

# Sashwat Tanay

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Google Scholar [profile](#)

## EDUCATION

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<b>Ph.D. (Physics)</b> University of Mississippi	2016-2022
<b>Advisor:</b> Prof. Leo C. Stein	
<b>Dissertation:</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> LUTH, Paris Observatory - PSL University	2023-2025
<b>Adjunct Instructor</b> University of Mississippi	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

## TEACHING EXPERIENCE

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<b>Phys 211</b> Instructor of record for calculus-based undergrad physics course (as adjunct instructor, Univ. of Mississippi; course website <a href="#">here</a> )	Summer 2023
<b>Phys 221, 222, 223, 224</b> Undergrad physics lab courses (as teaching assistant, Univ. of Mississippi)	2016-2022

## RESEARCH INTERESTS

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• Gravitational waves • Post-Newtonian dynamics of binary black holes • Quasi-normal mode ringdown of black holes • Hamiltonian systems • Extreme mass ratio inspirals

## MENTORING

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<b>Tom Colin</b> (postgrad, Ecole Normale Supérieure, Paris) worked on Publication (1)	Oct 2023-present
<b>Manuel Alva</b> (undergrad, Universidad Nacional de Trujillo, Peru)	Nov 2023-present
<b>Rickmoy Samanta</b> (postdoc, ISI Kolkata) worked on Publication (4)	Sep 2021-Sep 2022
<b>Pranav Kasetty</b> (undergrad thesis co-advisor, IISc Bengaluru)	Oct 2021-Apr 2022

## COMPUTER SKILLS

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• Mathematica (xAct), C/C++, Python, Fortran, Matlab, Jekyll (web development), Bash • GitHub [profile](#)

## PROFESSIONAL SERVICE

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Referee Physical Review & Physical Review Letters

Feb 2023-present

## INVITED TALKS & LECTURES

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Institut d'astrophysique de Paris (GReCO seminar)	Jan 2024
IISER Pune (Physics Seminar)	Jan 2024
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, <i>remote</i> )	Jun 2021
Simon Fraser Univ. (Cosmology Seminar, <i>remote</i> )	Sep 2020

## OUTREACH & SERVICE

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• 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) • Public talk in French (Journée du LUTH), Paris Observatory (2024) • YouTube videos on [research](#) and [popular science](#)

## LANGUAGES

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Hindi, English, French (elementary)

## PUBLICATIONS

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1. T. Colin, **S. Tanay**, and L. Bernard. Revisiting 2PN Hamiltonian mechanics of binary black holes, *in prep.* 2024
2. L. C. Stein, V. Witzany, **S. Tanay**, and V. Skoupý. Action angle variables of a spinning body in a Kerr background, *in prep.* 2024
3. **S. Tanay**. Towards a more robust algorithm for computing the Kerr quasinormal mode frequencies, 2022, [arXiv:2210.03657](#) (to be submitted)
4. R. Samanta, **S. Tanay**, and L. C. Stein. Closed-form solutions of spinning, eccentric binary black holes at 1.5 post-Newtonian order. *Phys. Rev. D*, 108(14):124039, 2023, [arXiv:2210.01605](#)
5. **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](#)
6. 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](#)
7. **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](#)

8. **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](#)
9. **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](#)