

Pavan Vynatheya

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Research Experience

Canadian Institute for Theoretical Astrophysics, University of Toronto

CITA POSTDOCTORAL FELLOW

Toronto, Canada

Sep. 2024 -

Max Planck Institute for Astrophysics

POSTDOCTORAL RESEARCHER

Garching, Germany

May. 2024 - Aug. 2024

Max Planck Institute for Astrophysics

PHD CANDIDATE

Supervisors: Adrian S. Hamers, Rüdiger Pakmor, Taeho Ryu, Selma de Mink

Garching, Germany

Sep. 2020 - Apr. 2024

Inter-University Centre for Astronomy and Astrophysics

MASTER THESIS

Supervisor: Kanak Saha

Pune, India

Aug. 2019 - May. 2020

University of Western Ontario

MITACS GLOBALINK RESEARCH FELLOWSHIP

Supervisor: Pauline Barmby

London, Canada

May. 2019 - Aug. 2019

Brera Astronomical Observatory

SUMMER RESEARCH INTERNSHIP

Supervisor: Tomaso Belloni

Merate, Italy

May. 2018 - Jul. 2018

Aryabhata Research Institute of Observational Sciences

INDIAN ACADEMY OF SCIENCES SUMMER RESEARCH FELLOWSHIP

Supervisor: Saurabh Sharma

Nainital, India

May. 2017 - Jul. 2017

Indian Institute of Astrophysics

SUMMER RESEARCH INTERNSHIP

Supervisor: Annapurni Subramaniam

Bengaluru, India

Jun. 2016 - Jul. 2016

Education

Max Planck Institute for Astrophysics

PHD IN ASTRONOMY (DEGREE FROM LUDWIG MAXIMILIAN UNIVERSITY OF MUNICH)

Part of the International Max Planck Research School (IMPRS) Munich

Overall grade: *magna cum laude*

Garching, Germany

Sep. 2020 - May. 2024

Indian Institute of Science Education and Research (IISER) Kolkata

BS-MS DUAL DEGREE IN PHYSICS (DST INSPIRE FELLOW)

Major in Physics + Minor in Mathematics

Cumulative Grade Point Average: 9.19 out of 10

Mohanpur, India

Aug. 2015 - Jul. 2020

Publications

FIRST AUTHOR

- Vynatheya, P.**; Ryu, T.; Pakmor, R.; de Mink, S. E.; Perets, H. B.: 2024, A&A, 685, A45
"Simulating the tidal disruption of stars by stellar-mass black holes using moving-mesh hydrodynamics"
- Vynatheya, P.**; Mardling, R. A.; Hamers, A. S.: 2023, MNRAS, 525, 2388
"Quadruple-star systems are not always nested triples: a machine learning approach to dynamical stability"
- Vynatheya, P.**; Hamers, A. S.; Mardling, R. A.; Bellinger, E. P.: 2022, MNRAS, 516, 4146
"Algebraic and machine learning approach to hierarchical triple-star stability"
- Vynatheya, P.**; Hamers, A. S.: 2021, ApJ, 926, 195
"How important is secular evolution for black hole and neutron star mergers in 2+2 and 3+1 quadruple-star systems?"

CO-AUTHOR

3. Britavskiy, N.; Renzo, M.; Nazé, Y.; Rauw, G.; **Vynatheya, P.**: 2024, A&A, 684, A35
"Tracing the evolution of short-period binaries with super-synchronous fast-rotators"
2. Hamers, A. S.; Rantala, A.; Neunteufel, P.; Preece, H.; **Vynatheya, P.**: 2021, MNRAS, 502, 4479
"Multiple Stellar Evolution: a population synthesis algorithm to model the stellar, binary, and dynamical evolution of multiple-star systems"
1. Bogensberger, D.; Ponti, G.; Jin, C.; Belloni, T. M.; Pan, H.; Nandra, K.; Russell, T. D.; Miller-Jones, J. C. A.; Muñoz-Darias, T.; **Vynatheya, P.**; Vincentelli, F.: 2020, A&A, 641, A101
"An underlying clock in the extreme flip-flop state transitions of the black hole transient Swift J1658.2-4242"

Awards & Fellowships

2024-27	CITA Postdoctoral Fellowship , Postdoctoral research at the Canadian Institute for Theoretical Astrophysics, University of Toronto	Toronto, Canada
2023	Poster Award , 3,2,1: Massive Triples, Binaries and Mergers conference – poster on the dynamical stability of triple- and quadruple-star systems	Leuven, Belgium
2022	Kippenhahn Award , Best PhD student paper in 2021 at the Max Planck Institute for Astrophysics – paper on gravitational wave progenitors in quadruple-star systems	Garching, Germany
2018	Mitacs Globalink Research Internship , Summer research at the University of Western Ontario	London, Canada
2017	Indian Academy of Sciences Summer Research Fellowship , Summer research at the Aryabhata Research Institute of Observational Sciences	Nainital, India
2015-20	Innovation in Science Pursuit for Inspired Research (INSPIRE) Fellowship , Awarded by the Department of Science and Technology to study science at IISER Kolkata for 5 years	Mohanpur, India

Talks & Workshops

INVITED TALKS

Apr. 2024	MPA Institute seminar , Max Planck Institute for Astrophysics	Garching, Germany
Mar. 2024	Collisional N-body dynamics workshop , Max Planck Institute for Astrophysics	Garching, Germany
Oct. 2022	Galaxies, Stars & Cosmology group seminar , Marseille Astrophysics Laboratory	Marseille, France (online)

SEMINAR TALKS

Sep. 2023	Stars and Compact Objects group seminar , Center for Computational Astrophysics, Flatiron Institute	New York, USA
Aug. 2023	Theoretical Astrophysics Including Relativity group seminar , Theoretical Astrophysics Including Relativity and Cosmology, California Institute of Technology	Pasadena, USA
Aug. 2023	Stellar & Galactic Astronomy group seminar , Division of Astronomy & Astrophysics, University of California Los Angeles	Los Angeles, USA
Jun. 2023	Massive stars and stellar populations group seminar , Anton Pannekoek Institute for Astronomy, University of Amsterdam	Amsterdam, Netherlands
Apr. 2023	Seminar on Stellar Astrophysics , Max Planck Institute for Astrophysics	Garching, Germany
Nov. 2022	Astrophysical relativity group seminar , International Centre for Theoretical Sciences	Bengaluru, India
Oct. 2022	Seminar on Stellar Astrophysics , Max Planck Institute for Astrophysics	Garching, Germany
Sep. 2022	Astrophysics whiteboard session , School of Physics & Astronomy, Monash University	Clayton, Australia
Oct. 2021	Seminar on Stellar Astrophysics , Max Planck Institute for Astrophysics	Garching, Germany
Jul. 2021	Max Planck Institute for Astrophysics summer retreat , Schloss Ringberg	Kreuth, Germany

CONTRIBUTED TALKS

Apr. 2024	Anticipating the Rising Tide of Tidal Disruption Events: Theory and Observations , Kavli Institute for Theoretical Physics, University of California Santa Barbara	Santa Barbara, USA
Sep. 2023	"Two in a million" – The interplay between binaries and star clusters , European Southern Observatory	Garching, Germany
Aug. 2023	MODEST-23: Star clusters in the post-pandemic era , Northwestern University	Evanston, USA
May. 2022	Growing Black Holes: Accretion and Mergers , Radisson Hotel Kathmandu	Kathmandu, Nepal
Jan. 2022	Dynamical Formation of Gravitational Wave Sources , Aspen Center for Physics	Aspen, USA

SCHOOLS

Jan. 2024	Nordic Winter School on Multimessenger Astrophysics , Thon Hotel Skeikampen	<i>Skeikampen, Norway</i>
Jul. 2022	Summer School for Astrostatistics at Crete , Department of Physics, University of Crete	<i>Heraklion, Greece</i>
Aug. 2021	NBIA Summer School on Gravitational Wave Astrophysics , Niels Bohr International Academy, University of Copenhagen	<i>Copenhagen, Denmark</i>
Dec. 2018	IIST Astronomy and Astrophysics School , Indian Institute of Space Science and Technology	<i>Thiruvananthapuram, India</i>
Feb. 2017	Telescope-making workshop , Indian Institute of Science Education and Research Kolkata	<i>Mohanpur, India</i>
Dec. 2015	Vijyoshi Science Camp , Eastern Zonal Cultural Centre	<i>Kolkata, India</i>

CONFERENCE POSTERS

Jul. 2023	3,2,1: Massive Triples, Binaries and Mergers , Katholieke Universiteit Leuven	<i>Leuven, Belgium</i>
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Skills

Astrophysics code	Multiple-star population synthesis: MSE (advanced), Moving-mesh hydrodynamics: AREPO (intermediate), <i>N</i> -body: MSTAR (intermediate), Detailed stellar evolution: MESA (basic)
Programming	python (advanced + machine learning), C/C++ (intermediate), MATLAB (basic), Mathematica (basic), Java (basic)
Web design	HTML (advanced), CSS (advanced), jQuery/JavaScript (intermediate), PHP (basic)
Languages	English (fluent), Kannada (native), Tamil (native), Hindi (fluent)

Other Activities

2021-23	Student representative , International Max Planck Research School (IMPRS) Munich	<i>Garching, Germany</i>
2021-22	Co-organizer , Seminar on Stellar Astrophysics (SESTAS)	<i>Garching, Germany</i>
2018 and 2019	Web designer , IISER Kolkata team at the International Genetically Engineered Machine (iGEM) competition - Gold medal winners	<i>Boston, USA (did not attend)</i>
2016-17	Web designer , Inquivesta - Science fest of IISER Kolkata	<i>Mohanpur, India</i>
2016-17	Convener , IISER Kolkata Music club	<i>Mohanpur, India</i>

References

Dr. Adrian Hamers – supervisor

Max Planck Institute for Astrophysics, Garching, Germany
Contact: hamers@mpa-garching.mpg.de

Prof. Dr. Selma de Mink – supervisor

Max Planck Institute for Astrophysics, Germany
& Anton Pannekoek Institute for Astronomy, University of Amsterdam, Netherlands
Contact: demink_office@mpa-garching.mpg.de

Dr. Rüdiger Pakmor – supervisor

Max Planck Institute for Astrophysics, Germany
Contact: rpakmor@mpa-garching.mpg.de

Dr. Rosemary Mardling – collaborator

School of Physics and Astronomy, Monash University, Australia
Contact: rosemary.mardling@monash.edu

Prof. Dr. Hagai Perets – collaborator

Physics department, Technion – Israel Institute of Technology, Israel
Contact: hperets@physics.technion.ac.il