

# Sashwat Tanay

204, Lewis Hall  
University of Mississippi  
University, MS 38677-1848, USA

stanay@olemiss.edu  
[sashwattanay.github.io/site](https://sashwattanay.github.io/site)  
ORCID: [0000-0002-2964-7102](https://orcid.org/0000-0002-2964-7102)

## EDUCATION

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

## EMPLOYMENT

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<b>Postdoctoral Fellow</b> Paris Observatory - PSL University ( <i>upcoming</i> )	2023-2025
<b>Adjunct Instructor</b> University of Mississippi ( <i>current</i> )	2022-2023
<b>Teaching and Research Assistant</b> University of Mississippi	2016-2022
<b>Junior Research Fellow</b> 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

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• 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](#)
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

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**Phys 211** Calculus-based Undergrad Physics (course website [here](#)) Summer 2023  
(as adjunct instructor, Univ. of Mississippi)

## INVITED TALKS & LECTURES

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Missouri University of Science and Technology (department colloquium)	Aug 2023
Northwestern University	Jul 2023
Univ. of Illinois Urbana-Champaign (lecture workshop; lecture notes <a href="#">here</a> )	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

## MENTORING

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<b>Rickmoy Samanta</b> (Postdoc, ISI Kolkata) worked on Publication (2)	Sep 2021 - Sep 2022
<b>Pranav Kasetty</b> (IISc Bengaluru, undergrad thesis co-advisor)	Oct 2021-Apr 2022

## COMPUTER SKILLS

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- Mathematica, C/C++, Python, Fortran, Matlab, Jekyll (web development), Bash
- GitHub: [github.com/sashwattanay](https://github.com/sashwattanay)

## OUTREACH & SERVICE

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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)  
 YouTube videos on [research](#) and [popular science](#)

## LANGUAGES

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**Native:** Hindi; **Fluent:** English; **Elementary:** French, German