

# Sashwat Tanay

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## 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 ( <i>upcoming</i> )	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, <i>remote</i> )	Jun 2021
Simon Fraser Univ. (Cosmology Seminar, <i>remote</i> )	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