

GAUTHAM ADAMANE PALLATHADKA

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EDUCATION

Johns Hopkins University (JHU)

Ph.D. in Astrophysics

M.A. in Physics

Baltimore, USA

Summer 2027 (expected)

May 2023

Indian Institute of Technology Madras (IITM)

B.S.+ M.S. in Physics (CGPA: 9.28/10.00, US equivalent GPA : 3.7/4)

Chennai, India

May 2021

RESEARCH INTERESTS

I currently work on one of the end stages of stellar binary evolution – double white dwarf binaries – studying their formation, populations, and eventual deaths in Type-Ia supernovae. I also collaborate with theorists studying white dwarfs as gravitational wave sources. More broadly, I am interested in the intricate evolutionary history of binary stars, with a particular focus on mass transfer phases, especially the complex and often chaotic common envelope phase. Looking forward, I am curious about stellar transients, the evolution of massive stars and compact objects, and how these connect to fundamental stellar astrophysics. Beyond astrophysics, I am also fascinated by the theory of machine learning and understanding how machines learn.

PUBLICATIONS

LEAD AUTHOR

1. **Adamane Pallathadka, G.**, Zenati, Y., Zakamska, N. L., et al.: *Presaging Doppler beaming discoveries of double white dwarfs during the Rubin LSST era*, <https://doi.org/10.48550/arXiv.2602.13137>, 2026. (submitted)
2. **Adamane Pallathadka, G.**, Chandra, V., Zakamska, N. L., et al.: *Double White Dwarf Binaries in SDSS-V DR19: A catalog of DA white dwarf binaries and constraints on the binary population*, The Astrophysical Journal, 1002, 207, <https://doi.org/10.3847/1538-4357/ae593f>, 2026.
3. **Adamane Pallathadka, G.**, Chandra, V., Gansicke, B. T., et al.: *Double White Dwarf Binaries in SDSS-V DR19: The discovery of a rare DA+DQ white dwarf binary with 31 hour orbital period*, The Astrophysical Journal, 999, 251, <https://doi.org/10.3847/1538-4357/ae3c9f>, 2026.
4. **Adamane Pallathadka, G.**, Chandra, V., Zakamska, N. L., et al.: *Discovery of a Proto-White Dwarf with a Massive Unseen Companion*, The Astrophysical Journal, 968, 42, <https://doi.org/10.3847/1538-4357/ad3e86>, 2024.
5. **Gautham A., P.** and Sethi, S.: *Cosmological implications of electromagnetically interacting dark matter: milli-charged particles and atoms with singly and doubly charged dark matter*, Journal of Cosmology and Astroparticle Physics, 2020, 039, <https://doi.org/10.1088/1475-7516/2020/03/039>, 2020.

CO-AUTHOR

6. **Gautham, A. P.**, Calore, F., Carenza, P., et al.: *Reconciling hints on axion-like-particles from high-energy gamma rays with stellar bounds*, J. Cosmol. Astropart. Phys., 2021, 036, <https://doi.org/10.1088/1475-7516/2021/11/036>, 2021. **[Equal contribution from all authors]**
7. Murakami, Y. S., Twedde, J. W., Wiseman, Phil, et al.: *Old Universe, Young SNe Ia: A Statistical Analysis of Type Ia Supernova Progenitor Age from 6,9831 TITAN Host Galaxies, and Implications for Cosmology*, (submitted)
8. Zakamska, N. L., **Pallathadka, G. A.**, Bizyaev, D., et al.: *ASASSN-24fw: Candidate Gas-rich Circumsecondary Disk Occultation of a Main-sequence Star*, The Astronomical Journal, 171, 95, <https://doi.org/10.3847/1538-3881/ae1fd9>, 2026.
9. Kollmeier, J. A., Rix, H.-W., Aerts, C., et al.: *Sloan Digital Sky Survey. V. Pioneering Panoptic Spectroscopy*, The Astronomical Journal, 171, 52, <https://doi.org/10.3847/1538-3881/ae0576>, 2026.
10. Crumpler, N. R., Zakamska, N. L., **Adamane Pallathadka, G.**, et al.: *Searching for Ultra-light Dark Matter in Spatial Correlations of White Dwarf Structure*, The Astrophysical Journal, 997, 273, <https://doi.org/10.3847/1538-4357/ae2d03>, 2026.
11. Crumpler, N. R., Chandra, V., Zakamska, N. L., et al.: *A Large Catalog of DA White Dwarf Characteristics Using SDSS and Gaia Observations*, The Astrophysical Journal, 989, 24, <https://doi.org/10.3847/1538-4357/ade9a9>, 2025.
12. Arseneau, S. M., Hermes, J. J., Zakamska, N. L., et al.: *Resolution-corrected White Dwarf Gravitational Redshifts Validate Fifth-generation Sloan Digital Sky Survey Wavelength Calibration and Enable Accurate Mass–Radius Tests*, The Astrophysical Journal, 991, 190, <https://doi.org/10.3847/1538-4357/adf8dd>, 2025.
13. Knight, K., Gänsicke, B. T., Schwobe, A., Anderson, S. F., et al.: *Cataclysmic variables from Sloan Digital Sky Survey - V (2020-2023) identified using machine learning*, Monthly Notices of the Royal Astronomical Society, 536, 1057, <https://doi.org/10.1093/mnras/stae2524>, 2025.
14. SDSS Collaboration, **Adamane Pallathadka, G.**, Aghakhanloo, M., et al.: *The Nineteenth Data Release of the Sloan Digital Sky Survey*, <https://doi.org/10.48550/arXiv.2507.07093>, 1 July 2025. (accepted at AAS journals)
15. Crumpler, N. R., Chandra, V., Zakamska, N. L., et al.: *Detection of the Temperature Dependence of the White Dwarf Mass–Radius Relation with Gravitational Redshifts*, The Astrophysical Journal, 977, 237, <https://doi.org/10.3847/1538-4357/ad8ddc>, 2024.
16. Arseneau, S., Chandra, V., Hwang, H.-C., Zakamska, N. L., et al.: *Measuring the Mass–Radius Relation of White Dwarfs Using Wide Binaries*, The Astrophysical Journal, 963, 17, <https://doi.org/10.3847/1538-4357/ad2168>, 2024.

UNPUBLISHED WORKS

1. **Adamane Pallathadka, G.**, Kothawala, D.: Master's Thesis Project: *Particle Production in Curved Space: Instanton Formalism*

TECHNICAL SKILLS & CERTIFICATIONS

Programming & Computing: 7+ years in Python (NumPy, SciPy, pandas, scikit-learn, PyTorch, emcee, Astropy), SQL, C++, high-performance computing, parallel computing

Statistics & Modeling: Bayesian inference, MCMC, maximum-likelihood estimation, Monte Carlo simulation, nonlinear fitting, regression analysis, uncertainty quantification, hypothesis testing, bootstrap methods

Data Science & Machine Learning: time-series analysis, signal detection, rare-event modeling, feature engineering, dimensionality reduction (PCA), tree-based models (decision trees, random forests, gradient-boosted trees), neural networks

Surveys and Facilities:

- Gemini Telescope **Observing Proposals:**
 - o GS-2022B-FT-111 (PI, successful)
 - o GN-2024A-FT-209 (PI, successful)
 - o GN-2024B-FT-208 (PI, successful)
 - o GN-2024B-Q-203 (PI, successful)
- Sloan Digital Sky Survey: Member and involved in multiple publications
- Magellan: Observing experience with MAGE
- APO: Observing experience with KOSMOS
- JWST: Experience with writing proposals
- LSST: Experience with survey capability and forecasts

Certificates:

- The Nuts and Bolts of Machine Learning (Google via Coursera)
- Foundations of Data Science (Google via Coursera)

TALKS & POSTER PRESENTATIONS

- Oral presentation, Empowering Science in the Data-Rich Era of Astronomy, Tucson, April 2026
- Oral presentation, 247th American Astronomical Society meeting, Phoenix, January 2026
- Poster presentation, 245th American Astronomical Society meeting, Washington DC, January 2025
- Poster presentation, “Transient from Space” conference, Maryland, March 2025
- Poster presentation, ‘Surveying the Milky Way: The Universe in Our Own Backyard’ conference, Pasadena, October 2023
- Group seminar, Prof. Kareem El-Badry, California Institute of Technology, Pasadena, 2023

Workshop

- “Time series and Lightcurve analysis”, Rubin Science Platform Bootcamp, Johns Hopkins University, 2026
- “Time series and Lightcurve analysis”, LSST Discover Alliance Regional Meeting, Johns Hopkins University, 2026

AWARDS & HONORS

2026	Johns Hopkins Dissertation Prize Fellowship
2026	Kupperman Family Graduate Fellowship for Travel
2026	Walter Cottrell Quincy Prize for Excellence in Teaching
2020	Award for Academic Excellence by Indian Institute of Technology Madras (IITM)
2019	Charpak Lab fellowship by Campus France

LEADERSHIP & TEACHING

- Member of the organising committee of the LSST-Rubin data analysis bootcamp at Johns Hopkins University (March 2026)
- Collaborated with course instructors to lead weekly meetings and prepare demonstration materials for classes, including:
 - o Machine Learning for Physicists (**Spring 2025 – teaching score of 4.75/5**)
 - o Special Relativity/Waves (**Fall 2024 and Fall 2025 – mean teaching score of 4.61/5**)
- Led weekly lab sessions for 24 students in introductory physics labs (2021-2026), providing technical guidance on experiments and troubleshooting practical issues that arose
- Took ownership of planning, proposing, and executing the follow-up observations of ~60 white dwarf stars within the SDSS collaboration's compact object team