

Sashwat Tanay

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EDUCATION

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| Ph.D. (Physics) University of Mississippi | 2016-2022 |
| Advisor: Prof. Leo C. Stein | |
| Dissertation Title: Post-Newtonian Dynamics of Eccentric, Spinning Binary Black Holes and the Associated Gravitational Waveforms | |
| B.Tech. (Mechanical Engineering) Indian Institute of Technology Ropar | 2009-2013 |

EMPLOYMENT

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| Adjunct Instructor University of Mississippi | 2022-present |
| Teaching and Research Assistant University of Mississippi | 2016-2022 |
| Junior Research Fellow Tata Institute of Fundamental Research, Mumbai | 2013-2015 |

AWARDS & FELLOWSHIPS

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| Postdoctoral Fellowship, Paris Observatory - PSL University | 2023-2025 |
| FGSA Travel Award for Excellence in Graduate Research, APS (\$500) | 2022 |
| Graduate School Honors Fellowship, Univ. of Mississippi (\$12,000 in total) | 2016-2020 |
| Junior Research Fellowship, Tata Institute of Fundamental Research, Mumbai | 2013-2015 |

RESEARCH INTERESTS

• Gravitational waves • Post-Newtonian dynamics of binary black holes • Quasi-normal mode ringdown of black holes • Hamiltonian systems • EMRIs • Inflationary cosmology

RESEARCH ARTICLES

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1. **S. Tanay**. Towards a more robust algorithm for computing the Kerr quasinormal mode frequencies, 2022, [arXiv:2210.03657](https://arxiv.org/abs/2210.03657) (to be submitted)
 2. R. Samanta, **S. Tanay**, and L. C. Stein. Closed-form solutions of spinning, eccentric binary black holes at 1.5 post-Newtonian order, 2022, [arXiv:2210.01605](https://arxiv.org/abs/2210.01605) (submitted)
 3. **S. Tanay**, G. Cho, and L. C. Stein. Action-angle variables of a binary black hole with arbitrary eccentricity, spins, and masses at 1.5 post-Newtonian order. *Phys. Rev. D*, 107(26):103040, 2021, [arXiv:2110.15351](https://arxiv.org/abs/2110.15351)
 4. G. Cho, **S. Tanay**, A. Gopakumar, and H. M. Lee. Generalized quasi-Keplerian solution for eccentric, nonspinning compact binaries at 4PN order and the associated inspiral-merger-ringdown waveform. *Phys. Rev. D*, 105(6):064010, 2022, [arXiv: 2110.09608](https://arxiv.org/abs/2110.09608)
 5. **S. Tanay**, L. C. Stein, and J. T. Gálvez Gherzi. Integrability of eccentric, spinning black hole binaries up to second post-Newtonian order. *Phys. Rev. D*, 103(6):064066, 2021, [arXiv: 2012.06586](https://arxiv.org/abs/2012.06586)

6. **S. Tanay**, A. Klein, E. Berti, and A. Nishizawa. Convergence of Fourier-domain templates for inspiraling eccentric compact binaries. *Phys. Rev. D*, 100(6):064006, 2019, [arXiv:1905.08811](#)
7. **S. Tanay**, M. Haney, and A. Gopakumar. Frequency and time domain inspiral templates for comparable mass compact binaries in eccentric orbits. *Phys. Rev. D*, 93(6):064031, 2016, [arXiv:1602.03081](#)

TEACHING EXPERIENCE

| | |
|------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Phys 211 Calculus-based Undergrad Physics (course website here) (as adjunct instructor, Univ. of Mississippi) | Summer 2023 |
| Phys 221, 222, 223, 224 Undergrad Physics Lab Courses (as teaching assistant, Univ. of Mississippi) | 2016-2022 |

INVITED TALKS & LECTURES

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| Missouri University of Science and Technology (Department Colloquium) | Aug 2023 |
| Seoul National University, South Korea | Jul 2023 |
| Univ. of Illinois Urbana-Champaign (Lecture Workshop; lecture notes here) | Jun 2022 |
| Montana State Univ. (Relativity, Astrophysics and Space Science Seminar) | Apr 2022 |
| Max Planck Inst. for Gravitational Physics Potsdam (ACR Seminar) | Jun 2021 |
| Simon Fraser Univ. (Cosmology Seminar) | Sep 2020 |

PROFESSIONAL SERVICE

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| Referee Physical Review & Physical Review Letters | Feb 2023 - present |
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MENTORING

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| Rickmoy Samanta (Postdoc, ISI Kolkata) worked on Publication (1) | Sep 2021 - Sep 2022 |
| Pranav Kasetty (IISc Bengaluru, Undergrad Thesis Co-advisor) | Oct 2021-Apr 2022 |

COMPUTER SKILLS

- Mathematica, C/C++, Python, Fortran, Matlab, Jekyll (Web Development), Bash
- GitHub: github.com/sashwattanay

OUTREACH & SERVICE

YouTube Videos on [Research](#) and [Popular Science](#)

Invited Public Talk on Astronomy - Univ. of MS (2023)

Judge at The Speaker's Edge Competition 2022 - Univ. of MS

Organized STEM Summer Camp - Univ. of MS (2018, 19)

Organized Spooky Physics Night - Univ. of MS (2016, 17, 18)

LANGUAGES

Hindi (native), English (fluent), German (elementary)