CURRICULUM VITAE — L. SRIRAMKUMAR

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PERSONAL INFORMATION

- **Gender:** Male
- **Date of Birth:** July 10, 1970
- **Nationality:** Indian
- **Marital Status:** Married with child

PRESENT POSITION

- Professor, Department of Physics, Indian Institute of Technology Madras, Chennai, India, 2015–Present

ACADEMIC HISTORY (in reverse chronological order)

- Associate Professor, Department of Physics, Indian Institute of Technology Madras, Chennai, India, 2011–15
- Associate Professor G, Harish-Chandra Research Institute, Allahabad, India, 2010–11
- Reader F, Harish-Chandra Research Institute, Allahabad, India, 2005–10
- Fellow E, Harish-Chandra Research Institute, Allahabad, India, 2003–05
- Postdoctoral Fellow, Harish-Chandra Research Institute, Allahabad, India, 2001–03
- Postdoctoral Fellow (of Prof. Don N. Page), Department of Physics, University of Alberta, Edmonton, Canada, 1999–2001
- Postdoctoral Fellow (of Prof. Jacob D. Bekenstein), Racah Institute of Physics, Hebrew University, Jerusalem, Israel, 1997–99
- Ph.D. Physics, Inter-University Centre for Astronomy and Astrophysics, Pune, India, 1992–97
  Thesis Title: *Quantum Fields in Non-trivial Backgrounds*
  Thesis Supervisor: Prof. T. Padmanabhan
- M.Sc. Physics, Indian Institute of Technology, Chennai, India, 1990–92
- B.Sc. Physics, Madras Christian College, Chennai, India, 1987–90

Last updated on February 13, 2024

RESEARCH INTERESTS

- Inflationary cosmology and the cosmic microwave background
  - Deviations from slow roll inflation and features in the inflationary perturbation spectra – Comparison with the observations of the cosmic microwave background
  - Generation and imprints of perturbations in multi-field inflationary models
  - Origin and signatures of primordial non-Gaussianities – Efficient numerical computation of the inflationary three-point functions – Validity of the consistency relations
  - Formation of primordial black holes – Generation and signatures of secondary gravitational waves
  - Post-inflationary dynamics – Effects on the evolution perturbations – Constraining the dynamics during reheating
  - Generation of magnetic fields during inflation – Cross-correlations between magnetic fields and scalar or tensor perturbations – Effects due to parity violation
  - Quantum-to-classical transition of primordial perturbations
  - Planck scale effects during inflation – Imprints on the cosmic microwave background
- Bouncing scenarios as an alternative to inflation
  - Origin and evolution of perturbations in classical bouncing scenarios – Construction of viable bounces
  - Generation of features in bouncing models
  - Non-Gaussianities in bouncing models – Effects due to non-minimal coupling
  - Origin of magnetic fields in bouncing scenarios – Imprints on the scalar and tensor perturbations
- Aspects of black hole physics
  - Hawking radiation – Possible quantum gravitational modifications
  - Entropy of black holes and black strings – Corrections to the Bekenstein-Hawking entropy
  - Entropy bounds – Trans-Planckian modes and the validity of entropy bounds in the early universe
- Quantum field theory in classical backgrounds
  - Unruh effect – Detecting thermal effects in spacetimes with horizons
  - Response of finite time detectors – Detecting effects due to entanglement
  - Vacuum polarization and particle production – Backreaction on the classical background
  - Radiation reaction and the fluctuation-dissipation theorem
  - Fluctuations in the backreaction term – Domain of validity of semi-classical gravity
  - Quantum gravitational corrections to semi-classical effects

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PUBLICATIONS AND PREPRINTS

• Publications in refereed journals

○ As articles and letters

1. **L. Sriramkumar** and T. Padmanabhan, *Finite-time response of inertial and uniformly accelerated Unruh-DeWitt detectors*, *Class. Quantum Grav.* **13**, 2061 (1996) [*arXiv:gr-qc/9408037*].

2. **L. Sriramkumar** and T. Padmanabhan, *Does a nonzero tunneling probability imply particle production in time-independent classical electromagnetic backgrounds?*, *Phys. Rev. D* **54**, 7599 (1996) [*arXiv:hep-th/9604111*].

3. **L. Sriramkumar**, R. Mukund and T. Padmanabhan, *Non-trivial classical backgrounds with vanishing quantum corrections*, *Phys. Rev. D* **55**, 6147 (1997) [*arXiv:hep-th/9703034*].

4. **L. Sriramkumar**, *Limits on the validity of the semiclassical theory—a minisuperspace example*, *Int. J. Mod. Phys. D* **6**, 363 (1997) [*arXiv:gr-qc/9505037*].

5. K. Srinivasan, **L. Sriramkumar** and T. Padmanabhan, *Plane waves viewed from an accelerated frame: Quantum physics in a classical setting*, *Phys. Rev. D* **56**, 6692 (1997).

6. K. Srinivasan, **L. Sriramkumar** and T. Padmanabhan, *Possible quantum interpretation of certain power spectra in classical field theory*, *Int. J. Mod. Phys. D* **6**, 607 (1997) [*arXiv:gr-qc/9606017*].

7. K. Srinivasan, **L. Sriramkumar** and T. Padmanabhan, *Hypothesis of path integral duality II: Corrections to quantum field theoretic results*, *Phys. Rev. D* **58**, 044009 (1998) [*arXiv:gr-qc/9710104*].

8. **L. Sriramkumar**, *On the response of detectors in classical electromagnetic backgrounds*, *Mod. Phys. Lett. A* **14**, 1869 (1999) [*arXiv:hep-th/9811250*].

9. G. Gour and **L. Sriramkumar**, *Will small particles exhibit Brownian motion in the quantum vacuum?*, *Found. Phys.* **29**, 1917 (1999) [*arXiv:quant-ph/9808032*].

10. **L. Sriramkumar**, *Fluctuations in the current and energy densities around a magnetic-flux-carrying cosmic string*, *Class. Quantum Grav.* **18**, 1015 (2001) [*arXiv:gr-qc/0011074*].

11. **L. Sriramkumar**, *Odd statistics in odd dimensions for odd couplings*, *Mod. Phys. Lett. A* **17**, 1059 (2002) [*arXiv:gr-qc/0206048*].

12. **L. Sriramkumar**, *Interpolating between the Bose-Einstein and the Fermi-Dirac distributions in odd dimensions*, *Gen. Rel. Grav.* **35**, 1699 (2003) [*arXiv:gr-qc/0212084*].

13. S. Shankaranarayanan and **L. Sriramkumar**, *Trans-Planckian corrections to the primordial spectrum in the infra-red and the ultra-violet*, *Phys. Rev. D* **70**, 123520 (2004) [*arXiv:hep-th/0403236*].

14. **L. Sriramkumar** and T. Padmanabhan, *Initial state of matter fields and trans-Planckian physics: Can CMB observations disentangle the two?*, *Phys. Rev. D* **71**, 103512 (2005) [*arXiv:gr-qc/0408034*].

15. **L. Sriramkumar** and S. Shankaranarayanan, *Path integral duality and Planck scale corrections to the primordial spectrum in exponential inflation*, *JHEP* **0612**, 050 (2006) [*arXiv:hep-th/0608224*].

16. H. K. Jassal and **L. Sriramkumar**, *Entropy of BTZ black strings in the brick wall approach*, *Class. Quantum Grav.* **24**, 2589 (2007) [*arXiv:gr-qc/0611102*].

17. R. K. Jain, P. Chingangbam and **L. Sriramkumar**, *On the evolution of tachyonic perturbations at super-Hubble scales*, *JCAP* **0710**, 003 (2007) [*arXiv:astro-ph/0703762*].

18. S. Sarkar, S. Shankaranarayanan and **L. Sriramkumar**, *Sub-leading contributions to the black hole entropy in the brick wall approach*, *Phys. Rev. D* **78**, 024003 (2008) [*arXiv:0710.2013 [gr-qc]*].

19. D. Kothawala, S. Shankaranarayanan and **L. Sriramkumar**, *Quantum gravitational corrections to the stress-energy tensor around the BTZ black hole*, *JHEP* **0809**, 095 (2008) [*arXiv:0801.0225 [hep-th]*].

20. R. K. Jain, P. Chingangbam, J.-O. Gong, **L. Sriramkumar** and T. Souradeep, *Punctuated inflation and the low CMB multipoles*, *JCAP* **0901**, 009 (2009) [*arXiv:0809.3915 [astro-ph]*].

21. D. Kothawala, **L. Sriramkumar**, S. Shankaranarayanan and T. Padmanabhan, *Path integral duality modified propagators in spacetimes with constant curvature*, *Phys. Rev. D* **80**, 044005 (2009) [*arXiv:0904.3217 [hep-th]*].

22. R. K. Jain, P. Chingangbam, **L. Sriramkumar** and T. Souradeep, *The tensor-to-scalar ratio in punctuated inflation*, *Phys. Rev. D* **82**, 023509 (2010) [*arXiv:0904.2518 [astro-ph.CO]*].

23. S. Unnikrishnan and **L. Sriramkumar**, *A note on perfect scalar fields*, *Phys. Rev. D* **81**, 103511 (2010) [*arXiv:1002.0820 [astro-ph.CO]*].

24. D. K. Hazra, M. Aich, R. K. Jain, **L. Sriramkumar** and T. Souradeep, *Primordial features due to a step in the inflaton potential*, *JCAP* **1010**, 008 (2010) [*arXiv:1005.2175 [astro-ph.CO]*].

25. S. Gutti, S. Kulkarni and **L. Sriramkumar**, *Modified dispersion relations and the response of the rotating Unruh-DeWitt detector*, *Phys. Rev. D* **83**, 064011 (2011) [*arXiv:1005.1807 [gr-qc]*].

26. R. K. Jain, P. Chingangbam and **L. Sriramkumar**, *Reheating in tachyonic inflationary models: Effects on the large scale curvature perturbations*, *Nucl. Phys. B* **852**, 366 (2011) [*arXiv:0902.1067 [astro-ph.CO]*].

27. J. Martin and **L. Sriramkumar**, *The scalar bispectrum in the Starobinsky model: The equilateral case*, *JCAP* **1201**, 008 (2012) [*arXiv:1109.5838 [astro-ph.CO]*].

28. D. K. Hazra, J. Martin and **L. Sriramkumar**, *Scalar bispectrum during preheating in single field inflationary models*, *Phys. Rev. D* **86**, 063523 (2012) [*arXiv:1206.0442*].

29. M. Aich, D. K. Hazra, **L. Sriramkumar** and T. Souradeep, *Oscillations in the inflaton potential: Complete numerical treatment and comparison with the recent and forthcoming CMB datasets*, *Phys. Rev. D* **87**, 083526 (2013) [*arXiv:1106.2798 [astro-ph.CO]*].

30. D. K. Hazra, **L. Sriramkumar** and J. Martin, *BINGO: A code for the efficient computation of the scalar bispectrum*, *JCAP* **1305**, 026 (2013) [*arXiv:1201.0926 [astro-ph.CO]*].

31. V. Sreenath, R. Tibrewala and **L. Sriramkumar**, *Numerical evaluation of the three-point scalar-tensor cross-correlations and the tensor bispectrum*, *JCAP* **1312**, 037 (2013) [*arXiv:1309.7169 [astro-ph.CO]*].

32. J. Martin, **L. Sriramkumar** and D. K. Hazra, *Sharp inflaton potentials and bi-spectra: Effects of smoothening the discontinuity*, *JCAP* **1409**, 039 (2014) [*arXiv:1404.6093 [astro-ph.CO]*].

33. V. Sreenath and **L. Sriramkumar**, *Examining the consistency relations describing the three-point functions involving tensors*, *JCAP* **1410**, 021 (2014) [*arXiv:1406.1609 [astro-ph.CO]*].

34. V. Sreenath, D. K. Hazra and **L. Sriramkumar**, *On the scalar consistency relation away from slow roll*, *JCAP* **1502**, 029 (2015) [*arXiv:1410.0252 [astro-ph.CO]/*].

35. **L. Sriramkumar**, K. Atmjeet and R. K. Jain, *Generation of scale invariant magnetic fields in bouncing universes*, *JCAP* **1509**, 010 (2015) [*arXiv:1504.06853 [astro-ph.CO]*].

36. D. Chowdhury, V. Sreenath and **L. Sriramkumar**, *The tensor bispectrum in a matter bounce*, *JCAP* **1511**, 002 (2015) [*arXiv:1506.06475 [astro-ph.CO]*].

37. D. J. Stargen, D. Kothawala and **L. Sriramkumar**, *Moving mirrors and the fluctuation-dissipation theorem*, *Phys. Rev. D* **94**, 025040 (2016) [*arXiv:1602.02526 [hep-th]*].

38. D. Chowdhury, **L. Sriramkumar** and R. K. Jain, *Duality and the generation of magnetic fields in bouncing universes*, *Phys. Rev. D* **94**, 083512 (2016) [*arXiv:1604.02143 [gr-qc]*].

39. D. Chowdhury, V. Sreenath and **L. Sriramkumar**, *The scalar-scalar-tensor inflationary three-point function in the axion monodromy model*, *JCAP* **1611**, 041 (2016) [*arXiv:1605.05292 [astro-ph.CO]*].

40. R. N. Raveendran and **L. Sriramkumar**, *Numerical evaluation of the tensor bispectrum in two field inflation*, *JCAP* **1707**, 035 (2017) [*arXiv:1611.00473 [astro-ph.CO]*].

41. D. J. Stargen, N. Kajuri and **L. Sriramkumar**, *Response of a rotating detector coupled to a polymer quantized field*, *Phys. Rev. D* **96**, 066002 (2017) [*arXiv:1706.05834 [gr-qc]*].

42. R. N. Raveendran, D. Chowdhury and **L. Sriramkumar**, *Viable tensor-to-scalar ratio in a symmetric matter bounce*, *JCAP* **1801**, 030 (2018) [*arXiv:1703.10061 [gr-qc]*].

43. D. Chowdhury, **L. Sriramkumar** and M. Kamionkowski, *Enhancing the cross-correlations between magnetic fields and scalar perturbations through parity violation*, *JCAP* **1810**, 031 (2018) [*arXiv:1807.07477 [astro-ph.CO]*].

44. D. Chowdhury, **L. Sriramkumar** and M. Kamionkowski, *Cross-correlations between scalar perturbations and magnetic fields in bouncing universes*, *JCAP* **1901**, 048 (2019) [*arXiv:1807.05530 [astro-ph.CO]*].

45. R. N. Raveendran and **L. Sriramkumar**, *Primordial features from ekpyrotic bounces*, *Phys. Rev. D* **99**, 043527 (2019) [*arXiv:1809.03229 [astro-ph.CO]*].

46. R. N. Raveendran and **L. Sriramkumar**, *Viable scalar spectral tilt and tensor-to-scalar ratio in near-matter bounces*, *Phys. Rev. D* **100**, 083523 (2019) [*arXiv:1812.06803 [astro-ph.CO]*].

47. D. Nandi and **L. Sriramkumar**, *Can non-minimal coupling restore the consistency condition in bouncing universes?*, *Phys. Rev. D* **101**, 043506 (2020) [*arXiv:1904.13254 [gr-qc]*].

48. M. Braglia, D. K. Hazra, **L. Sriramkumar** and F. Finelli, *Generating primordial features at large scales in two-field models of inflation*, *JCAP* **2008**, 025 (2020) [*arXiv:2004.00672 [astro-ph.CO]*].

49. M. Braglia, D. K. Hazra, F. Finelli, G. F. Smoot, **L. Sriramkumar** and A. A. Starobinsky, *Generating PBHs and small-scale GWs in two-field models of inflation*, *JCAP* **2008**, 001 (2020) [*arXiv: 2005.02895 [astro-ph.CO]*].

50. P. Saha, S. Anand and **L. Sriramkumar**, *Accounting for the time evolution of the equation of state parameter during reheating*, *Phys. Rev. D* **102**, 103511 (2020) [*arXiv:2005.01874 [astro-ph.CO]*].

51. H. V. Ragavendra, P. Saha, **L. Sriramkumar** and J. Silk, *Primordial black holes and secondary gravitational waves from ultra slow roll and punctuated inflation*, *Phys. Rev. D* **103**, 083510 (2021) [*arXiv:2008.12202 [astro-ph.CO]*].

52. D. J. Stargen, V. Sreenath and **L. Sriramkumar**, *Quantum-to-classical transition and imprints of continuous spontaneous localization in classical bouncing universes*, , to appear in *Int. J. Mod. Phys. D* **30**, 2150049 (2021) [*arXiv:1605.07311v2 [gr-qc]*].

53. H. V. Ragavendra, **L. Sriramkumar** and J. Silk, *Could PBHs and secondary GWs have originated from squeezed initial states?*, *JCAP* **2105**, 010 (2021) [*arXiv:2011.09938 [astro-ph.CO]*].

54. Md. R. Haque, D. Maity, T. Paul and **L. Sriramkumar**, *Decoding the phases of early and late time reheating through imprints on primordial gravitational waves*, *Phys. Rev. D* **104**, 063513 (2021) [*arXiv:2105.09242 [astro-ph.CO]*].

55. S. Tripathy, D. Chowdhury, R. K. Jain and **L. Sriramkumar**, *Challenges in the choice of the nonconformal coupling function in inflationary magnetogenesis*, *Phys. Rev. D* **105**, 063519 (2022) [*arXiv:2111.01478 [astro-ph.CO]*].

56. H. V. Ragavendra, D. Chowdhury and **L. Sriramkumar**, *Suppression of scalar power on large scales and associated bispectra*, *Phys. Rev. D* **106**, *043535 (2022)* [*arXiv:2003.01099 [astro-ph.CO]*].

57. R. N. Raveendran, K. Parattu and **L. Sriramkumar**, *Enhanced power on small scales and evolution of quantum state of perturbations in single and two field inflationary models*, *Gen. Rel. Grav.* **54**, *91 (2022)* [*arXiv:2206.05760 [astro-ph.CO]*].

58. S. Balaji, H. V. Ragavendra, S. K. Sethi, J. Silk and **L. Sriramkumar**, *Observing nulling of primordial correlations via the 21-cm signal*, *Phys. Rev. Lett.* **129**, 261301 (2022) [*arXiv:2206.06386 [astro-ph.CO]*].

59. S. Tripathy, D. Chowdhury, H. V. Ragavendra, R. K. Jain and **L. Sriramkumar**, *Circumventing the challenges in the choice of the non-conformal coupling function in inflationary magnetogenesis*, *Phys. Rev. D* **107**, 043501 (2023) [*arXiv:2211.05834 [astro-ph.CO]*].

60. S. Tripathy, R. N. Raveendran, K. Parattu and **L. Sriramkumar**, *Amplifying quantum discord during inflationary magnetogenesis through violation of parity*, *Phys. Rev. D* **108**, 123512 (2023) [*arXiv:2306.16168 [gr-qc]*].

61. W. H. Kinney, S. Maity and **L. Sriramkumar**, *The Borde-Guth-Vilenkin theorem in extended de Sitter spaces*, to appear *in Phys. Rev. D* [*arXiv:2307.10958 [gr-qc]*].

○ **As reviews**

62. **L. Sriramkumar** and T. Padmanabhan, *Probes of the vacuum structure of quantum fields in classical backgrounds*, *Int. J. Mod. Phys. D* **11**, 1 (2002) [*arXiv:gr-qc/9903054]*].

63. **L. Sriramkumar**, *An introduction to inflation and cosmological perturbation theory*, *Curr. Sci.* **97**, 868 (2009) [*arXiv:0904.4584 [astro-ph.CO]*].

64. H. V. Ragavendra and **L. Sriramkumar**, *Observational imprints of enhanced scalar power on small scales in ultra slow roll inflation and associated non-Gaussianities*, *Galaxies* **11**, 34 (2023) [*arXiv:2301.08887 [astro-ph.CO]*].

• Other articles

65. **L. Sriramkumar**, *On the generation and evolution of perturbations during inflation and reheating*, in *Vignettes in Gravitation and Cosmology*, Eds. L. Sriramkumar and T. R. Seshadri (World Scientific, Singapore, 2012), pp. 207–250.

66. **L. Sriramkumar**, *What do detectors detect?*, in *Gravity and the Quantum*, Eds. J. S. Bagla and S. Engineer (Springer, Berlin, 2017), pp. 457–478 [*arXiv:1612.08579 [gr-qc]*].

• Publications in proceedings of conferences

67. **L. Sriramkumar**, T. Padmanabhan and R. Mukund, *Classical backgrounds with vanishing effective Lagrangians*, in *Proceedings of the Eighth Marcel Grossmann Meeting on General Relativity* (Hebrew University, Jerusalem, Israel, June 22–27, 1997), Ed. T. Piran (World Scientific, Singapore, 1999), pp. 833–835.

68. S. Shankaranarayanan and **L. Sriramkumar**, *Planck scale effects and the suppression of power on the large scales in the primordial spectrum*, in *Proceedings of the Tenth International Symposium on Particles, Strings and Cosmology* (Northeastern University, Boston, U. S. A., August 16–22, 2004), Eds. G. Alverson, E. Barberis, P. Nath and M. T. Vaughn (World Scientific, Singapore, 2004), pp. 38–42.

69. S. Sarkar, S. Shankaranarayanan and **L. Sriramkumar**, *Corrections to the Bekenstein-Hawking entropy in the brick wall approach*, in *Proceedings of the Meeting on Black Holes in General Relativity and String Theory* (Veli Losinj, Croatia, August 24–30, 2008), *PoS (BHs, GR and Strings)* 035 (2009).

70. D. Kothawala, S. Shankaranarayanan and **L. Sriramkumar**, *Quantum gravitational corrections to the propagator in spacetimes with constant curvature*, in *Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity* (UNESCO Headquarters, Paris, France, July 12–18, 2009), Eds. T. Damour, R. Jantzen and R. Ruffini (World Scientific, Singapore, 2012), pp. 2426–2428 [*arXiv:1002.1132 [hep-th]*].

71. **L. Sriramkumar**, *Primordial gravitational waves, BICEP2 and beyond*, in *Proceedings of the International Workshop on Unification and Cosmology after Higgs Discovery and BICEP2* (Department of Physics, Panjab University, Chandigarh, India, May 13–15, 2014), Pramana **86**, 325–333 (2016).

72. H. V. Ragavendra, D. Chowdhury and **L. Sriramkumar**, *Unique contributions to the scalar bispectrum in 'just enough inflation'*, *Proceedings of the Workshop on Frontiers in High Energy Physics*, (University of Hyderabad, Hyderabad, India, October 14–17, 2019), Eds. A. Giri and R. Mohanta (Springer, Singapore, 2020), pp. 39–47 [*arXiv:1906.03942 [astro-ph.CO]*].

• Preprints

73. S. Barman, B. R. Majhi and **L. Sriramkumar**, *Radiative processes of single and entangled detectors on circular trajectories in* $(2+1)$*-dimensional Minkowski spacetime*, *arXiv:2205.01305 [gr-qc]*.

74. S. Maity, H. V. Ragavendra, S. K. Sethi and **L. Sriramkumar**, *Loop contributions to the scalar power spectrum due to quartic order action in ultra slow roll inflation*, *arXiv:2307.13636 [astro-ph.CO]*.

75. S. Maiti, D. Maity and **L. Sriramkumar**, *Constraining inflationary magnetogenesis and reheating via GWs in light of PTA data*, *arXiv:2401.01864 [astro-ph.CO]*.

• Unpublished article

76. **L. Sriramkumar**, *Superfluid helicity and vortex reconnections*, Manuscript available online at *http://www.physics.iitm.ac.in/~sriram/professional/research/up-articles/helicity.pdf*.

• Book edited

- **L. Sriramkumar** and T. R. Seshadri (Editors), *Vignettes in Gravitation and Cosmology* (World Scientific, Singapore, 2012).

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INVITED TALKS IN WORKSHOPS AND CONFERENCES (since 2006)

1. *Inflation—A window to Planck scale physics*, in *Field Theory Aspects of Gravity V*, Birla Institute of Technology and Science, Goa, India, December 18–23, 2006.

2. *Quantum to classical transition of the primordial fluctuations*, in *Himalayan Relativity Dialogue*, Mirik, India, April 18–20, 2007.

3. *Deviations from slow roll inflation and features in the primordial spectrum*, in *The First Indo-Brazil Workshop on Cosmology*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, July 16–21, 2007.

4. *Vanilla cosmology, and beyond*, plenary talk in *Indian Conference on Cosmology and Galaxy Formation*, Harish-Chandra Research Institute, Allahabad, India, November 3–5, 2007.

5. *Path integral duality and Planck scale corrections to the stress-energy tensor around the BTZ black hole*, in *Field Theory Aspects of Gravity VI*, Harish-Chandra Research Institute, Allahabad, India, November 13–17, 2007.

6. *Corrections to the Bekenstein-Hawking entropy in the brick wall approach*, in *The Sixth International Conference on Gravitation and Cosmology*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, December 17–21, 2007.

7. *Cooling and reheating the universe*, in *Prospects and Problems of Gravitation and Cosmology*, Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi, India, January 29–30, 2008.

8. *Probing Planckian scales through inflation*, lecture at *Cosmology with the CMB and LSS*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, July 20–August 31, 2008.

9. *Reheating in tachyonic inflationary models and effects on large scale curvature perturbations*, in *Cosmology with the CMB and LSS*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, July 20–August 31, 2008.

10. *Double inflation and the low CMB multipoles*, plenary talk in *The Second Indo-Brazilian Workshop on Gravitation and Cosmology*, Universidade Federal do Rio Grande do Norte, Natal, Brazil, October 13–17, 2008.

11. *Inflation—A cosmological magnifying glass for Planck scale physics*, plenary review talk at *The Eighteenth DAE-BRNS High Energy Physics Symposium*, Banaras Hindu University, Varanasi, India, December 14–18, 2008.

12. *Inflation and reheating*, plenary talk at *The XXV Meeting of the Indian Association of General Relativity and Gravitation*, Saha Institute of Nuclear Physics, Kolkata, India, January 28–31, 2009.

13. *Do primordial features have a future?*, in *Neutrinos in Particle Astrophysics and Cosmology*, Chennai, India, April 5–7, 2009.

14. *Path integral duality, modified propagators and Planck scale effects*, in *Gravitation and Astronomy: Frontiers in Theory and Observations—The First IUCAA Reunion Meeting*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, August 11–14, 2009.

15. *A glimpse into the future of primordial features*, in *Indo-South African Workshop on Cosmology*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, December 7–10, 2009.

16. *The scalar bispectrum in the Starobinsky model*, in *Indo-UK Scientific Seminar: Confronting Particle-Cosmology with Planck and LHC*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, August 10–12, 2011.

17. *Features in the primordial spectrum and associated non-Gaussianities*, in *Astro-Cosmo @ Trivandrum*, Indian Institute of Science Education and Research, Thiruvananthapuram, India, November 18, 2011.

18. *Essentials of inflation and cosmological perturbation theory* and *Primordial features and non-Gaussianities*, in *Discussion Meeting on Cosmology*, The Institute of Mathematical Sciences, Chennai, India, February 14, 2012.

19. *Non-Gaussianities: A powerful probe of the early universe*, review talk in *XX DAE-BRNS High Energy Physics Symposium*, Department of Physics, Visva-Bharati, Santiniketan, India, January 13–18, 2013.

20. *Inflationary dynamics and non-Gaussianities: Planck and prospects*, in *Planck Day*, International Centre for Theoretical Sciences, Bengaluru, India, April 16, 2013.

21. *The early universe: Through the 'eyes' of Planck*, in *Our Universe: Revelations from Planck*, Indian Institute of Astrophysics, Bengaluru, India, April 17, 2013.

22. *Generation of primordial non-Gaussianities and constraints from Planck*, in *Field Theoretic Aspects of Gravity IX*, Indian Institute of Technology, Gandhinagar, India, September 5–8, 2013.

23. *Numerical evaluation of inflationary three-point functions*, working group talk in *Workshop on High Energy Physics and Phenomenology XIII*, Puri, India, December 12–21, 2013.

24. *The BICEP2 results and its implications for the physics of the early universe*, in *Cosmology Day*, International Centre for Theoretical Sciences, Bengaluru, India, April 8, 2014.

25. *The BICEP2 results and its implications for the physics of the early universe*, in *International Workshop on Unification and Cosmology after Higgs Discovery and BICEP2*, Department of Physics, Panjab University, Chandigarh, India, May 13–15, 2014.

26. *Beyond power spectra—Inflationary three-point functions*, in *Aspects of Cosmology*, Indian Institute of Astrophysics, Bengaluru, India, April 9–11, 2014.

27. *Beyond power spectra—Inflationary three-point functions*, in *SYMPHY*, Department of Physics, Indian Institute of Technology Bombay, Mumbai, India, April 12–13, 2014.

28. *Computation and characteristics of inflationary three-point functions*, in *International Conference on Matters of Gravity and the Universe*, Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi, India, October 27–29, 2014.

29. *Computation and characteristics of inflationary three-point functions*, in *Workshop on Invisible Matters*, Department of Physics, Indian Institute of Technology, Hyderabad, India, October 29–31, 2014.

30. *Inflationary three-point functions*, plenary talk in *The Primordial Universe after Planck*, Institut d'Astrophysique de Paris, Paris, France, December 15–19, 2014.

31. *Observational constraints on the standard cosmological model and beyond*, invited talk in *Astronomy, Cosmology and Fundamental Physics with Gravitational Waves*, Chennai Mathematical Institute, Chennai, India, March 2–4, 2015.

32. *Whither inflation* and *Bouncing universes*, invited talks in *Discussion Meeting on Cosmology and Astroparticle Physics*, Institute of Physics, Bhubaneswar, India, October 30–November 5, 2015.

33. *The standard model of cosmology*, invited talk in *100 Years of General Relativity: Where do we Stand?*, Department of Physics, Indian Institute of Technology, Guwahati, India, February 13, 2016.

34. *Viable tensor-to-scalar ratio in a symmetric matter bounce*, invited talk in *Aspects of Early Universe Cosmology*, Saha Institute of Nuclear Physics, Kolkata, India, January 16–20, 2017.

35. *Inflation and alternatives*, invited talk in *Aspects of Gravity and Cosmology*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, March 7–9, 2017.

36. *Magnetogenesis in bouncing universes*, invited talk in *The Plasma Universe and its Structure Formation*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, August 30–September 1, 2017.

37. *Viable scalar spectral tilt and tensor-to-scalar ratio in near-matter bounces*, invited talk in *Post-Planck Cosmology: Enigmas, Visions and Challenges*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, October 9–12, 2017.

38. *Primordial non-Gaussianities*, working group talk in *The Fifteenth Workshop in High Energy Physics Phenomenology*, Indian Institute of Science Education and Research, Bhopal, India, December 14–23, 2017.

39. *Inflation and the early universe*, invited talk in *Assessing the Prospects for Frontier Cosmic Microwave Background Experiments from India*, Indian Space Research Organization Head Quarters, Bengaluru, January 7–8, 2018.

40. *The status of the inflationary paradigm – A cosmological perspective*, invited talk in *Joint Astro and Particle Physics Meeting*, Centre for Gravitational Physics and Astronomy, Inter-University Centre for Astronomy and Astrophysics, Pune, India, and Indian Institute of Science Education and Research, Pune, India, February 25, 2018.

41. *Viable near-matter bounces*, invited talk in *Recent Developments in Cosmology*, Banaras Hindu University, Varanasi, India, April 6–8, 2018.

42. *Magnetogenesis in inflationary and bouncing scenarios*, contributed talk in *The XXX Meeting of the Indian Association of General Relativity and Gravitation*, Birla Institute of Technology and Science—Pilani, Hyderabad, India, January 3–5, 2019.

43. *Primordial features from ekpyrotic bounces*, contributed talk in the workshop on *Cosmology—The Next Decade*, International Centre for Theoretical Studies, Bengaluru, India, January 22–25, 2019.

44. *Towards constructing viable bouncing scenarios*, invited talk in *Gravity at Different Length Scales*, Indian Association for the Cultivation of Science, Kolkata, India, February 25–27, 2019.

45. *Generation and amplification of primordial gravitational waves*, invited talk in *Bala Fest: The Future of Gravitational-Wave Astronomy*, International Centre for Theoretical Studies, Bengaluru, India, August 19–22, 2019.

46. *Suppression of scalar power on large scales and associated bispectra*, invited talk in *International Workshop on Frontiers in High Energy Physics*, University of Hyderabad, Hyderabad, India, October 14–17, 2019.

47. *Can bouncing scenarios generate primordial features?*, contributed talk in *The Ninth International Conference on Gravitation and Cosmology*, Indian Institute of Science Education and Research, Mohali, India, December 10–13, 2019.

48. *Signatures of enhanced scalar power on small scales*, invited talk in the parallel session on General Relativity and Cosmology in *The XXXIX Meeting of the Astronomical Society of India*, held online jointly by the International Centre for Theoretical Studies, Bengaluru, India, Indian Institute of Science Education and Research, Mohali, India, and Inter-University Centre for Astronomy and Astrophysics, Pune, India, February 18–23, 2021.

49. *Probing physics at high energies through cosmological observations*, invited talk in the online *India-STAR-ALICE Collaboration Meeting*, Panjab University, Chandigarh, India, August 18, 2021.

50. *Observational probes of inflation on large and small scales*, invited talk in *Tribute to Prof. Thanu Padmanabhan*, Commemorative Webinar Series, Kerala State Council for Science, Technology and Environment, September 27–October 1, 2021.

51. *Small scale signatures of non-trivial inflationary and post-inflationary dynamics*, invited talk in *International Conference on Advances in Relativity and Cosmology*, held online by the Birla Institute of Technology and Science-Pilani, Hyderabad Campus, India, October 26–28, 2021.

52. *Signatures of non-trivial inflationary and post-inflationary dynamics on small scales*, invited talk in *Current Status of Cosmology*, Thanu Padmanabhan Centre for Cosmology and Science Popularization, Shree Guru Gobind Singh Tricentenary University, Delhi-NCR, India, October 17–19, 2022.

53. *Formation of PBHs: Possibilities and consequences*, invited talk in *Neutron Stars: The Celestial Clocks that Probe Extreme Physics*, The Institute of Mathematical Sciences, Chennai, India, February 1–3, 2023.

54. *Probing the physics of the early universe*, Thanu Padmanabhan Memorial Lecture, invoted talk in the *35th Kerala Science Congress*, Mar Baselios Christian College of Engineering and Technology, Kuttikkanam, Idukki, India, February 10–14, 2023.

55. *Imprints of non-trivial inflationary dynamics on small scales*, invited talk at *Frontiers in Cosmology*, Raman Research Institute, Bengaluru, India, February 20–24, 2023.

56. *Magnetogenesis in inflationary models leading to features—Challenges and possible resolutions*, invited talk in *Field Theoretic Aspects of Gravity*, Birla Institute of Technology, Mesra, India, March 17–19, 2023.

57. *Magnetogenesis during inflation: Imprints of non-trivial dynamics*, invited talk in *A. K. Raychaudhuri Centenary Symposium*, Indian Association for the Cultivation of Science, Kolkata, India, August 11–12, 2023.

58. *Loop contributions to the scalar power spectrum due to quartic order action in ultra slow roll inflation*, invited talk in *Remembering Amal Kumar Raychaudhuri*, The Institute of Mathematical Sciences, Chennai, India, October 5–7, 2023.

59. *Genesis of magnetic fields during inflation—Effects due to non-trivial dynamics*, plenary talk in the *Conference on Cosmology @ CCSP*, Thanu Padmanabhan Centre for Cosmology and Science Popularization, Shree Guru Gobind Singh Tricentenary University, Delhi-NCR, India, November 29–December 1, 2023.

60. *Gravitational waves from the early universe*, invited talk in the *Indian Pulsar Timing Array Meeting*, The Institute of Mathematical Sciences, Chennai, India, February 5–9, 2024.

PARTICIPATION IN WORKSHOPS AND CONFERENCES (since 2006)

1. *Inflation+25: The First 25 Years of Inflationary Cosmology*, Institut d'Astrophysique, Paris, France, June 26–30, 2006.

2. *Field Theory Aspects of Gravity V*, Birla Institute of Technology and Science, Goa, India, December 18–23, 2006.

3. *The XXIV Meeting of the Indian Association of General Relativity and Gravitation*, Jamia Millia Islamia, New Delhi, India, February 5-8, 2007.

4. *Himalayan Relativity Dialogue*, Mirik, India, April 18–20, 2007.

5. *The First Indo-Brazil Workshop on Cosmology*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, July 16–21, 2007.

6. *Indian Conference on Cosmology and Galaxy Formation*, Harish-Chandra Research Institute, Allahabad, India, November 3–5, 2007.

7. *Field Theory Aspects of Gravity VI*, Harish-Chandra Research Institute, Allahabad, India, November 13–17, 2007.

8. *The Sixth International Conference on Gravitation and Cosmology*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, December 17–21, 2007.

9. *The Tenth Workshop in High Energy Physics Phenomenology*, Institute of Mathematical Sciences, Chennai, India, January 2–13, 2008.

10. *Prospects and Problems of Gravitation and Cosmology*, Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi, January 29–30, 2008.

11. *Cosmology with CMB and LSS*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, July 20–July 31 and August 18–31, 2008.

12. *The Second Indo-Brazilian Workshop on Gravitation and Cosmology*, Universidade Federal do Rio Grande do Norte, Natal, Brazil, October 13–17, 2008.

13. *The Eighteenth DAE-BRNS High Energy Physics Symposium*, Banaras Hindu University, Varanasi, India, December 14–18, 2008.

14. *The XXV Meeting of the Indian Association of General Relativity and Gravitation*, Saha Institute of Nuclear Physics, Kolkata, India, January 28–31, 2009.

15. *Neutrinos in Particle Astrophysics and Cosmology*, Chennai, India, April 5–7, 2009.

16. *Gravitation and Astronomy: Frontiers in Theory and Observations—The First IUCAA Reunion Meeting*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, August 11–14, 2009.

17. *Indo-South African Workshop on Cosmology*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, December 7–10, 2009.

18. *Primordial Features and Non-Gaussianities*, Harish-Chandra Research Institute, Allahabad, India, December 14–18, 2010.

19. *The XXVI Meeting of the Indian Association of General Relativity and Gravitation*, Harish-Chandra Research Institute, Allahabad, India, January 19–21, 2011.

20. *Indo-UK Scientific Seminar: Confronting Particle-Cosmology with Planck and LHC*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, August 10–12, 2011.

21. *Astro-Cosmo @ Trivandrum*, Indian Institute of Science Education and Research, Thiruvananthapuram, India, November 18, 2011.

22. *The Seventh International Conference on Gravitation and Cosmology*, Goa, India, December 14–19, 2011.

23. *Discussion Meeting on Cosmology*, The Institute of Mathematical Sciences, Chennai, India, February 14, 2012.

24. *Bayes by the Bay*, Pondicherry, India, January 4-8, 2013.

25. *XX DAE-BRNS High Energy Physics Symposium*, Department of Physics, Visva-Bharati, Santiniketan, India, January 13-18, 2013.

26. *Planck Day*, International Centre for Theoretical Sciences, Bengaluru, India, April 16, 2013.

27. *Our Universe: Revelations from Planck*, Indian Institute of Astrophysics, Bengaluru, India, April 16, 2013.

28. *Field Theoretic Aspects of Gravity IX*, Indian Institute of Technology, Gandhinagar, India, September 5–8, 2013.

29. *Workshop on High Energy Physics and Phenomenology XIII*, Puri, India, December 12–21, 2013.

30. *Cosmology Day*, International Centre for Theoretical Sciences, Bengaluru, India, April 8, 2014.

31. *Aspects of Cosmology*, Indian Institute of Astrophysics, Bengaluru, India, April 9–11, 2014.

32. *SYMPHY*, Department of Physics, Indian Institute of Technology Bombay, Mumbai, India, April 12–13, 2014.

33. *International Workshop on Unification and Cosmology after Higgs Discovery and BICEP2*, Department of Physics, Panjab University, Chandigarh, India, May 13–15, 2014.

34. *International Conference on Matters of Gravity and the Universe*, Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi, India, October 27–29, 2014.

35. *Workshop on Invisible Matters*, Department of Physics, Indian Institute of Technology, Hyderabad, India, October 29–31, 2014.

36. *The Primordial Universe after Planck*, Institut d'Astrophysique de Paris, Paris, France, December 15–19, 2014.

37. *Astronomy, Cosmology and Fundamental Physics with Gravitational Waves*, Chennai Mathematical Institute, Chennai, India, March 2–4, 2015.

38. *The XXVIII Meeting of the Indian Association of General Relativity and Gravitation*, Raman Research Institute, Bengaluru, India, March 18–20, 2015.

39. *Discussion Meeting on Cosmology and Astroparticle Physics*, Institute of Physics, Bhubaneswar, India, October 30–November 5, 2015.

40. *The Eighth International Conference on Gravitation and Cosmology*, Indian Institute of Science Education and Research, Mohali, India, December 14–18, 2015.

41. *100 Years of General Relativity: Where do we Stand?*, Department of Physics, Indian Institute of Technology, Guwahati, India, February 13, 2016.

42. *The Future of Gravitational-Wave Astronomy*, International Centre for Theoretical Sciences, Bengaluru, India, April 6–7, 2016.

43. *International Workshop on CMB Spectral Distortions from Cosmic Baryon Evolution*, Raman Research Institute, Bengaluru, India, July 11–15, 2016.

44. *Aspects of Early Universe Cosmology*, Saha Institute of Nuclear Physics, Kolkata, India, January 16–20, 2017.

45. *Aspects of Gravity and Cosmology*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, March 7–9, 2017.

46. *The Plasma Universe and its Structure Formation*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, August 30–September 1, 2017.

47. *Post-Planck Cosmology: Enigmas, Visions and Challenges*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, October 9–12, 2017.

48. *The Fifteenth Workshop in High Energy Physics Phenomenology*, Indian Institute of Science Education and Research, Bhopal, India, December 14–23, 2017.

49. *Assessing the Prospects for Frontier Cosmic Microwave Background Experiments from India*, Indian Space Research Organization Head Quarters, Bengaluru, January 7–8, 2018.

50. *Joint Astro and Particle Physics Meeting*, Centre for Gravitational Physics and Astronomy, Inter-University Centre for Astronomy and Astrophysics, Pune, India, and Indian Institute of Science Education and Research, Pune, India, February 25, 2018.

51. *Recent Developments in Cosmology*, Banaras Hindu University, Varanasi, India, April 6-8, 2018.

52. *The XXX Meeting of the Indian Association of General Relativity and Gravitation*, Birla Institute of Technology and Science – Pilani, Hyderabad, India, January 3–5, 2019.

53. Workshop on *Cosmology – The Next Decade*, International Centre for Theoretical Studies, Bengaluru, India, January 22–25, 2019.

54. *Gravity at Different Length Scales*, Indian Association for the Cultivation of Science, Kolkata, India, February 25–27, 2019.

55. *Bala Fest: The Future of Gravitational-Wave Astronomy*, International Centre for Theoretical Studies, Bengaluru, India, August 19-22, 2019.

56. *International Workshop on Frontiers in High Energy Physics*, University of Hyderabad, Hyderabad, India, October 14–17, 2019.

57. *The Sixteenth Workshop on High Energy Physics Phenomenology*, Indian Institute of Technology, Guwahati, India, December 1–10, 2019.

58. *The Ninth International Conference on Gravitation and Cosmology*, Indian Institute of Science Education and Research, Mohali, India, December 10–13, 2019.

59. *Chennai Symposium on Gravitation and Cosmology*, Indian Institute of Technology Madras, Chennai, India, January 22–24, 2020.

60. *Physics of the Early Universe—An Online Precursor*, held by the International Centre for Theoretical Studies, Bengaluru, India, August 31-September 3, 2020.

61. *Less Traveled Path of Dark Matter: Axions and Primordial Black Holes*, held online by the International Centre for Theoretical Studies, Bengaluru, India, November 9–13, 2020.

62. *The XXXI Meeting of the Indian Association for General Relativity and Gravitation*, held online by the Indian Institute of Technology, Gandhinagar, India, December 19–20, 2020.

63. *The XXXIX meeting of the Astronomical Society of India*, held online jointly by the International Centre for Theoretical Studies, Bengaluru, India, Indian Institute of Science Education and Research, Mohali, India, and Inter-University Centre for Astronomy and Astrophysics, Pune, India, February 18–23, 2021.

64. *Tribute to Prof. Thanu Padmanabhan*, Commemorative Webinar Series, Kerala State Council for Science, Technology and Environment, September 27–October 1, 2021.

65. *International Conference on Advances in Relativity and Cosmology*, held online by the Birla Institute of Technology and Science-Pilani, Hyderabad Campus, India, October 26–28, 2021.

66. *Current Status of Cosmology*, Thanu Padmanabhan Centre for Cosmology and Science Popularization, Shree Guru Gobind Singh Tricentenary University, Delhi-NCR, India, October 17–19, 2022.

67. *Neutron Stars: The Celestial Clocks that Probe Extreme Physics*, The Institute of Mathematical Sciences, Chennai, India, February 1–3, 2023.

68. *35th Kerala Science Congress*, Mar Baselios Christian College of Engineering and Technology, Kuttikkanam, Idukki, India, February 10–14, 2023.

69. *Frontiers in Cosmology*, Raman Research Institute, Bengaluru, India, February 20–24, 2023.

70. *Field Theoretic Aspects of Gravity*, Birla Institute of Technology, Mesra, India, March 17–19, 2023.

71. *A. K. Raychaudhuri Centenary Symposium*, Indian Association for the Cultivation of Science, Kolkata, India, August 11–12, 2023.

72. *Remembering Amal Kumar Raychaudhuri*, The Institute of Mathematical Sciences, Chennai, India, October 5–7, 2023.

73. *Conference on Cosmology @ CCSP*, Thanu Padmanabhan Centre for Cosmology and Science Popularization, Shree Guru Gobind Singh Tricentenary University, Delhi-NCR, India, November 29–December 1, 2023.

74. *Indian Pulsar Timing Array Meeting*, The Institute of Mathematical Sciences, Chennai, India, February 5–9, 2024.

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TEACHING

- **At the graduate school at Harish-Chandra Research Institute**

1. *Classical Mechanics* ($\sim$ 40 lectures), August–December 2003.
2. *Astrophysics* ($\sim$ 40 lectures), August–December 2004.
3. *Astrophysics* ($\sim$ 40 lectures), August–December 2006.
4. *Cosmology* ($\sim$ 20 lectures), January–March 2007.
5. *Cosmology* (a reading course), January–May 2008.
6. *Quantum Mechanics* ($\sim$ 35 lectures), August–December 2008.
7. *General Theory of Relativity* ($\sim$ 35 lectures), August–December 2009.
8. *Classical Electrodynamics* ($\sim$ 35 lectures), August–December 2010.

- **At Indian Institute of Technology Madras**

1. PH3500, *Classical Physics* ($\sim$ 40 lectures), July–November 2011.
2. PH5870, *General Relativity and Cosmology* ($\sim$ 45 lectures), January–May 2012.
3. PH3500, *Classical Physics* ($\sim$ 45 lectures), July–November 2012.
4. PH3520, *Quantum Physics* ($\sim$ 40 lectures), January–May 2013.
5. PH5460, *Classical Field Theory* ($\sim$ 40 lectures), July–November 2013.
6. PH5870, *General Relativity and Cosmology* ($\sim$ 45 lectures), January–May 2014.
7. EP2210, *Principles of Quantum Mechanics* ($\sim$ 45 lectures), July–November 2014.
8. PH5870, *General Relativity and Cosmology* ($\sim$ 45 lectures), January–May 2015.
9. PH1010, *Physics I* ($\sim$ 56 lectures), July–November 2015.
10. PH1020, *Physics II* ($\sim$ 56 lectures), January–May 2016.
11. EP2210, *Principles of Quantum Mechanics* ($\sim$ 42 lectures), July–November 2016.
12. PH5870, *General Relativity and Cosmology* ($\sim$ 45 lectures), January–May 2017.
13. PH1010, *Physics I* ($\sim$ 56 lectures), July–November 2017.
14. PH1020, *Physics II* ($\sim$ 56 lectures), January–May 2018.
15. EP2210, *Principles of Quantum Mechanics* ($\sim$ 45 lectures), July–November 2018.
16. PH5460, *Classical Field Theory* ($\sim$ 47 lectures), July–November 2019.
17. PH5170, *Quantum Mechanics II* ($\sim$ 42 lectures), January–May 2020.

18. PH5100, *Quantum Mechanics I* ($\sim$ 50 lectures), September–December 2020.
19. PH5170, *Quantum Mechanics II* ($\sim$ 42 lectures), February–May 2021.
20. PH5870, *Introduction to General Relativity* ($\sim$ 41 lectures), July–November 2021.
21. PH5875, *Advanced General Relativity* ($\sim$ 42 lectures), January–May 2022.
22. PH5870, *Introduction to General Relativity* ($\sim$ 43 lectures), July–November 2022.
23. PH5875, *Advanced General Relativity* ($\sim$ 42 lectures), January–May 2023.
24. PH1010, *Physics I* ($\sim$ 56 lectures), July–November 2023.
25. EP2210, *Principles of Quantum Mechanics* (in progress), January–May 2024.

- **Other**

1. *Introduction to the Standard Model of Cosmology* (9 tutorials for the course taught by Prof. T. Padmanabhan), in *SERC Main School in Theoretical High Energy Physics*, Department of Physics, University of Rajasthan, Jaipur, India, February 9–17, 2004.
2. *The Smooth and the Perturbed Universe* (10 lectures), in *Summer School on Gravitation and Cosmology*, Harish-Chandra Research Institute, Allahabad, India, May 10–21, 2004.
3. *Cosmology for Particle Physicists* (8 tutorials for the course taught by Prof. Urjit A. Yajnik), in *SERC Main School in Theoretical High Energy Physics*, Physical Research Laboratory, Ahmedabad, India, February 11–21, 2006.
4. *The Smooth and the Perturbed Universe* (7 tutorials for the courses taught by Profs. Shiv Sethi and Somnath Bharadwaj), in *Summer School on Gravitation and Cosmology*, Harish-Chandra Research Institute, Allahabad, India, May 12–24, 2008.
5. *Black Holes* (2 lectures), in *Introductory Summer School on Astronomy and Astrophysics*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, June 2–3, 2008.
6. *Cosmology* (9 lectures), in *The Fourth Amal Kumar Raychaudhuri School on General Relativity*, Saha Institute of Nuclear Physics, Kolkata, India, October 21–24, 2008.
7. *Origin and Evolution of Perturbations During Inflation and Reheating* (11 lectures), *Topical course* at Inter-University Centre for Astronomy and Astrophysics, Pune, India, February 9–20, 2009.
8. *Generation and Evolution of Perturbations During Inflation and Reheating* (16 lectures), *Special course* at Harish-Chandra Research Institute, Allahabad, India, January–March 2010.
9. *The Smooth and the Perturbed Universe* (7 tutorials for the courses taught by Prof. T. R. Seshadri and Dr. Tirthankar Roy Choudhury) and *Inflationary Cosmology* (2 lectures), in *Summer School on Gravitation and Cosmology*, Harish-Chandra Research Institute, Allahabad, India, May 17–22, 2010.

10. *Inflation and Cosmological Perturbation Theory* (9 lectures), in *SERC Main School in Theoretical High Energy Physics*, Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi, India, February 11–20, 2011.

11. *Inflation* (4 lectures), in *School on Recent Advances in Cosmology*, Department of Physics, North Bengal University, Siliguri, India, February 24–26, 2011.

12. *Cosmological Perturbation Theory and Non-Gaussianities* (3 lectures), in *GIAN Course on Origin and Evolution of Perturbations during Inflation and Reheating*, Indian Institute of Technology Madras, Chennai, India, November 25–30, 2016.

13. *Introduction to Inflationary Cosmology* (3 lectures), in *Pre-SUSY School*, Tata Institute of Fundamental Research, Mumbai, India, December 4–8, 2017.

14. *Inflation and Cosmological Perturbation Theory* (3 lectures), at Department of Physics, Indian Institute of Science Education and Research, Pune, India, September 30–October 1, 2019.

15. *Introduction to General Relativity* (5 lectures), at IUCAA-CUTN School on Introductory General Relativity and Cosmology, Central University of Tamil Nadu, Thiruvarur, India, January 4–6, 2020.

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PROJECTS

- **At Harish-Chandra Research Institute (HRI)**

  - I was the coordinator of a sub-project titled *High Energy Astrophysics and Inflation* that was proposed by the Astrophysics Group and supported in the XI Five-Year Plan under Scientific Human Resources Training at HRI. The total budget that was allocated for the sub-project during the plan period (i.e. 2007–12) was INR 83.3 Lakhs. The aims of the sub-project were: (1) to conduct a vigorous visitors' program, (2) active participation in national and international conferences and meetings, and (3) manpower development (by conducting schools and meetings) in the fields of high-energy astrophysics, inflation and the early universe, and cosmology and large scale structure.

- **At Indian Institute of Technology (IIT) Madras**

  - I was a co-principal investigator (Co-PI) of the proposal for setting up a Indo-US Center for *Fundamental Tests of Cosmology with Planck Measurements of the Cosmic Microwave Background*. The proposal that we had submitted to the Indo-US Science and Technology Forum (IUSSTF), was approved for the period of 2015–17. Prof. K. M. Górski, Jet Propulsion Laboratory (JPL), California Institute of Technology, Pasadena, and Prof. Tarun Souradeep, Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, were the principal investigators (PIs) of the proposal from U.S.A. and India, respectively. Profs. M. Kamionkowski (Department of Physics and Astronomy, Johns Hopkins University, Baltimore), C. Lawrence (JPL), J. Borrill (Computational Cosmology Center, Lawrence Berkeley National Laboratory, University of California, Berkeley) and G. Rocha (JPL) were the Co-PIs from U.S.A.. Apart from me, the Co-PIs from India were Profs. S. Mitra (IUCAA), P. Jain (Department of Physics, Indian Institute of Technology, Kanpur) and T. R. Choudhury (National Center for Radio Astrophysics, Tata Institute of Fundamental Research, Pune). The total funds provided for the Center by IUSSTF was INR 20.9 Lakhs.

  - Dr. Krishnamohan Parattu had received the national postdoctoral fellowship (NPDF) to work under my mentorship on the topic of *Classical Structures from Primordial Quantum Fluctuations: Inflationary vs Bouncing Scenarios*. Dr. Parattu had worked as a national postdoctoral fellow at IIT Madras during September 2017–March 2018.

  - An Exploratory Research Proposal titled *Did the universe bang or bounce?* that I had submitted to IIT Madras was supported for the period of 2018–19, and I was provided funds amounting to INR 4.5 Lakhs.

  - Dr. Sampurn Anand had received the NPDF to work under my mentorship on the topic of *Examining the Imprints of Cosmic Magnetic Fields on Primordial Correlations*. Dr. Anand had worked as a national postdoctoral fellow at IIT Madras during August 2019–July 2020.

  - I was the PI of the project titled *Investigating the observational imprints of non-trivial inflationary dynamics* that was funded for a period of three years during 2019–2022 under the Core Research Grant (CRG) scheme of the Science and Engineering Research Board (SERB), Department of Science and Technology (DST), Government of India (GoI). The

Co-PI on the project was Dr. Rajeev Kumar Jain, Department of Physics, Indian Institute of Science, Bengaluru. The project was provided funds amounting to INR 14.17 Lakhs.

- I am the Co-PI of the project titled *Reheating the universe: Decoding the observational signatures* that is being funded for a period of three years (since December 2020) under the CRG scheme of SERB. The PI of the project is Dr. Debaprasad Maity, Department of Physics, Indian Institute of Technology, Guwahati, India. The project is being provided funds amounting to INR 10.17 Lakhs.

- Dr. Sukannya Bhattacharya had received the NPDF to work under my mentorship on the topic of *Primordial black holes and secondary gravitational waves from bouncing scenarios*. Dr. Bhattacharya had worked as a national postdoctoral fellow at IIT Madras during February–October 2021.

- I am the Co-PI of the proposal titled *Reconstructing Early and Late events In Cosmology*, which is currently being supported by the DST, GoI. The project supports mobility of researchers between India and Italy. The PI of the proposals are Dr. Dhiraj Kumar Hazra (The Institute of Mathematical Sciences, Chennai) from the Indian side and Prof. Fabio Finelli (INAF Institute of National Astrophysics, Bologna) from the Italian side. The other Indian Co-PI is Prof. Tarun Souradeep, Raman Research Institute, Bengaluru. Under the project, DST will be providing funds of about INR 18.0 Lakhs to the Indian researchers and about Euros 9,000 to the Italian researchers.

- I am the Indian PI of the collaborative scientific research project titled *Testing flavors of the early universe beyond vanilla models with cosmological observations* that is being be supported during 2023–2026 by the Indo-French Centre for the Promotion of Advanced Research (IFCPAR/CEFIPRA). The French PI of the project is Prof. Jérôme Martin, Institut d'Astrophysique de Paris, Paris. The Indian and French Co-PIs on the project are Prof. Julien Grain (Université Paris-Saclay, CNRS, Institut d'Astrophysique Spatiale, Orsay), Dr. Dhiraj Kumar Hazra (The Institute of Mathematical Sciences, Chennai), Dr. Rajeev Kumar Jain (Department of Physics, Indian Institute of Science, Bengaluru) and Prof. Vincent Vennin (Laboratoire Astroparticule et Cosmologie, Université Denis Diderot Paris 7, Paris). IFCPAR/CEFIPRA will be providing funds of about INR 64.86 Lakhs to the Indian researchers and about Euros 79,280 to the French researchers.

- An Exploratory Research Proposal titled *Loop corrections to the inflationary power spectra* that I had submitted to IIT Madras has been approved for the period of 2023–24, and I will be provided funds amounting to INR 5.5 Lakhsn.

- I am the PI of the IoE (Institute of Excellence) *Research Centre for Strings, Gravitation and Cosmology* that is being supported by IIT Madras. The Co-PIs of the IoE Research Centre are Dr. Samir Choudhuri, Prof. Suresh Govindarajan, Dr. Dawood Kothawala, Dr. Chandra Kant Mishra and Prof. Prasanta Kumar Tripathy. The IoE Research Centre is being provided funds of about INR 5.0 Crores over the period of 2023–2026.

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INTERNATIONAL VISITS (since 2009)

1. Institut d'Astrophysique de Paris, Paris, France, October 9–November 7, 2009.
2. Institut d'Astrophysique de Paris, Paris, France, July 18–30, 2010.
3. Institut d'Astrophysique de Paris, Paris, France, December 3–23, 2012.
4. Kenyon College, Gambier, Ohio, U.S.A., July 29–August 7, 2016.
5. Department of Physics and Astronomy, Johns Hopkins University, Baltimore, U.S.A., September 1–16, 2016.

MENTORING

• Thesis supervision

○ At Harish-Chandra Research Institute

1. Rajeev Kumar Jain, 2005–09. Title: *On the origin and evolution of perturbations in the early universe.*
   Current position: Assistant Professor, Department of Physics, Indian Institute of Science, Bangalore, India
2. Dhiraj Kumar Hazra, 2009–12. Title: *Primordial features and non-Gaussianities.*
   Current position: Reader, The Institute of Mathematical Sciences, Chennai, India

○ At Indian Institute of Technology Madras

1. V. Sreenath, 2011–15. Title: *Computation and characteristics of inflationary three-point functions.*
   Current position: Assistant Professor, Department of Physics, National Institute of Technology Karnataka, Mangaluru, India
2. H. V. Ragavendra, 2016–22. Title: *Observational imprints of non-trivial inflationary dynamics over large and small scales.*
   Current position: Postdoctoral fellow, Raman Research Institute, Bengaluru, India
3. Sagarika Tripathy, 2017–23
   Title: *Genesis of magnetic fields during inflation: Implications of deviations from slow roll.*
   Current position: To join soon as a postdoctoral fellow at the Indian Institute of Astrophysics, Bengaluru, India
4. Suvashis Maity, 2018–Present. Topic: *Primordial correlations and gravitational waves.*
5. Alipriyo Hoory, 2022–Present. Topic: *Constraining models of inflation using modern approaches.*

• Joint thesis supervision

○ At Harish-Chandra Research Institute

1. Kumar Atmjeet, 2009–15, Joint supervision with Prof. T. R. Seshadri, Department of Physics and Astrophysics, University of Delhi, Delhi, India. Title: *Cosmological magnetogenesis*.
   Current position: Associate, Morgan Stanley, Mumbai, India

○ At Indian Institute of Technology Madras

1. D. Jaffino Stargen, 2011–17. Joint supervision with Dr. Dawood Kothawala, Department of Physics, Indian Institute of Technology Madras, Chennai, India. Title: *Investigations in semi-classical gravity and cosmology*.
   Current position: Assistant Professor and Assistant Dean (Research), School of Arts and Natural Sciences, Joy University, Vadakkangulam (Near Kanyakumari)

2. Debika Chowdhury, 2013–18, Joint supervision with Dr. Dawood Kothawala, Department of Physics, Indian Institute of Technology Madras, Chennai, India. Title: *Inflation, bounces and primordial correlations*.
   Current position: C. V. Raman postdoctoral fellow, Department of Physics, Indian Institute of Science, Bengaluru, India

3. Rathul Nath Raveendran, 2013–18, Joint supervision with Profs. Ghanashyam Date and Bala Sathiapalan, The Institute of Mathematical Sciences, Chennai, India. Title: *Two field models of inflationary and bouncing scenarios*.
   Current position: Postdoctoral fellow, School of Physical Sciences, Indian Association for the Cultivation of Science, Kolkata, India

   Note: Though Debika Chowdhury and Rathul Nath Raveendran were formally joint students, they had carried out all their work under my supervision.

• Postdoctoral fellows

The following postdoctoral fellows have collaborated or closely interacted with me.

○ At Harish-Chandra Research Institute

1. Jinn-Ouk Gong
2. Pravabati Chingangbam
3. Sashideep Gutti
4. Shailesh Kulkarni
5. Sudipta Das
6. Akhilesh Nautiyal

○ **At Indian Institute of Technology Madras**

1. Nirmalya Kajuri
2. Krishnamohan Parattu

   Note: Krishnamohan Parattu was initially supported by the institute postdoctoral fellowship. He had later received the national postdoctoral fellowship to work under my mentorship.
3. Rahul Kothari
4. Debottam Nandi
5. Pankaj Saha
6. Sampurn Anand

   Note: Sampurn Anand was a national postdoctoral fellow who had worked under my mentorship.
7. Sukannya Bhattacharya

   Note: Sukannya Bhattacharya was a national postdoctoral fellow who worked under my mentorship.
8. Nilanjandev Bhaumik
9. Md Riajul Haque

   Note: Md Riajul Haque is a national postdoctoral fellow who is presently working under my mentorship.
10. Arnab Paul

    Note: Arnab Paul is a postdoctoral fellow who is being supported by grants from IFC-PAR/CEFIPRA.
11. Bikash Dinda

    Note: Bikash Dinda will be joining soon as a national postdoctoral fellow to work under my mentorship.

• Supervision of undergraduate thesis

○ **At Harish-Chandra Research Institute**

1. Atul Chhotray, Integrated M.Sc. in Physics and B.E. in Electrical and Electronics Engineering, V year, Birla Institute of Technology and Science, Pilani, India, January–May 2010. Title: *Classical and semi-classical aspects of black holes*.

○ **At Indian Institute of Technology Madras**

1. S. Prasanth, B.Sc. Physics, III year, Chennai Mathematical Institute, Chennai, India, 2011–12. Title: *Inflationary cosmology*.

• Supervision of projects

○ Graduate projects at Harish-Chandra Research Institute

1. Rajeev Kumar Jain, January–May 2005. Topic: *Generation of density perturbations from inflation*.
2. Nishikanta Khandai, January–May 2005. Topic: *The physics of CMB anisotropies*.
3. Ayan Mukhopadhyay, January–May 2006. Topic: *Cosmological perturbation theory*.
4. Anindya Dey, January–May 2007. Topic: *Perturbations in a bouncing universe*.
5. Girish P. Kulkarni, January–May 2007. Topic: *Origin of perturbations in the inflationary scenario*.
6. Dhiraj Kumar Hazra, January–May 2009. Topic: *Primordial features with tachyons*.

○ Graduate projects at The Institute of Mathematical Sciences

1. Rathul Nath Raveendran, 2013-14, Title: *A study of the inflationary paradigm*.
2. Akhil Antony, 2018–19, Topic: *Bouncing scenarios*.
3. Sushovan Mondal, 2018–19, Topic: *Schwinger effect in cosmology*.

○ B.Tech., B.S.-M.S. and M.Sc. projects at Indian Institute of Technology Madras

1. Tirthankar Banerjee, M.Sc. Physics, II year, 2011–12. Title: *Accelerating universe and the nature of dark energy*.
2. Sayantan Auddy, M.Sc. Physics, II year, 2012–13. Title: *Inflation and cosmological perturbation theory*.
3. Ramit Dey, M.Sc. Physics, II year, 2012–13. Title: *Classical and semi-classical aspects of black holes*.
4. Darshan Kakkad, M.Sc. Physics, II year, 2013–14. Title: *Radiative processes in astrophysics*.
5. S. Sunil Kumar, B.Tech. Electrical Engineering, IV year, 2014–15. Title: *Quantum field theory in de Sitter spacetime*.
6. Simran Singh, M.Sc. Physics, II year, 2014–15. Title: *Big bang nucleosynthesis*.
7. Rahul Sai Poruri, B.S.-M.S. Physics, V year, 2015. Title: *Numerical evaluation of the inflationary tensor bispectrum using Python*.
8. Somdutta Ghosh, M.Sc. Physics, II year, 2015–16. Title: *Non-perturbative effects in quantum field theory*.
9. Mohammad Asif Azad, M.Sc. Physics, II year, 2017–18. Title: *Decoherence and the quantum-to-classical transition*.

10. Arnab Pradhan, M.Sc. Physics, II year, 2017–18. Title: *Thermal history of the universe*.

11. H. S. Sunil Simha, B.S.-M.S. Physics, V year, 2017–18. Title: *Mg II absorber clustering along QSO sightlines*.

    Note: This project was jointly supervised with Prof. R. Srianand of the Inter-University Centre for Astronomy and Astrophysics, Pune, India.

12. S. Sindhu Sri Sravya, B.Tech. Engineering Physics, IV year, 2017–18. Title: *The matter power spectrum*.

13. Amit Vikram, B.Tech. Engineering Physics, IV year, 2017–18. Title: *The Schwinger effect in inflationary cosmology*.

14. Karthik Srinivasan, B.Tech. Engineering Physics, IV year, 2019–20. Title: *The Schwinger effect in bouncing cosmology*.

15. Abhik Bhattacharjee, M.Sc. Physics, II year, 2020–21. Title: *Generation of primordial magnetic fields and imprints on gravitational waves*.

16. Saurav Mishra, M.Sc. Physics, II year, 2021–22. Title: *Formation of primordial black holes in the early universe*.

17. Tamal Mukherjee, M.Sc. Physics, II year, 2021–22. Title: *Generation of primary and secondary gravitational waves in the early universe*.

18. Rahul Priyadarshan, B.Tech. Aerospace Engineering, IV year, 2021–22. Title: *Comparison of models of the early universe with the cosmological data*.

19. Pulkit Bansal, B.Tech.-M.Tech. Engineering Physics and Quantum Quantum Science and Technology, V year, 2022–23. Title: *Inflation and primordial perturbations in modified theories of gravitation*.

20. M. S. Dinesh, M.Sc. Physics, II year, 2022–23. Title: *Quantum-to-classical transition of primordial perturbations*.

21. Nirmal Dinesh Padwal, M.Sc. Physics, II year, 2022–23. Title: *Lensing of electromagnetic and gravitational waves*.

22. Pramit Bhattacharya, M.Sc. Physics, II year, 2023–24. Topic: *Spectral distortions in the cosmic microwave background*.

23. Rahul, M.Sc. Physics, II year, 2023–24. Topic: *The transfer function and the matter power spectrum*.

24. Hrishabh Srivastava, B.Tech.-M.Tech. Metallurgical and Materials Engineering and Data Science, V year, 2023–24. Topic: *Bayesian evidence for models of dark energy*.

◦ **Other B.S.-M.S. and M.Sc. projects**

1. Neel Shah, B.S.-M.S. Physics, V Year, Indian Institute of Science Education and Research, Pune, India, 2022–23. Title: *Constraining primordial perturbations on small scales*.

2. Parvathy Harikumar, M.Sc. Physics, II year, Department of Theoretical Physics, University of Madras, Chennai, India, January–May 2015. Title: *Rotation curves of galaxies*.

3. Shikshaa Subramani, M.Sc. Physics, II year, Department of Physics, Meenakshi College for Women, Chennai, India, January–March 2021. Title: *A study of Newtonian cosmology*.

• Supervision of visiting students

○ At Harish-Chandra Research Institute

1. Prabhanshu Shekhar, Integrated M.Sc. Physics, III year, Department of Physics and Meteorology, Indian Institute of Technology, Kharagpur, India, May–June 2003. Topic: *Late-time acceleration of the universe*.

2. Anwesha Tapadar, M.Sc. Physics, II year, Department of Physics, Indian Institute of Technology, Kanpur, India, May–June 2003. Topic: *Violation of Lorentz invariance and synchrotron radiation*.

3. P. C. Bharadwaj, M.Sc. Physics, II year, Department of Physics, Indian Institute of Technology, Chennai, India, September–October 2003. Topic: *Empirical tests of the Bekenstein bound on specific entropy*.

4. Aswani Kumar Unnam, M.Sc. Physics, I year, Department of Physics, Periyar University, Salem, India, May–June 2004. Topic: *Trajectories in Schwarzschild spacetime*.

5. Himanshu Sharma, Integrated M.Sc. Physics, II year, Department of Physics and Meteorology, Indian Institute of Technology, Kharagpur, India, May–June 2005. Topic: *Decoherence and quantum Brownian motion*.

6. Deepak Khurana, Integrated M.Sc. Physics, II year, Department of Physics and Meteorology, Indian Institute of Technology, Kharagpur, India, May–June 2005. Topic: *Gravitational lensing*.

7. Arindam Chatterjee, B.Sc. Physics, III year, Chennai Mathematical Institute, Chennai, India, May–June 2006. Topic: *Dark energy with non-canonical scalar fields*.

8. Sk. Maidul Haque, M.Sc. Physics, I year, Department of Physics, Indian Institute of Technology, Delhi, India, May–June 2007. Topic: *Galactic dynamics*.

9. Ishan Srivastava, B.Tech. Engineering Physics, III year, Departments of Physics and Electrical Engineering, Indian Institute of Technology, Chennai, India, June–July 2007. Topic: *Gravitational lensing and microlensing*.

10. Nilanjan Banik, B.Tech. Mechanical Engineering, III year, Department of Mechanical Engineering and Mining Machinery Engineering, Indian School of Mines, Dhanbad, India, May–June 2009. Topic: *Dark energy and the accelerating universe*.

11. Harikrishnan Ramani, B.Sc. Physics, II year, Chennai Mathematical Institute, Chennai, India, July 2009. Topic: *Early and late time acceleration*.

○ **At Indian Institute of Technology Madras**

1. Vaishak Prasad, M.Sc. (Honors) Physics, IV year, Birla Institute of Technology and Science Pilani, Hyderabad Campus, India, June–July 2015. Joint supervision with: Dr. Dawood A. Kothawala, Department of Physics, Indian Institute of Technology Madras, Chennai, India. Title: *Estimation of cosmological parameters from the supernovae data*.

2. Lokahith Agasthya, Integrated B.S.-M.S. Physics, III year, Indian Institute of Science Education and Research, Pune, India, June–July 2016. Title: *Formation of structures in the universe*.

• Supervision of school students

○ **At Harish-Chandra Research Institute**

1. Hamsa Padmanabhan, XII Standard, Kendriya Vidyalaya, Ganeshkhind, Pune, India, May–June 2007. Topic: *Elements of quantum mechanics*.

○ **At Indian Institute of Technology Madras**

1. Akshay P. Roy, XI Standard, Amrita Vidyalayam, Nesapakkam, Chennai, India and Malavika Suresh, XI Standard, Srimathi Sundaravalli Memorial School, Chrompet, Chennai, India, May–June -2011. Topic: *Linear and non-linear oscillators*.

ORGANIZATION

• Schools and meetings

○ **At Harish-Chandra Research Institute**

1. *Summer School on Gravitation and Cosmology*, May 10–21, 2004.

2. *Field Theory Aspects of Gravity VI*, November 13–17, 2007.

3. *Summer School on Gravitation and Cosmology*, May 12–24, 2008.

4. *Summer School on Gravitation and Cosmology*, May 10–22, 2010. I had coordinated the school with Dr. Tirthankar Roy Choudhury.

5. *Primordial Features and Non-Gaussianities*, December 14–18, 2010. This meeting had also contained a component on string cosmology. I had organized the meeting with Prof. Sudhakar Panda.

6. *The XXVI Meeting of the Indian Association for General Relativity and Gravitation*, January 19-21, 2011. I had organized the meeting with Dr. Tirthankar Roy Choudhury.

○ **At Indian Institute of Technology Madras**

1. *One-day Meeting on Black Holes and Cosmology*, October 6, 2015.

2. *GIAN Course on Origin and Evolution of Perturbations during Inflation and Reheating*, November 25–30, 2016. The international faculty for the course was Prof. Jérôme Martin of the Institut d'Astrophysique de Paris, Paris, France.

3. *A Day of Gravitation and Cosmology*, January 26, 2018.

4. *Chennai Symposium on Gravitation and Cosmology*, January 22–24, 2020. I had organized the meeting with Drs. Chandra Kant Mishra and Dawood Kothawala.

5. *School on Black Holes and Gravitational Waves*, January 17–22, 2022. I had organized the online school with Drs. Chandra Kant Mishra and Dawood Kothawala.

6. *Chennai Symposium on Gravitation and Cosmology*, February 2–5, 2022. I had organized the online meeting with Drs. Chandra Kant Mishra and Dawood Kothawala.

7. *Mini School on Gravitation and Cosmology*, November 24–26, 2022.

○ **At other institutions**

1. *Indo-UK Scientific Seminar: Confronting Particle-Cosmology with Planck and LHC*, Inter-University Centre for Astronomy and Astrophysics, Pune, India, August 10–12, 2011. I had organized the meeting with Profs. Tarun Souradeep and Anupam Mazumdar.

2. *Physics of the Early Universe—An Online Precursor*, International Centre for Theoretical Studies, Bengaluru, India, August 31–September 3, 2020. I had organized the online meeting with Profs. Robert Brandenberger, Jérôme Martin and Subodh Patil.

3. *Physics of the Early Universe (Hybrid)*, International Centre for Theoretical Studies, Bengaluru, India, January 3–12, 2022. I had organized the hybrid school with Profs. Robert Brandenberger, Jérôme Martin and Subodh Patil.

• Other

1. I was the chair of the Quantum Gravity workshop at the *XXIV Meeting of the Indian Association of General Relativity and Gravitation* that was held at Jamia Millia Islamia, New Delhi, India, during February 5–8, 2007.

2. I was one of the coordinators of the Working Group on Astroparticle Physics, Cosmology and Neutrinos at *The Tenth Workshop in High Energy Physics Phenomenology* that was held at the Institute of Mathematical Sciences, Chennai, India, during January 2–13, 2008.

3. I was a member of the Scientific Organizing Committee of the *Gravitation and Astronomy: Frontiers in Theory and Observations—The First IUCAA Reunion Meeting* that was held at the Inter-University Centre for Astronomy and Astrophysics, Pune, India, during August 11–14, 2009. I was also the coordinator of the session on *Quantum Aspects of Gravity and Early Universe* at the meeting.

4. I was a member of the Organizing Committee of *The Seventh Meeting on Field Theory Aspects of Gravity* that was held at the Indian Institute of Advanced Study, Simla, India, during November 15–19, 2008. I was also a member of the Organizing Committee of *The Eighth Meeting* that was held at the H. N. B. Garhwal University, Srinagar, Garhwal, India, during April 19–23, 2010.

5. I was the Convener of the Scientific Organizing Committee of *The XXVI Meeting of the Indian Association for General Relativity and Gravitation* that was held at the Harish-Chandra Research Institute, Allahabad, India, during January 19–21, 2011.

6. Since 2011, I have been a member of the Indian Initiative in Gravitational-wave Observations (IndIGO) Consortium.

7. I was one of the Chairs of the parallel session on Cosmology at *The Seventh International Conference on Gravitation and Cosmology* that was held in Goa, India, during December 14–19, 2011.

8. I was a member of the Council of the *Indian Association for General Relativity and Gravitation* during 2012-16.

9. I was a member of the National Organizing Committee for the *XX DAE-BRNS High Energy Physics Symposium* that was held at the Indian Institute of Technology, Guwahati, India, during December 8–12, 2014.

10. Along with Dr. C. V. Krishnamurthy, I had overseen the Department Computing Facility here at the Department of Physics at the Indian Institute of Technology Madras, Chennai, India, during 2011–14.

11. I was responsible for organizing the Physics Colloquium here at the Department of Physics at the Indian Institute of Technology Madras, Chennai, India, during 2013–14. During 2014–18, I had served as a member of the committee that was formed to oversee the organization of the Colloquiua.

12. I was one of the Chairs of the parallel session on Cosmology at *The XXVIII Meeting of the Indian Association of General Relativity and Gravitation* that was held at the Raman Research Institute, Bengaluru, India, during March 18–20, 2015.

13. I was a member of the Organizing Committee of the *XXVII IUPAP Conference on Computational Physics* that was held at the Indian Institute of Technology Guwahati, Guwahati, India, during December 2–5, 2015.

14. I was one of the Chairs of the parallel session on Cosmology at *The Eighth International Conference on Gravitation and Cosmology* that was held at the Indian Institute of Science Education and Research, Mohali, India, during December 14–18, 2015.

15. I was a member of the Scientific Organizing Committee for *The XXIX Meeting of the Indian Association of General Relativity and Gravitation* that was held at the Department of Physics, Indian Institute of Technology Guwahati, Guwahati, India, during May 18–20, 2017.

16. I was a member of the National Organizing Committee for *The Fifteenth Workshop in High Energy Physics Phenomenology* that was held at the Indian Institute of Science Education and Research, Bhopal, December 14–23, 2017.

17. I was a member of the Scientific Organizing Committee for the international conference *The Physical Universe* that was held at Nagpur, India, during February 26–March 1, 2018.

18. I was the Secretary of the Indian Association of General Relativity and Gravitation March 2018–22.

19. I was one of the coordinators of the Working Group on Astroparticle Physics and Cosmology at *The Sixteenth Workshop in High Energy Physics Phenomenology* that was held at the Indian Institute of Technology, Guwahati, India, during December 1–10, 2019.

20. Since January 2022, I have been serving as a member of the Editorial Board of Pramana.

OTHER ACADEMIC ACTIVITIES

- I have refereed theses carried out at the following institutions: Birla Institute of Technology and Science, Pilani, India; Birla Institute of Technology and Science Pilani, Goa, India; Birla Institute of Technology and Science Pilani, Hyderabad, India; Centre for Theoretical Physics, Jamia Millia Islamia, Delhi, India; Cochin University of Science and Technology, Kochi, India; Indian Institute of Astrophysics, Bengaluru, India; Indian Institute of Science, Bengaluru, India; Indian Institute of Science Education and Research, Bhopal, India; Indian Institute of Science Education and Research, Kolkata, India; Indian Institute of Science Education and Research, Thiruvananthapuram, India; Indian Institute of Technology, Kanpur, India; Inter-University Centre for Astronomy and Astrophysics, Pune, India; Manipal Centre for Natural Sciences, Manipal Academy of Higher Education, Manipal, India; Physical Research Laboratory, Ahmedabad, India; Raman Research Institute, Bengaluru, India; Saha Institute of Nuclear Physics, Kolkata, India; St. Xavier's College, Univerity of Calcutta, Kolkata, India; Tata Institute of Fundamental Research, Mumbai, India; University of Delhi, Delhi, India and Utkal University, Bhubaneswar, India.

- I have acted, and continue to act, as a referee for the following journals: Advances in High Energy Physics, Annals of Physics, Astronomische Nachrichten, Astrophysical Journal, Canadian Journal of Physics, Classical and Quantum Gravity, European Journal of Physics, European Physical Journal C, European Physics Letters, General Relativity and Gravitation, Heliyon, Indian Journal of Physics, International Journal of Modern Physics A, Journal of Astrophysics and Astronomy, Journal of Cosmology and Astroparticle Physics, Journal of High Energy Physics, Journal of Physics A, Modern Physics Letters A, New Journal of Physics, Pramana, Physical Review D, Physical Review Letters, Physica Scripta and Reports on Progress in Physics.

PUBLIC OUTREACH

- The Harish-Chandra Research Institute conducts an annual test for school children which is aimed at identifying and motivating talented young students towards pursuing a career in science. I was involved in conducting the physics part of the test during 2002–10.
