

Manvendra Pratap Rajvanshi

Curriculum Vitae

PERSONAL DETAILS

Nationality Indian
Address Hostel 7, IISER Mohali, Punjab, India-140306
Phone (+91) 7696437139
Mail manvendra.x0@gmail.com, ph16051@iisermohali.ac.in

AFFILIATION

Indian Institute of Science Education and Research (IISER) Mohali

EDUCATION

Ph.D., Physics

Expected
June, 2021

IISER, Mohali

Currently pursuing in Cosmology

Topic: "Investigating dynamical nature of dark energy (DE) via perturbations":
Simulating perturbations (linear as well as nonlinear) in dynamical dark energy models like quintessence, tachyonic field, etc. to see if dynamic nature of dark energy will lead to any significant deviations from standard models. Also I am investigating implications due to coupling between dark matter and dark energy. We are also working towards relativistic N-body simulations with dynamic dark energy. For more details please visit:

<https://manu0x.github.io/PhDResearchSummary2.pdf>

Guide: Prof. Jasjeet Singh Bagla (email: jasjeet@iisermohali.ac.in)

BS-MS, Major Physics

2011-2016

IISER, Mohali

MS Thesis topic: Modelling Evolution of Spherical Overdensities in Cosmology.

RESEARCH INTERESTS

Dark Energy: Theory & Simulation, Numerical Methods (PDEs, ODEs, N-body, etc.), General Relativity, Machine Learning for Physical Sciences, etc.

PUBLICATIONS

- Manvendra Pratap Rajvanshi and J.S. Bagla,
Nonlinear spherical perturbations in quintessence models of dark energy,
Journal of Cosmology and Astroparticle Physics, Volume 2018, June 2018
[doi: 10.1088/1475-7516/2018/06/018](https://doi.org/10.1088/1475-7516/2018/06/018) [[arXiv:1802.05840](https://arxiv.org/abs/1802.05840)]

- Rajvanshi, M.P., Chakraborty, T. & Bagla, J.S. Gravitational Collapse and Structure Formation in an Expanding Universe with Dark Energy. *Reson* 24, 977–993 (2019) [[arXiv:1803.04267](#)]
- Manvendra Pratap Rajvanshi, J. S. Bagla
Reconstruction of dynamical dark energy potentials: Quintessence, tachyon and interacting models, *J Astrophys Astron* (2019) 40: 44. [[arXiv:1905.01103](#)]
- Manvendra Pratap Rajvanshi, J. S. Bagla
Non-linear spherical collapse in tachyon models and a comparison of collapse in tachyon and quintessence models of dark energy.
Classical and Quantum Gravity, Volume 37, Number 23
[doi:10.1088/1361-6382/abbb63](#) [[arXiv:2003.07647](#)]
- Manvendra Pratap Rajvanshi, Avinash Singh, H.K. Jassal & J.S. Bagla
Tachyonic vs Quintessence dark energy: linear perturbations and CMB data. [In preparation....we hope to arxiv by end of March.]

SCHOLARSHIPS

- Awarded Inspire Scholarship for Higher Education for funding BS-MS studies.

TEACHING EXPERIENCE

- Teaching Assistant for Classical Mechanics lab(PHY111), Fall Sem(2016 & 2017)
- Teaching Assistant for Modern Physics lab(PHY212), Spring Sem(2017)
- Teaching Assistant for Computational Methods in Physics(using C), Spring Sem(2018)
- Teaching Assistant for Introduction to Computers(intro to Scientific computing using Python), Fall Sem (2018)
- Teaching Assistant for Computational Methods in Physics, Spring Sem (2020)

SKILLS

<i>Languages</i>	Hindi (mother tongue) English (fluent), TOEFL Score (Oct 2016) 106
<i>Computational</i>	Experience in numerically solving differential equations Symbolic Computations for General Relativity OpenMP Python, C, C++, Matlab, Mathematica, git GNUplot, Matplotlib Data analysis using R Regression, SVM, general additive methods, decision trees, PCA Neural Nets with PyTorch & Keras CLASS(for CMB anisotropy calculations), MontePython

TALKS AND POSTER PRESENTATIONS

- Talk in 29th meeting of the Indian Association for General Relativity and Gravitation (IAGRG), May 2017, IIT Guwahati.
"Nonlinear Spherical Perturbations in Quintessence Cosmology"
- Poster in 36th Annual Meeting of Astronomical Society of India, Feb 2018 at Osmania University, Hyderabad
- Talk in YOUNG ASTRONOMERS' MEET 2018, PRL, Ahmedabad
- Poster in XXXVII Meeting of Astronomical Society of India Christ (Deemed to be University), Bengaluru 18 - 22 February 2019
- Poster in International Conference on Gravitation & Cosmology IISER Mohali, 2019
- Virtual talk in CHALLENGES AND INNOVATIONS IN COMPUTATIONAL ASTROPHYSICS - II (IAU CB1 ChaICA - II) virtual meeting, Nov 2020
"Simulating Scalar Field Perturbations in Cosmology."

REFERENCES

Jasjeet Singh Bagla

Dean Academics and Professor of Physics

Indian Institute of Science Education and Research, Mohali
Knowledge city, Sector 81 SAS Nagar, Manauli PO 140306, India

Email: jasjeet@iisermohali.ac.in Phone: +91 172 2293129

<http://www.iisermohali.ac.in/faculty/dps/jasjeet>

Harvinder Kaur Jassal

Associate Professor of Physics

Indian Institute of Science Education and Research, Mohali
Knowledge city, Sector 81 SAS Nagar, Manauli PO 140306, India

Email: hkjassal@iisermohali.ac.in Phone: +91 172 2293125

https://web.iisermohali.ac.in/dept/physics/Harvinder_Kaur_Jassal.html

Kinjalk Lochan

Assistant Professor of Physics

Indian Institute of Science Education and Research, Mohali
Knowledge city, Sector 81 SAS Nagar, Manauli PO 140306, India

Email: kinjalk@iisermohali.ac.in Phone: +91 172 229 3155

https://web.iisermohali.ac.in/dept/physics/Kinjalk_Lochan.html