Saurabh

Curriculum Vitae

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https://Relativist1.github.io

Education

2021–2023 **M.Sc. (Physics) Specialisation in Astrophysics and Cosmology**,
P.D. Patel Institute of Applied Sciences, Charusat University, Gujarat, India..

2017–2020 **B.Sc Honours (Physics)**,
Department of Physics, Dyal Singh College, University of Delhi, India.

2017 **Higher Secondary Education**,
Manav Rachna International School,Charmwood Village, Faridabad, India).

2015 **Matriculation Examination**,
Manav Rachna International School, Charmwood Village, Faridabad, India.

Scholastic and Curricular Achievements

2017-2020 Member of the College Physics Society - Cosmos

2017 Founded **Stellar Universe** - A student organisation for every astronomy and physics enthusiast to work and learn collectively while providing a platform to grow in the field by doing activities such as research/learning projects, seminars, webinars, lectures , interactive sessions, etc. and organising interactive sessions every weekend.

Awards

1 1st Prize for Poster Presentation, Science Manthan 2022 at Charusat Unversity, India.

2 1st Prize for Online Paper Presentation, 2020 by Motilal Nehru College, University of Delhi, Topic: Shadows cast by compact and ultracompact objects

3 1st Prize for Presentation/Seminar Presentation, 2020 at Dyal Singh College, University of Delhi, Topic: Shadows cast by compact and ultracompact objects

Technical Skills

Programming Python, C++, Scilab, Fortran, Bash

Software Mathematica, CASA (Common Astronomy Software Application), LaTeX

Publications

(1) **Saurabh**, P. Bambhaniya, & Pankaj S. Joshi, 'Probing the Shadow Image of the Sagittarius A* with Event Horizon Telescope', 2022. [arXiv:2202.00588]

(2) Kimet Jusufi, **Saurabh**, Mustapha Azreg-Aïnou, Mubasher Jamil, Qiang Wu,& Cosimo Bambi, 'Constraining Wormhole Geometries using the Orbit of S2 Star and the Event Horizon Telescope', *The European Physical Journal C*, 82, 2022.

(3) Parth Bambhaniya, **Saurabh**, Kimet Jusufi, & Pankaj S. Joshi, 'Thin accretion disk in the Simpson-Visser black-bounce and wormhole spacetimes', *Phys. Rev. D 105*, 023021, 2022.

(4) S. Nampalliwar & **Saurabh**, 'Theory-agnostic tests of gravity with black hole shadows', 2021 [arXiv:2108.01190]

(5) S. Nampalliwar, **Saurabh**, Kimet Jusufi, Qiang Wu, Mubasher Jamil, & Paolo Salucci , 'Modelling the Sgr A* Black Hole Immersed in a Dark Matter Spike', 2021 *The Astrophysical Journal*, 916, 2

(6) Kimet Jusufi & **Saurabh**, 'Black Hole Shadows in Verlinde's Emergent Gravity', *MNRAS*, 2021, d10.1093/mnras/stab476

(7) **Saurabh** & Kimet Jusufi, 'Imprints of Dark Matter on Black Hole Shadows using Spherical Accretions', 2020 [arXiv:2009.10599]

(8) **Saurabh** & Himanshu Kumar, 'The ageing problem of twins in Reissner–Nordström spacetime', *Mod. Phy. Lett. A*, 2019, 10.1142/S021773232050008X

(9) Shubham Kala, **Saurabh**, Hemwati Nandan,'Deflection of light and Shadow cast by a Dual Charged Stringy Black Hole', *Int. Jour. of Mod. Phy. A*, 2020, 10.1142/S0217751X20501778 [arXiv:2010.03615]

(10) Shreyas Bapat, (34 authors), **Saurabh**, (15 authors), 'EinsteinPy: A Community Python Package for General Relativity', 2020 [arXiv:2005.11288]

Codes

(1) `Gallifray`: Geometric Modelling and Parameter Estimation Framework for Black hole images obtainted from VLBI using Bayesian Techniques. (Python) [Developer]

Link *https://github.com/Relativist1/Gallifray*

(2) `Brahma` : General Relativistic Raytracing and Radiative Transfer in arbitrary spacetimes. (C++/Python) [Developer]

(3) `EinsteinPY`: Python package dedicated to problems arising in General Relativity and gravitational physics (Python) [Contributor]

Link *https://einsteinpy.org*

Research Interests

General Relativity, General Relativistic Ray-Tracing and Radiative Transfer, Testing GR and compact objects, VLBI and Synthesis Imaging.

Responsibilities

(1) Stellar Universe - Student's organisation for astronomy and astrophysics enthusiasts.

Position Founder

(2) BOSE-X - Bose.X is an independent multidisciplinary research organization

Position Associate Mentor & Project Lead

Work Experience

(1) Indian School of Robotics (ISRROBOTICS): Paid part-time work

Position Technical Educator

Teaching Massive Online Open Course (MOOC) Astronomy and Machine learning to Kids.

Mentoring Experience

(1) Mentor-Mentee Program, 2020 organised by SciRox, Guru Nanak Dev University, Amritsar,India [Project Mentor]

Research Internships

(1) Summer Research Internship Program - 2019

Mentor Prof. Pankaj Joshi

Topic Shadows of Black Holes and Naked Singularities

Institution International Centre for Cosmology (ICC), CHARUSAT University, Gujarat

(2) Summer Internship - 2019

Mentor Dr. Himanshu Kumar

Topic Twin Paradox Studies and Simulations in General Relativity

Institution Dyal Singh College, University of Delhi

Collaboration

(1) Next-Generation Event Horizon Telescope (ngEHT) Collaboration [*https://ngeht.org*]

(2) SWAN - Sky Watch Array Network, RRI.

Talks and Poster presentation

(1) Talk - *'Investigation of deviation of GR in semi-analytic RIAF models.'*, during ngEHT (next-generation Event Horizon Telescope) Science Meeting, November,2021.

(1) Talk - *'GALLIFRAY-A Geometric Modelling and Parameter Estimation Framework for Black hole images using Bayesian Techniques'*, during ngEHT (next-generation Event Horizon Telescope) Science Meeting,2021.

(2) Talk - *'Theory-Independent test of General Relativity by analysing Black hole images using VLBI'*, during VLBI Splinter session of SKA Science Conference, 2021.

(3) Oral Poster - *'GALLIFRAY-A Geometric Modelling and Parameter Estimation Framework for Black hole images using Bayesian Technique'*, RATOP (Relativistic Astrophysics, Theory and Observational Perspectives) Scientific Symposium, 2021.

(4) Oral Poster - *'GALLIFRAY-A Geometric Modelling and Parameter Estimation Framework for Black hole images using Bayesian Technique'*, HamSCI Workshop, 2021.

(5) Talk - *'Theory-Independent tests of General Relativity by analysing Black hole images'* during Undergrad Symposium, Precision'20, Presidency College, Bangalore, India.

(6) Lightning Talk - *'Theory-Independent tests of General Relativity by analysing Black hole images'* ' during Sixth Southern Regional Meeting, Research in Astronomy: Opportunities and Challenges, Sponsored by IUCAA

(7) Poster Presentation - *'The ageing problem of twins in Reissner–Nordström spacetime'* during International Workshop on Astrophysics and Cosmology, ICC, Gujarat, India

(8) Talk - *'Shadows cast by compact and ultracompact objects'* during *P*resentation/Seminar Presentation, Dyal Singh College, University of Delhi

(9) Talk - 'Timing of *V*ela Pulsar using Python (Data taken from Ooty Radio Telescope)' as Student-Coordinator during SKA-Outreach Week, Vigyam Samagam, New Delhi

Conferences & Workshops

(1) Relativistic Astrophysics, Theory and Observational Perspectives (RATOP) Scientific Symposium, 2021.

(2) HamSCI Workshop, 2021.

(3) 31st meeting of the Indian Association for General Relativity and Gravitation (IAGRG) organised by IIT Gandhinagar, India.

(4) Sixth Southern Regional Meeting, Research in Astronomy: Opportunities and Challenges, Sponsored by IUCAA, 2020

(5) 23rd Capra Meeting on Radiation Reaction in General Relativity, University of Texas at Austin

(6) Black Hole Perturbation Toolkit (BHPToolkit) Spring 2020 Workshop

(7) Cosmology Summer School 2020 (University of Michigan)

(8) International Workshop on Astrophysics and Cosmology organised by International Centre for Cosmology (ICC),Charusat University, Gujarat, India

(9) 30th Indian Association for General Relativity and Gravitation Meet (IAGRG) at BITS Pilani Hyderabad Campus.

(10) Co-hosted and Participated in Astronomy Boot Camp organised by Nehru Planetarium (2019)

(11) Astronomy Code Camp organised by Nehru Planetarium (2018)

(12) Research Assistant at One-Day RAD Workshop (ODRAW) at St. Stephens College, Delhi University organised by RAD@HOME

(13) RAD@HOME Discovery Camp (2018)

Co-curricular

(1) Organised Astro Retreat 2020, an online/virtual meet for talks and poster presentations in collaboration with SciRox (Science Club, Guru Nanak Dev University, Amritsar).

(2) Organising a free certificate course on 'Special and General Theory of Relativity' in Collaboration with Scienceteen Edt. Pvt. Ltd., Ramanujan Research Institute and Nehru Planetarium.

(3) Volunteer at LIGO-India booth (One week) at Vigyan Samagam, Delhi

(4) SWAN Imaging Challenge (Creating a 100 Sq.degree Image of any part of sky with observations from SWAN).

References

(1) Prof. Pankaj S. Joshi

Director, International Center for Cosmology, Gujarat, India

(2) Dr. Yosuke Mizuno

T. D. Lee Fellow, Tsung-Dao Lee Institute and School of Physics and Astronomy, Shanghai Jiao Tong University, Shanghai, China.

(3) Dr. Razieh Emami

Center for Astrophysics | Harvard & Smithsonian, 60 Garden Street, Cambridge, MA 02138, USA

(4) Dr. Sourabh Nampwalliwar

Theoretical Astrophysics, IAAT, Eberhard Karls Universitat, Tubingen, Germany.

SISSA, Via Bonomea 265, 34136 Trieste, Italy and INFN Sezione di Trieste