, Brown University, USA. Industry in California. Senior Research Scientist at Genomatica sustainable chemicals, San Diego. 3. Steve Glenn of University of California, Davis, on Zγ in the electron channel from D0 Run 1B. Advisor – 			

Mani Tripathi, UC, Davis, USA.

4. Paul Bloom of University of California, Davis, on WW to two leptons mode from D0 Run 1B. Advisor – Mani Tripathi, UC, Davis, USA. Teaching in Naperville Central College, an undergraduate institution near Fermilab, IL.

At Caltech, several undergraduate students worked closely with me on scintillator and fiber R&D for the MINOS detector. I also provided ideas to my colleagues at the collaborating institution on MINOS R&D. Being one of the main people leading the R&D efforts for the MINOS detector I guided and provided ideas to them.

Since I joined University Delhi as a Professor in 2004, several students and post-doctoral fellows have worked very closely with me. Three PhD students have graduated and several others are presently working with me.

Post-Doctoral Fellows:

5. Kirti Ranjan on "Top cross-section in lepton+track channel with b-quark tagging at the D0 experiment". Currently faculty at University of Delhi.
6. Manoj Jha on "W+jets at the CMS". Currently staff in the Computers supports department of Purdue University, USA.

Graduate Students whom I supervised:

7. Ashish Kumar on "Top cross-section measurement in di-electron channel at the D0 experiment". Advisor – R. K. Shivpuri. Degree awarded in 2006. Currently Senior Research Scientist at SUNY, Buffalo.
8. Manoj Jha on "Lead Shape study for the preshower detector for the EM calorimeter for the CMS experiment at CERN". Advisor – R. K. Shivpuri. Degree awarded in 2007. Post-doctoral fellow at INFN, Bologna, Italy.
9. Md. Naimuddin, on "Bs mixing at the D0 experiment". Advisor – D. S. Kulshreshtha. Degree awarded in 2007. Post-doctoral fellow - Fermilab. Currently junior faculty at Delhi University.

Graduate Students Registered Under My Supervision:

10. Pooja Gupta on "Study of Direct Photon at the CMS experiment at CERN". Degree awarded in January 2009. Joined as post-doctoral fellow at UC, Davis on LBNE with Robert Svoboda, Spokesperson LBNE. Left Research and moved to hi-tech industry in USA.
11. Sushil S. Chauhan on "Search for Quark Compositeness at $\sqrt{s} = 14$ TeV at the Large Hadron Collider". Degree awarded in April 2010. Currently post-doctoral fellow at UC, Davis on CMS with Mani Tripathi.
12. Abhinav K. Dubey on "Search for Standard Model Higgs Boson in the Decay $ZH \rightarrow \nu\bar{\nu} + b\bar{b}$ at D0". Degree awarded May 2012. Currently post-doctoral fellow at Tohoku University, Sendai, Japan with Hitoshi Yamamoto.
13. Sudha Ahuja on "Study of Direct Photon Physics with CMS detector at the LHC" – thesis submitted April 2013. Selected as visitor to LHC Physics Center at Fermilab.
14. Varun Sharma on "Search for Quark Compositeness in γ +jet and di-photon channels at CMS" registered since October 2010.
15. Rocky Bala – since October 2011 – Study of Higgs Boson at CMS.
16. Pavanpoot Pandey – since October 2011 - Neutrino Oscillation with the NOvA detector.
17. Prabhjot Singh - since Fall 2013 – Long-Baseline Neutrino Oscillation Experiment
18. Richa Sharma (Co-guide with Dr. Vipin Bhatnagar of Panjab University) on MINOS Experiment - since January 2010 - working on Neutrino oscillation with anti-neutrino beam data and also neutrino to anti-neutrino transition - under India-Fermilab Neutrino collaboration.
19. Sonam Mahajan (Co-guide with Dr. Vipin Bhatnagar of Panjab University) on MIPP Experiment - since

January 2010 - working on Particle Production with different energy beam on various nuclear targets - under India-Fermilab Neutrino collaboration.
Honors & Awards
<ol style="list-style-type: none"> 1. Monbusho Faculty Fellowship in 1997 to visit BELLE experiment in Japan. 2. University Gold Medal for 1st rank in M.Sc. (Physics) 3. University Gold Medal for 1st rank in B.Sc. (Physics Hons.)
Publications
<p>In Indexed/ Peer Reviewed Journals (January 2009 to 5th August 2013) <i>(LAST FIVE YEARS only)</i></p> <p>434 Published Papers in indexed/peer reviewed journals with 18,459 citations. h_{HEP} index = 65</p> <p>Details can be found at:</p> <p>http://inspirehep.net/search?ln=en&ln=en&p=find+a+choudhary%2C+b.+and+date+%3E+2009&of=hcs&action_search=Search&sf=&so=d&rm=&rg=100&sc=0</p>
<p>In Indexed/ Peer Reviewed Journals (1987 to 5th August 2013) <i>(COMPLETE LIST OF PUBLICATIONS)</i></p> <p>705 Published Papers in indexed/peer reviewed journals with 42,204 citations. h_{HEP} index = 92</p> <p>Details can be found at:</p> <p>http://inspirehep.net/search?ln=en&ln=en&p=find+a+choudhary%2C+b.&of=hcs&action_search=Search&sf=&so=d&rm=&rg=25&sc=0</p> <p>779 citable papers with 43,990 citations (includes scientific literature on HEP related web-sites but not published in journals). h_{HEP} index = 94. Details can be found at:</p> <p>http://inspirehep.net/search?ln=en&ln=en&p=find+a+choudhary%2C+b.&of=hcs&action_search=Search&sf=&so=d&rm=&rg=25&sc=0</p>
Public Service / University Service / Consulting Activity
<ol style="list-style-type: none"> 1. On the expert committee of Department of Science and Technology (DST), Govt. of India for reviewing of research projects for award of scientific grants. 2. On the DST committee for SERC School in EHEP. 3. External M.Phil and Ph.D examiner for Panjab University, Chandigarh, H.N.B. Garhwal University, Shrinagar, Uttranchal, BHU, Varanasi and Jamia Milia Islamia, New Delhi. 4. Member selection committees for appointment/promotion of college teachers (Assistant and Associate Professors) 5. Member Governing Body - "Sri Venkateswra College, University of Delhi" as University representative – 1/2011 – 1/2013. 6. Departmental Committee – As a senior Professor I am member of almost all important committees related to framing of courses, research, teaching, laboratories and other important issues of the department.
Professional Societies Memberships

1. Member American Physical Society (APS).

Projects (Major Grants / Collaborations)

Projects Completed as Co-PI and PI:

1. 2004 - 2009 - Co-PI on the proposal "Search for New Particle in Large Hadron Collider at CERN, Geneva", supported by the Department of Science and Technology (DST and Department of Atomic Energy (DAE), Government of India (Gol). Amount sanctioned INR 27.15M (~\$600K).
2. 2005 – 2009 - Co-PI on the proposal "Grid Computing-Setting up of Computing Centers (Tier2/3centres) in the country for CMS and Alice Projects at CERN, Geneva", supported by the DST and DAE, Gol. Amount sanctioned INR 8.4M (~\$ 200K)
3. 2004 – 2007 - Co-PI on the proposal "Fabrication of Pixel Scintillation Counter for the DZERO Detector (Phase-II)", supported by the Department of Science and Technology, Government of India. Amount sanctioned INR 2.9M (~USD 70K)
4. 2007 – 2010 - PI of the joint proposal for the University of Delhi, Delhi and Panjab University, Chandigarh, "Characteristics of Top Quark and Search for New Particles, Phenomena at the D0 Experiment at Fermilab", supported by the Department of Science and Technology, Government of India. Amount sanctioned INR 3.13M for DU (~\$70K) and INR 2.25 for PU – (~\$55K)
5. 2010 – 2012 - PI of Delhi Group on Indian-based Neutrino Observatory (INO) – INR – 1.3M (~\$ 28K) – Supported by DST, Gol.

Projects In Progress as PI:

6. 2012 – 2015 – Spokesperson and PI of India-Fermilab Neutrino Collaboration – a consortium of 8 Indian Institutions – INR 110M (\$2.2M) – Share of DU group INR 20M – (~\$400K), Supported by DST/DAE, Gol.
7. 2012 – 2016 - PI of the DU group (Associate Member) of the EU sponsored project "Invisibles – Neutrino, Dark matter and Dark Energy Physics" funded by European ITN Project (FP7-PEOPLE-2011-ITN, PITN-289442—INVISIBLES. Euro 4.4M. Money given to EU Institutions only. Associate Members to be supported by EU institutions.

Project Funding Request In Pipeline as PI:

8. 2013 – 2018 – PI of the Proposal submitted for funding of next phase of INO – requested amount to DST/DAE, Gol – INR 39.3M (~\$725K) – Funding to be decided by summer of 2013.
9. 2013 – 2018 – PI of the Proposal submitted for funding of CMS Project – requested amount to DST/DAE, Gol – INR 49.6M (~\$ 900K) – Funding to be decided by summer of 2013
10. 2013 – 2018 – PI of the Proposal submitted for funding of next phase of India-Fermilab Neutrino Collaboration.

Other Details:

Important contribution to the field of EHEP:

1. Part of the team, which discovered a new Boson at a mass of 125 GeV with the CMS detector at CERN, July 2012. ---- *Worked on direct photons and published the first paper on direct photon production in CMS even before the data was available. With CMS data published three papers to understand the direct photon and direct di-photon physics that are crucial for understanding the background for Higgs decay to $\gamma\gamma$ channel.*
2. Leadership role in R&D and construction of MINOS Far Detector. *Personally lead the Scintillator and fiber R&D, and the Caltech group built half of the far detector (using almost 200 Tons of solid scintillator). 1997-2002.*
3. Part of the team, which substantiated "Atmospheric Neutrino Oscillation" (i.e. neutrinos have mass) in 1998 at LNGS, Italy (MACRO Collaboration). *Important contribution.*
4. Discovered "top quark" – 1995, Fermilab – D0 Collaboration. *Seminal contribution to the discovery. I was the trigger in-charge for the D0 experiment for two years before and during top discovery. I played an important role in understanding the triggers for the various physics processes, optimizing them and distributing them in such a fashion that discovery physics was reachable along with other physics albeit with limited trigger bandwidth. Also played lead role in understanding the QCD backgrounds.*

5. *Discovered di-bosons at Fermilab, measured the cross-sections and the coupling for the first time at Tevatron in $W\gamma$ and $Z\gamma$ channels on the D0 experiment.*
6. Best poster award (Experimental) to “Search for Excited Quark through $q\bar{q} \rightarrow \gamma\gamma$ Final State at the LHC” (authors Satyaki Bhattacharya, Sushil Singh Chauhan, Brajesh Choudhary and Debajyoti Choudhury) at XXIII International Symposium on Lepton and Photon Interactions at High Energy (LP07) – Daegu, Korea – 13th to 18th August, 2007. Work of Ph.D. student Sushil S. Chauhan.
7. Prize Awarded to Ph.D. student – Ms. Pooja Gupta for oral presentation and poster on “Direct Photon + Jet study at CMS” – at the XXVII Physics in Collision (PIC2007) held at LAPP, Annecy, France – 26th June to 29th June 2007.

Important leadership position in various Experiments:

1. Senior Trigger in-charge for the D0 collaboration – 1994-1995 (2 years). The “top quark” was discovered during this time.
2. Member Scintillator R&D steering committee for the MINOS collaboration. The MINOS detector has used the largest amount of extruded solid scintillator and WLS/Clear fiber in the world. (1997 -2002)
3. Fiber Manager for MINOS. Total Fiber cost was approximately USD 4 Millions. (1998 – 2002)
4. Project Manager for Fermilab Recycler Ring BPM upgrade – USD 1 Million. Successfully implemented. (2002 – 2004).
5. Project Manager for Fermilab Main Injector BPM upgrade. Planned the project. Cost approximately USD 1 Million. Was successfully implemented using the same technology as Recycler Ring BPM after me. (2002 – 2004).
6. Beam line Physicist for the Meson-Test test beam facility SY 120 at Fermilab. (2005).
7. Level 3 manager for NOvA fiber procurement (2003 – 2006 – when I left for India). Successfully negotiated with vendor Fiber cost of approximately USD 20 Millions.
8. Member Publication Committee - CMS Collaboration - 2010-11.
9. Member Publication Committee – Exotica Board – CMS Collaboration – 2012-13.
10. Leader - Neutrino Working Group - for Indo-US Collaboration on Project-X - (since 2010).
11. Spokesperson India-Fermilab Neutrino Collaboration (IIFC-vP, 2009 onward).

Selected other Scientific Contributions:

1. On Local Organizing Committee for “10th International Conference on Calorimetry in High Energy Physics (CALOR02)”, held at California Institute of Technology, Pasadena, USA.
2. On National Organizing Committee for WHEPP 2006, held at IOP, Bhubaneswar.
3. On the National Organizing Committee for the "Workshop on Synergy between High Energy and High Luminosity Frontiers", January 10 - 12, 2011, TIFR, Mumbai, India
4. On the Scientific Program Committee, National Organizing Committee, and Co-Convener of Local Organizing Committee for NuINT-2011 - Seventh International Workshop on Neutrino-Nucleus Interactions in Few GeV Region, March 7th - 11th, 2011, Dehradun, Uttarakhand, India.
5. On the Scientific Committee for symposium “Particle Physics at crossroads”, Edinburgh-Delhi Particle Physics symposium, 15 – 17 February, 2013, India International Center, New Delhi.

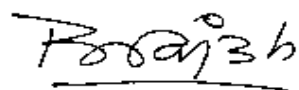
Conference Presentations – Few Selected Invited Plenary Talks since 2009:

1. 2009 - “Physics with Long-Baseline Neutrino Experiments” at “CTP International Conference on Neutrino Physics in the LHC Era”, 15-19 November 2009, Luxor, Egypt.
2. 2010 - “LBNE: Physics Reach and Status” at “12th International Workshop on Neutrino Factories, Super Beams and Beta Beams”, 20-25 October 2010, TIFR, Mumbai, India.
3. 2011 - “Review of Long-Baseline Neutrino Oscillation Physics at Fermilab” at “NuHORIZONS IV – Neutrinos in Physics, Astrophysics and Cosmology” – 23-25 February 2011, HRI-Allahabad, India.
4. 2011 - “Neutrino Physics in India” on behalf of Indian Institutions at “Intensity Frontier Workshop –

- Fundamental Physics at the Intensity Frontier”, Nov 30 – Dec 2, 2011, Rockville, MS, USA.
5. 2012 - “The Physics Reach of Fermilab Long-Baseline Neutrino Experiments and Indo-US Collaboration” at “NuHoRizons V – Neutrinos in Physics, Astrophysics and Cosmology” – 1-3 February 2012, HRI-Allahabad, India
 6. 2012 - “India-based Neutrino Observatory (INO)” at “2012 Project X Physics Study”, 14-23 June 2012, Fermilab, USA.
 7. 2012 - “A Review of Fermilab Long-Baseline Neutrino Program”, at “What is ν ? From New Experimental Neutrino Results to a Deeper Understanding of Theoretical Physics and Cosmology”, 11th July 2012, The Galileo Galilei Institute, Florence, Italy.
 8. 2012 - “HEP Program and Planning – Next Decade in India” at “DPF organized Community Planning Meeting (CPM2012) for Community Summer Study (CSS2013) of APS”, 11-13 October 2012, Fermilab, USA. **Represented Indian HEP community. At the invitation of DPF Vice Chair.**
 9. 2013 - “Neutrino Experiments – Recent Results and Future Prospects” at “XX DAE-BRNS High Energy Physics Symposium”, 13-18 January 2013, Visva-Bharati, Santiniketan.
 10. 2013 – “A Review of Neutrino Physics: An Experimentalists Perspective”, IPM International School and Workshop in Particle Physics (IPP13), May 4-6, 2013, IPM, Teheran Iran. **(via SKYPE)**
 11. 2013 - “Long Tern Neutrino Prospects” at “25th Recontres de Blois – Particle Physics and Cosmology”, May 26-31, 2013, Blois, France.
 12. 2013 – “Overview of Upcoming Neutrino Experiments”, Interface of Numerical Relativity with Gravitational-Wave Astronomy, Neutrino Physics and High-Energy Astrophysics, June 24 – July 5, 2013, ICTS, Bangalore, India. **(via SKYPE)**
 13. 2013 - “The Mass Hierarchy and CPV from Long-baseline Neutrino Experiments”, Annual meeting of ITN Invisibles – Invisibles13, 15-19 July, 2013, Durham University and IPPP at Lumley Castle, Durham, UK.

IMPORTANT SESSION CHAIR:

1. *Invited to Chair plenary session on "Top & Higgs Bosons" at Recontres de Moriond QCD and High Energy Interactions, March 2011, La Thuile, Italy.*



5.August.2013

(Signature of Faculty Member)