

Prof. Amol Dighe: Curriculum Vitae
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Prof. Amol Dighe

Department of Theoretical Physics,
Tata Institute of Fundamental Research
1, Homi Bhabha Road, Colaba, Mumbai 400005
Tel: +91(0)22-2278 2423, Fax: +91(0)22-2278 2777
Email: amol@theory.tifr.res.in

Personal

- Date and place of birth: October 23, 1970, Mumbai, India
- Nationality: Indian

Area of specialization

High Energy Physics Phenomenology

- Neutrinos: Phenomenology, Theory, Astroparticle physics
- Collider physics: Decays of B mesons, Charge-Parity violation

Education:

- Ph.D. in Physics, University of Chicago, 1997.
- M.S. in Physics, University of Chicago, 1994.
- B.Tech. in Engineering Physics, Indian Institute of Technology Bombay, 1992.

Academic positions:

- Professor H, TIFR Mumbai, 2012 – ..
- Associate Professor G, TIFR Mumbai, 2007 – 2011.
- Reader F, TIFR Mumbai, 2003 – 2007.
- Postdoc, Max Planck Institute for Physics, Munich, 2001 – 2003.
- Postdoc, Theory Division, CERN, Geneva, 1999 – 2001.
- Postdoc, ICTP, Trieste, 1997 – 1999.
- Research Assistant, Enrico Fermi Institute, U. of Chicago, 1994 - 1997.
- Research Assistant, KTeV Experimental Group, U. of Chicago, 1993.
- Teaching Assistant, Physics Department, U. of Chicago, 1992-1995.

Honours and Awards

- Fellow, Indian National Science Academy (INSA), 2015–.
- Shanti Swarup Bhatnagar Award, Council of Scientific and Industrial Research, India, 2013.
- Fellow, Indian Academy of Sciences (IASc), 2013–.
- Swarnajayanti Fellowship in Physical Sciences, Department of Science and Technology, India, 2009.
- Partnergroup Leader, Max Planck - India Partnergroup program in “Neutrino Physics and Astrophysics”, 2005–2010.
- Selected for the John Bell Scholarship, Worldlab-CERN, 1999.
- Nominated for the Physical Sciences Teaching Prize, U. of Chicago, 1994.
- Institute Silver Medal, Indian Institute of Technology Bombay, 1992.
- Bronze Medal, International Mathematics Olympiad, Braunschweig, Germany, 1989.

Adjunct Positions

- Lecturer, International Max Planck Research School (IMPRS) in Elementary Particle Physics, 2010 – .
- Joint Faculty, International Centre for Theoretical Sciences (ICTS-TIFR), Bangalore, 2010 – 2013 .

Administrative Positions

- Member, University Grants Commission (UGC) Academic Advisory Committee on Massive Online Open Courses (MOOCs), Sciences, 2017–.
- Member, International Union of Pure and Applied Physics (IUPAP), Commission C11 (Particles and Fields), 2015 – 2017.
- Member, SERC Theoretical High Energy Physics School Committee, 2016 –.
- Member, DST-INSPIRE Faculty Selection Committee (INSA), 2016 – 2017.
- Member, Physical Sciences Research Committee, CSIR, 2015 –.
- Dean, Graduate Studies, TIFR Deemed University, 2014 –.
- Member Secretary, Scientific Management Board, India-based Neutrino Observatory (INO), 2013 –.

Research Interests and Highlights

- **Collider physics:**

- Flavor physics and CP violation,
- Precision tests of the Standard Model of particle physics,
- Searches for physics beyond the Standard Model.

Developed the technique of flavor $SU(3)$ relations among decay amplitudes of B mesons. Proposed the measurement of $[Bs \text{ to } J/\psi \text{ } \phi]$ angular distribution for lifetime difference and weak phases in Bs - Bs bar system. Suggested $[Bs \text{ to } \tau \text{ } \tau]$ enhancement as the resolution for the observed anomalous like-sign dimuon CP asymmetry.

- **Neutrino oscillation phenomenology:**

- Measuring neutrino parameters
- Detecting new physics at neutrino experiments,
- Models of neutrino mass generation.

Explored optimization of energies and baselines for neutrino factories. Looked for signals of large extra dimensions and long-range forces in neutrino data. Calculated quantum corrections to neutrino masses and mixing in Type-III seesaw models. One of the leaders of the simulation and physics analysis group of the INO collaboration.

- **Astroparticle physics:**

- Neutrino oscillations in extremely dense media,
- Neutrino-neutrino interactions inside a supernova and nonlinear collective effects,
- Probing supernova astrophysics using neutrino spectra.

One of the pioneers of the study of neutrino oscillations inside a supernova. Related neutrino mass ordering with the observations of neutrinos from a supernova. Showed how the shock wave inside the star can be tracked with neutrinos. Developed the formalism for treating the collective effects in three-flavor framework and for non-spherical geometries. Discovered the novel nonlinear effect of multiple spectral splits in supernova neutrino oscillations. Demystified the onset of collective effects through the linearized stability analysis.

Theses Supervisions

- Ph.D. Thesis (INO-HBNI), Ms. Moon Moon Devi, “Enhancing ICAL potential with hadrons, and development of multigap RPCs” (*Submitted Jan 2015*)
- M.Sc. Thesis (CBS-MU), Mr. Sourabh Wajhal, “Neutrino oscillations inside supernovae”, Nov 2014
- Ph.D. Thesis (TIFR), Dr. Diptimoy Ghosh, “Looking for new physics beyond the Standard Model through flavor transitions”, April 2012 (Rahul Basu Memorial Award for the best High Energy Physics thesis from India)
- M. Sc. Thesis (TIFR), Arka Banerjee, “Collective oscillations in supernova neutrinos: onset and beyond”, Aug 2011
- Ph.D. Thesis (TIFR), Dr. Shamayita Ray, “Neutrino oscillation phenomenology with fermions beyond the Standard Model”, April 2010
- Ph.D. Thesis (TIFR), Dr. Basudeb Dasgupta, “Nonlinear oscillations of supernova neutrinos”, April 2009 (Honourable Mention for the Geeta Udgaonkar Best Thesis Award)
- M.Sc. Thesis (TIFR), Mr. Basudeb Dasgupta, “Neutrino flavour conversions inside a supernova”, Dec 2006
- Diploma Thesis (ICTP), Ms. Anota Lawal, “CKM angle α from angular correlations”, Sep 1998

External Project Students

- Sheryl Matthews, IIT Bombay (VSRP, summer 2016)
Effect of turbulence on supernova neutrino oscillations
- Saurav Sarkar, IISER Kolkata (VSRP, summer 2014)
Neutrino oscillations in matter: from Sun to supernova
- Sourabh Wajhal, CBS Mumbai (CBS semester project, 2014)
Neutrino oscillations inside the Sun
- Amol Patwardhan, IIT Bombay (B.Tech. project, 2010–11)
Non-linear flavor oscillations of a dense neutrino gas under self-interaction
- Shireen Gangal, U. Pune (VSRP, summer 2010)
Neutrino propagation through a non-adiabatic MSW resonance
- Aniket Joglekar, IIT Bombay (VSRP, summer 2009)
Neutrino flavour conversions in long-baseline experiments: a semi-analytic approach in three flavours

- Bhubanjyoti Bhattacharya, IIT Kanpur (VSRP, summer 2005)
Neutrino propagation through non-monotonic matter density
- M. D. Prabha, IIT Madras (VSRP, summer 2004)
Neutrino flavour conversions in matter

Graduate Courses in TIFR

- “Classical Mechanics” (Core course), Autumn 2017
- “Quantum Mechanics-II” (Core course), Spring 2015, 2016
- “Flavour Physics” (Topical course), Spring 2014
- “Neutrino Physics” (Topical course), Spring 2013, 2010, 2009
- “Electrodynamics-II” (Core course), Autumn 2012, 2011, 2007
- “Mathematical Methods” (Core course), Autumn 2008
- “Particle Physics” (Topical course), Autumn 2006
- “Topics in Theoretical Physics” (Reading course), Autumn 2005
- “Particle Physics” (Reading course), Autumn 2004
- “Quantum Mechanics” (Core course), Spring 2004

Invited Short Courses

- “Flavour Physics”, Lectures at the Pre-SUSY School 2017, TIFR Mumbai, Dec 2017
- “Neutrino Physics”, Lectures at the SERC School in Experimental High Energy Physics, NISER Bhubaneswar, Dec 2017
- “Complex Analysis”, Science Academies’ Refresher Course, University of Mumbai, Oct 2016
- “Flavour Physics”, SERC school in Theoretical High Energy Physics, BITS Pilani, Goa, Dec 2014
- “Supernova and neutrinos”, Universenet School, Oxford, UK, Sep 2008
- “B Physics”, SERC School in Theoretical High Energy Physics, IIT Bombay, Feb 2008
- “Introduction to Neutrino Physics”, NIUS camp, HBCSE, Mumbai, May 2006
- “Neutrino Physics”, SERC school in Theoretical High Energy Physics, IIT Kanpur, Dec 2004
- “CP violation”, Summer School in Particle Physics, ICTP, Jun 1999

Online Pedagogical Repositories

- A complete course on “Neutrino Physics”, with videotaped lectures and lecture notes, available on YouTube and at <http://theory.tifr.res.in/~amol/nuphy/nuphy.html>
- A complete web course on “Electrodynamics”, prepared for National Programme on Technology-Enhanced Learning (NPTEL), Ministry of Human Resources and Development (HRD), India, available at <http://nptel.ac.in/courses/115101004/>

National and International Involvement

- **International Advisory Committees:** International Conference on High Energy Physics (ICHEP 2016), Chicago, USA, July 2016; Lepton-Photon 2015, Slovenia, July 2015; Topics in Astroparticle and Underground Physics (TAUP 2013), Asilomar, USA, Sep 2013.
- **National Organising Committees:** National Symposium on Particles, Detectors and Instrumentation (NSPDI 2017), Mumbai, Oct 2017; 9th International Workshop on the CKM Unitarity Triangle (CKM 2016), Mumbai, Dec 2016; Workshop on High Energy Physics Phenomenology (WHEPP-XIV), IIT Kanpur, Dec 2015; National Symposium on Particles, Detectors and Instrumentation (NSPDI 2015), Madurai, Mar 2015; Lepton-Photon 2011, TIFR Mumbai, Aug 2011; XIX DAE-BRNS High Energy Physics Symposium, LNMIIT Jaipur, Dec 2010; Workshop on Synergy between High Energy and High Luminosity Frontiers (SEL 2011), TIFR Mumbai, January 2011; Workshop on High Energy Physics Phenomenology (WHEPP X), IMSc Chennai, Jan 2010; 17th DAE-BRNS High Energy Physics Symposium, IIT, Kharagpur, December 2006.
- **International Olympiad Academic Core Committees:** International Olympiad for Astronomy and Astrophysics (IOAA 2016), Bhubaneswar, Dec 2016; International Physics Olympiad (IPhO 2015), Mumbai, May 2015; International Junior Science Olympiad (IJSO 2013), Pune, Dec 2013.
- **Referee of International Journals:** Physical Review Letters, Physical Review D, Journal of High Energy Physics, Journal of Cosmology and Astroparticle Physics, Physics Letters B, International Journal of Modern Physics A, Modern Physics Letters A, European Physics Journal C, Pramana.
- **Faculty Selection / Continuation / Promotion committees:** IIT Bombay, Feb 2015; IIT Jodhpur, Nov 2012.
- **Ph.D. Thesis / Viva-voce Examiner:** IIT Guwahati, Feb 2018, Dec 2014; IIT Gandhinagar, Feb 2017; M.S. University Udaipur (PRL Ahmedabad), March 2016, Feb 2012; HBNI (HRI Allahabad), Jul 2011; HBNI (SINP Kolkata), Jan 2011; University of Canterbury, New Zealand, Sep 2010; Oxford University, United Kingdom, Sep 2008; Allahabad University, Jul 2008.

- **Conference Convener / Co-convener:** International Workshop on the CKM Unitarity Triangle (CKM 2016), TIFR Mumbai, Dec 2016; India-UChicago@TIFR Workshop, TIFR Mumbai, Sep 2013; Workshop in High Energy Physics Phenomenology (WHEPP-XII), Mahabaleswar, Jan 2012; ICTS Program “Aspects of Neutrinos”, IMSc Chennai, International Centre Goa and TIFR Mumbai, April 2009; Joint Indo-German Supernova Astroparticle Physics Workshop (JIGSAW 2010), TIFR Mumbai, Feb 2010; Joint Indo-German School And Workshop (JIGSAW 2007) on Neutrinos in Physics, Astrophysics and Cosmology, TIFR, Mumbai, February 2007.
- **Working Group / Parallel Session Coordinator:** International Conference on High Energy Physics (ICHEP 2014), Valencia, Spain, Sep 2014; Topics in Astroparticle and Underground Physics (TAUP 2011), Germany, Sep 2011; HAMBURG Neutrinos from Supernova Explosions (Hanse 2011), Germany, Jul 2011; International Workshop on Neutrino-nucleon Interactions (NuInt 2011), Dehradun, Mar 2011; Workshop on High Energy Physics Phenomenology (WHEPP XI), PRL Ahmedabad, Jan 2010; Workshop on High Energy Physics Phenomenology (WHEPP VIII), IIT Bombay, Jan 2008; DAE-BRNS Symposium in HEP, SINP, Kolkata, Nov 2004.
- **Organising Committees of conferences / workshops:** National Symposium on Particles, Detectors and Instrumentation (NSPDI 2015), Madurai, Mar 2015; Program on CP Violation in elementary particles and composite systems (PCPV 2013), Mahabaleswar, Feb 2013; National Symposium on Particles, Detectors and Instrumentation (NSPDI 2012), TIFR Mumbai, Mar 2012; International Workshop on Neutrino Factories, Superbeams and beta beams (NuFact10), TIFR Mumbai, October 2010; International Colloquium on Perspectives in Fundamental Research, TIFR Mumbai, March 2010; 21st International Workshop on Weak Interactions and Neutrinos (WIN07), SINP, Kolkata, January 2007.
- **Academic administration within TIFR:** Dean, Graduate Studies (2014–); Physics Subject Board Convener (2011-2014); Physics Subject Board member (2006–2011); DTP Search Committee Convener (2009-2014); DTP Visiting Fellow Coordinator (2005-2010); DTP Colloquium Coordinator (2005–2006); Institute VSRP Coordinator (2005); Department VSRP Coordinator (2004).

Talks (2003 –)

A. Invited Talks at Conferences and Workshops

- “Flavor data and new physics: hints and constraints”, Belle Analysis Workshop, MNIT Jaipur, Nov 2017
- “India-based Neutrino Observatory (INO): science, technology, and opportunities”, Indian Science Congress, Tirupati, Jan 2017
- “Pauli’s messengers: looking at the sky in neutrinos”, Astronomical Society of India meeting, Srinagar, May 2016
- “Supernova neutrino oscillations: Probing neutrino-neutrino interactions in dense media”, International Workshop on Frontiers in Electroweak Interactions of Leptons and Hadrons, Aligarh Muslim University, Nov 2016
- “Supernova Neutrinos”, Nu-HoRIZons Workshop, HRI Allahabad, Mar 2016
- “Physics potential of INO-ICAL”, Workshop on Neutrino Programs with facilities in Japan, Aug 2015 (over video-conferencing)
- “Flavour data and new physics: hints and constraints”, XXI DAE-BRNS HEP Symposium, IIT Guwahati, Dec 2014
- “The world of neutrinos”, Symposium on Neutrinos and INO, IASc Annual Meeting, Nov 2014
- “Future non-accelerator based HEP projects: theoretical motivations”, Vision meeting of Nuclear, Particle and High Energy Physics, HBCSE Mumbai, Aug 2014
- “Neutrino flavours from astrophysical sources”, Conference on Flavour Physics and Mass Generation, NTU Singapore, Feb 2014
- “Heavy flavour decays: the mundane and the exotic”, National meeting on Heavy Flavour (HFmeet 2013), IIT Bombay, Apr 2013
- “INO Physics studies: status in Nov 2013”, INO-LBNE meeting, TIFR Mumbai, Nov 2013
- “Particle astrophysics of neutrinos”, Indian Academy of Sciences, Mid-year meeting, IISc Bangalore, July 2013
- “Exploring the universe with neutrinos”, Lepton-Photon Symposium (LP13), San Francisco, USA, June 2013
- “Supernova neutrino oscillations: the current status”, NC-HEPC 2013 (National Conference on High Energy Physics and Cosmology), Guwahati University, Feb 2013

- “Looking for BSM physics through B decays”, KIAS Phenomenology Workshop, Seoul, South Korea, Sep 2012
- “India-based neutrino observatory”, NuFact12 (International Workshop On Neutrino Factories, Superbeams and Betabeams), USA, July 2012 (Given remotely via video-link)
- “Supernova neutrinos: a SmirnovFest overview”, Invisibles conference, Florence, Italy, June 2012
- “B Physics: Standard Model and beyond”, Conference on B Physics at the LHC Kolkata, March 2012
- “Theoretical issues in flavor physics”, Lepton-Photon 2011, Mumbai, Aug 2011
- “Signatures of supernova neutrino oscillations”, Hanse 2011 (*Hamburg Neutrinos from Supernova Explosions*), Hamburg, germany, Jul 2011
- “Neutrino-neutrino interactions inside a supernova”, NuInt11 (*International Workshop on Neutrino-Nucleus Interactions*), Dehradun, Mar 2011
- “Supernova observation for neutrino mixing parameters” NuFact10 (*International Workshop On Neutrino Factories, Superbeams and Betabeams*), TIFR Mumbai, Oct 2010
- “Collective effects in oscillations of supernova neutrinos”, NuTheme (Institute on Neutrino Theory, Models and Experiments), CERN, Geneva, Sep 2010
- “SN neutrinos: collective and matter effects at large detectors”, NOW 2010 (Neutrino Oscillation Workshop), Otranto, Italy, Sep 2010
- “Inverse supernova neutrino problem”, NuHoRIZons 2010, HRI Allahabad, Feb 2010
- “Supernova neutrino oscillations: some recent insights” Workshop on High Energy Physics Phenomenology (WHEPP XI) PRL, Ahmedabad, Jan 2010
- “Particle astrophysics of neutrinos”, Science Without Boundaries, ICTS Inaugural Event IISc, Bangalore, Dec 2009
- “B Physics at the LHC”, LHC and New Frontiers of Particle Physics, U. of Calcutta, Dec 2009
- “Supernova neutrino oscillations: some new insights”, CTP International Conference on Neutrinos in the LHC Era, Luxor, Egypt, Nov 2009
- “The Elusive Neutrino”, Young Indian Scientists Colloquium, TIFR Mumbai, Sep 2009

- “Supernova neutrino oscillations: what do we understand?”, International Conference on Topics in Astroparticle and Underground Physics (TAUP 2009) Rome, Italy, Jul 2009
- “Collective oscillations of supernova neutrinos: a three-flavour course”, *Melbourne Neutrino Theory Workshop*, Melbourne, Australia, Jun 2008.
- “Physics potential of the next supernova observations”, NEUTRINO 2008 (*International Conference on Neutrino Physics and Astrophysics*), Christchurch, New Zealand, May 2008.
- “Lifetime differences in neutral B mesons”, LHC08 (*International conference on Early Physics at LHC with CMS Detector*, TIFR Mumbai, Mar 2008.
- “Supernova neutrinos: our current understanding”, *Nu-HoRIZons Workshop*, HRI Allahabad, Feb 2008.
- “Models of neutrino Majorana masses”, *Workshop on Neutrinoless Double Beta Decay*, TIFR Mumbai, Oct 2007.
- “Supernova and neutrinos”, NuFact07 (*International Workshop On Neutrino Factories, Superbeams and Betabeams*), Okayama, Japan, Aug 2007.
- “Constraining long range leptonic forces from neutrino experiments”, JIGSAW07 (*Joint Indo-German School and Workshop on “Neutrinos in Physics, Astrophysics and Cosmology”*), TIFR Mumbai, Feb 2007.
- “Physics of supernova neutrinos”, WIN07 (*Weak Interactions and Neutrinos*), SINP Kolkata, Jan 2007.
- “Neutrinos in Astrophysics”, *DAE-BRNS Symposium in High Energy Physics*, IIT Kharagpur, Dec 2006.
- “Physics at the India-based Neutrino Observatory (INO)”, ICHEP06 (*International Conference on High Energy Physics*), Moscow, Russia, Jul 2006.
- “Constraints on flavor-dependent long range forces from neutrino experiments”, ICHEP06 (*International Conference on High Energy Physics*), Moscow, Russia, Jul 2006.
- “Supernova: the cosmic competitor of neutrino factories”, *Physics with Atmospheric Neutrinos and Neutrinos from Muon Storage Rings*, IIT Mumbai, Aug 2005.
- “Probing neutrino physics with a supernova”, CuTaPP (*Current Topics in Astroparticle Physics*), Tegernsee, Germany, Apr 2005.
- “Galactic supernova for neutrino mixing and SN astrophysics”, NNN05 (*Next Generation of Nucleon Decay and Neutrino Detectors*), Aussois, France, Apr 2005.

- “Supernova neutrinos: production, propagation and oscillations”, Neutrino 2004 (*International Conference on Neutrino Physics and Astrophysics*), Paris, France, Jun 2004.
- “Supernova neutrino oscillations”, *International Conference on Perspectives in Particle Physics, Gravity and Cosmology*, Ahmedabad, India, April 2004.
- “Neutrinos from a Type II supernova”, *Workshop on Supernovae, Gamma Ray Bursts and Pulsars*, Mumbai, India, Jan 2004.
- “Oscillations of supernova neutrinos”, *MPI Young Scientists Workshop on Hot Topics in Particle and Astroparticle Physics*, Tegernsee, Germany, Jul 2003.

B. Seminars and Colloquia

- Neutrino physics and astrophysics”, D. P. Roy Memorial Colloquium Series, Dec 2017
- “Astroparticle physics of neutrinos: Nobel 2015 and beyond”,
 - International Centre for Theoretical Sciences (ICTS) Colloquium, Bengaluru, Nov 2015
 - Saha Institute of Nuclear Physics (SINP) Colloquium, Dec 2015
 - Indian Association for Cultivation of Sciences (IACS), Kolkata, Dec 2015
- “Universe through the Neutrino Eye”, Physics Colloquium, IISc Bengaluru, Nov 2015
- “Changing Flavours of Neutrinos: the journey to Nobel 2015 and beyond”,
 - UM-DAE CEBS Colloquium, Feb 2016
 - Homi Bhabha Distinguished Public Lecture, IISER Pune, Nov 2015
- “Exploring the world with neutrinos” NCRA Colloquium, Mar 2015
- “The universe of neutrinos: the invisible particles”,
 - TIFR Centre for Interdisciplinary Sciences, March 2015
 - IIT Hyderabad, March 2015
 - Madurai Kamraj University, Sep 2014
- “Neutrino detectors and the physics they teach us”, SYMPHY 2014, IIT Bombay, Apr 2014
- “Particle astrophysics of neutrinos”
 - IIT Bombay, Jan 2014

- IIT Guwahati, Feb 2013
- “The universe of neutrinos: the invisible particles”
 - Madurai Kamraj University, IISER Pune, Sep 2013
 - University of Mumbai, Ruparel College, Jan 2014
- “The elusive neutrino”, PRL Colloquium, Physical Research Laboratory, Ahmedabad, March 2010
- “Supernova neutrino oscillations: what do we understand?”, CHEP Seminar, IISc Bangalore, Jul 2009
- “CP violation and the third generation of quarks: Nobel Prize in Physics, 2008”, BARC Colloquium, Bhabha Atomic Research Centre, Mumbai, Nov 2008.
- “The Elusive Neutrino”, Colloquium, Centre for Basic Sciences, Mumbai University, March 2008
- “Neutrinos: a CV”, DHEP Seminar, TIFR, Oct 2007
- “Neutrinos: masses, mixing and symmetries”, ProbirFest, TIFR, Oct 2007
- “Supernova neutrino oscillations”, EFI, University of Chicago, Jun 2006
- “Looking at the supernova shock wave in neutrinos”, DTP Colloquium, TIFR, Mar 2006
- “Supernova neutrinos for neutrino mixing and SN astrophysics”, TPSC colloquium, IISc Chennai, Feb 2005
- HEP Journal Club talks (on arXiv papers):
 - “Pulsar Kicks from Active-Sterile Neutrino Transformation in Supernovae”, Feb 2011
 - “2 sigma neutrino results from ICHEP 2010”, Aug 2010
 - “Card game restriction in LHC can only be successful!” Nov 2009
 - “Gravity Modification with Yukawa-type Potential: Dark Matter and Mirror Gravity”, May 2009
 - “Asymmetric Dark Matter”, Jan 2009
 - “The GSI anomaly”, Aug 2008
 - “Probes of Lorentz Violation in Neutrino Propagation”, May 2008
 - “Neutrino oscillations in a stochastic model for space-time foam”, Dec 2007
 - “Unparticle constraints from SN1987A”, Sep 2007
 - “Revisiting cosmological bounds on radiative neutrino lifetime”, Jun 2007

- “ $B_s \rightarrow K^{(*)0} \bar{K}^{(*)0}$ decays: the golden channels for new physics searches”, Mar 2007
- “Coherent Development of Neutrino Flavor in the Supernova Environment”, Aug 2006
- “Leptogenesis Below the Davidson-Ibarra Bound”, Mar 2006
- “Neutrino statistics and non-standard commutation relations”, Oct 2005
- “Supersymmetric Theories of Neutrino Dark Energy”, Jul 2005
- “A Sinister Extension of the Standard Model to $SU(3) \times SU(2) \times SU(2) \times U(1)$ ”, Apr 2005
- “Matter effects on Majorana neutrino phases”, Mar 2005
- “Mixing-Induced CP Violation in $B \rightarrow P_1 P_2 \gamma$ in Search of Clean New Physics Signals”, Oct 2004
- “Supernova neutrino oscillations”, Free Meson Seminar, TIFR, Nov 2003

C. Popular Science Talks

- “*jaminii-khaaluun aakaashaachaa vedh*” (Going underground to look at the sky), Science Forum talk (Marathi), Kankavli, Jan 2018
- “The invisible neutrinos and how they make the sky visible”, Public Lecture, MNIT Jaipur, Nov 2017
- “Goodbye, Mr. Kilogram”, Chai-and-Why talk, Oct 2017
- “Science Corner”, Interview (in 3 parts) on All India Radio, Oct 2017
- “Those invisible neutrinos and their astroparticle physics”, at
 - Bhoutics, IIT Madras, Mar 2017
 - Tea-time talk, VSRP program, TIFR, Jul 2017, May 2014
- “Exploring particle physics: participating in the creation of knowledge”, Rendezvous, UM-DAE-CBS, University of Mumbai, Mar 2017
- “Asking questions”, Institute of Mathematics Education, Thane, Mar 2017
- “Going underground to look at the sky”, at
 - Bizznext, Vidyalkar Institute of Technology, Mumbai, Feb 2017
 - Sawaal-jawaab, Lamakaan, Hyderabad, Mar 2015
- “The changing flavours of neutrinos: journey to 2015 Nobel prize and beyond”, at
 - Homi Bhabha Distinguished Public Lecture, IISER Pune, November 2015

- Vijyoshi National Science camp, IISER Kolkata, December 2015
- National Talent Search program, HBCSE, January 2016
- MathTriX festival, Ruia College, January 2016
- INSPIRE Internship Program, Amity University Gwalior, January 2016
- Sir P. T. Sarwajanik College of Science, Surat, February 2016
- “How fast is the fastest ?”, Chai-and-Why talk, Ruparel College, Oct 2015
- “The largest, the smallest, and us”, Mumbai Local talk, Junoon, Mumbai, Mar 2015
- “Fantasy and science fiction”, “Chai-and Why” panel discussion, Prithvi Theatre, Oct 2014
- “How electron got its mass: Nobel Prize in Physics 2013”, Public Lecture, Nehru Centre, Mumbai, Nov 2013
- “The excitement in neutrino physics and open problems”, INO Outreach Program, Science City, Kolkata, Nov 2013
- “Neutrinos: invisible particles all around us”, Visiting Students’ Research Program, TIFR, May 2013
- “The world of particle physics and TIFR” (tri-lingual), Founder’s Day lecture, TIFR, Oct 2012
- “Discovery of the Higgs Boson: before, during, and after”, at
 - Jhunjhunwala College, Mar 2014
 - Knowledge Series Lecture, D.J.Sanghvi College of Engineering, Feb 2013
 - Ruparel College, St. Xaviers College, Sophia College, Ruia College, Jun-Dec 2012
 - Rotary Club Malabar Hill, Oct 2012;
 - Institute of Science - Maharashtra Times Public Lecture, Jul 2012
- “Did something ν just break the speed limit ?”, Chai and Why, Prithvi Theatre, Nov 2011
- “Neutrinos: invisible particles all around us”, Frontiers of Science, TIFR Mumbai, Nov 2010; Chai and Why, Ruia College, Mumbai, Jan 2010
- “Astronomy with Neutrinos: the invisible particles from the sky”, JNCASR, Bangalore, Jul 2009
- “Why is the sea blue ? : a tribute to C. V. Raman” National Science Day Lecture, Kendriya Vidyalaya 3, Mumbai, Feb 2008

- “Science as a career”, Bombay Centre for Talent Search Award Function, Ruparel College, Jan 2008; (in Marathi) Jidnyasa Award Function, S. S. School, Thane, Jul 2007
- “Zooming in: from infinity to infinitesimal” (English), “Zoooooom: paramaanu se antariiksha tak” (Hindi), TIFR, Sep-Oct 2006

Publications

A. Research Papers

1. **Nonstandard neutrino self-interactions in a supernova and fast flavor conversions,**
Amol Dighe, Manibrata Sen
Phys. Rev. D **97** (2018) 043011 [arXiv:1709.06858 [hep-ph]]
2. **New effects of non-standard self-interactions of neutrinos in a supernova,”**
A. Das, A. Dighe and M. Sen
J. Cosmol. Astropart. Phys. **1705**, 051 (2017) [arXiv:1705.00468 [hep-ph]]
3. **“Neutrino mixing and R_K anomaly in $U(1)_X$ models: a bottom-up approach,”**
D. Bhatia, S. Chakraborty and A. Dighe
J. High Energy Phys. **1703**, 117 (2017) [arXiv:1701.05825 [hep-ph]]
4. **“Physics Potential of the ICAL detector at the India-based Neutrino Observatory (INO),”**
[ICAL Collaboration]
Pramana **88**, 79 (2017) [arXiv:1505.07380 [physics.ins-det]]
5. **“Simulation studies of hadron energy resolution as a function of iron plate thickness at INO-ICAL”**
S. M. Lakshmi, A. Ghosh, M. M. Devi, D. Kaur, S. Choubey, A. Dighe, D. Indumathi and M. V. N. Murthy *et al.*
J. Instrum. **9**, T09003 (2014) [arXiv:1401.2779 [physics.ins-det]]
6. **“Enhancing sensitivity to neutrino parameters at INO combining muon and hadron information”**
M. M. Devi, T. Thakore, S. K. Agarwalla and A. Dighe
J. High Energy Phys. **1410**, 189 (2014) [arXiv:1406.3689 [hep-ph]].
7. **“Nonuniversality of indirect CP asymmetries in $D \rightarrow \pi\pi, KK$ decays”**
A. Dighe, D. Ghosh and B. P. Kodrani
Phys. Rev. D **89**, 096008 (2014) [arXiv:1306.3861 [hep-ph]]
8. **“Hadron energy response of the Iron Calorimeter detector at the India-based Neutrino Observatory”**
M. M. Devi, A. Ghosh, D. Kaur, L. S. Mohan, S. Choubey, A. Dighe, D. Indumathi and S. Kumar *et al.*
J. Instrum. **8**, P11003 (2013) [arXiv:1304.5115 [physics.ins-det]]
9. **“The Reach of INO for Atmospheric Neutrino Oscillation Parameters”**
T. Thakore, A. Ghosh, S. Choubey and A. Dighe
J. High Energy Phys. **1305**, 058 (2013) [arXiv:1303.2534 [hep-ph]]

10. **“Testing Times for Supersymmetry: Looking Under the Lamp Post”**
A. Dighe, D. Ghosh, K. M. Patel and S. Raychaudhuri
Int. J. Mod. Phys. A **28**, 1350134 (2013) [arXiv:1303.0721 [hep-ph]]
11. **“How large can the branching ratio of $B_s \rightarrow \tau^+\tau^-$ be ?”**
A. Dighe and D. Ghosh
Phys. Rev. D **86**, 054023 (2012) [arXiv:1207.1324 [hep-ph]]
12. **“Large mass splittings for fourth generation fermions allowed by LHC Higgs exclusion”**
A. Dighe, D. Ghosh, R. M. Godbole and A. Prasath
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 - *neutron taare aaNi tyaanchaa miilanasohaLaa* (The merger of neutron stars), Nov 2017
 - *ek ghaTanaa, anek ssakshiidaar* (Multi-messenger astronomy), Oct 2017
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 - *global warming-chyaa avarodhaa-saaThii nano-tantradnyaan* (Nano-technology for preventing global warming), May 2017
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 - *“prakaashaache Dohii”* (Bathing in microwave light), Dec 2016
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