Sashwat Tanay

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EDUCATION

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

Postdoctoral Fellow Paris Observatory - PSL University *(upcoming)* 2023-2025

Adjunct Instructor University of Mississippi *(current)* 2022-2023

Teaching and Research Assistant University of Mississippi 2016-2022

Junior Research Fellow Tata Institute of Fundamental Research, Mumbai 2013-2015

AWARDS & FELLOWSHIPS

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

1. **S. Tanay**. Towards a more robust algorithm for computing the Kerr quasinormal mode frequencies, 2022, arXiv: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 (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
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

5. **S. Tanay**, L. C. Stein, and J. T. Gálvez Ghersi. 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

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

INVITED TALKS & LECTURES

Missouri University of Science and Technology *(upcoming)* — Aug 2023

Northwestern University — 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, *remote*) — Jun 2021

Simon Fraser Univ. (Cosmology Seminar, *remote*) — Sep 2020

PROFESSIONAL SERVICE

Referee Physical Review & Physical Review Letters — Feb 2023 - present

MENTORING

Rickmoy Samanta (Postdoc, ISI Kolkata) worked on Publication (2) — 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

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

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