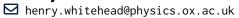
Henry Whitehead



Personal Website

Department Website

Academic History

2022-

■ DPhil, University of Oxford Astrophysics Supervised by Prof. Bence Kocsis, studying black hole interactions in AGN discs by use of hydrodynamic simulations

2017-2021

MSci, University of Cambridge Natural Sciences - First Class Astrophysics specialisation, recipient of scholarship and two college prizes

Research Publications

First Author

- H. Whitehead, C. Rowan, and B. Kocsis, "3D Adiabatic Simulations of Binary Black Hole Formation in AGN", arXiv e-prints, arXiv:2502.14959, arXiv:2502.14959, Feb. 01 2025. ODOI: 10.48550/arXiv.2502.14959. arXiv: 2502.14959 [astro-ph.HE].
- **H. Whitehead**, C. Rowan, T. Boekholt, and B. Kocsis, "Disc novae: thermodynamics of gas-assisted binary black hole formation in AGN discs", vol. 533, no. 2, pp. 1766–1781, Sep. 03 2024. **9** DOI: 10.1093/mnras/stae1866. arXiv: 2312.14431 [astro-ph.HE].
- H. Whitehead, C. Rowan, T. Boekholt, and B. Kocsis, "Gas assisted binary black hole formation in AGN discs", vol. 531, no. 4, pp. 4656–4680, Jul. 05 2024. Doi: 10.1093/mnras/stae1430. arXiv: 2309.11561 [astro-ph.GA].
- **H. Whitehead** and J. H. Matthews, "Studying the link between radio galaxies and AGN fuelling with relativistic hydrodynamic simulations of flickering jets", vol. 523, no. 2, pp. 2478–2497, Aug. o6 2023.

 **DOI: 10.1093/mnras/stad1582. arXiv: 2305.19328 [astro-ph.HE].

Latter Author

- C. Rowan, **H. Whitehead**, G. Fabj, P. Kirkeberg, M. E. Pessah, and B. Kocsis, "Hydrodynamic simulations of black hole evolution in AGN discs I: orbital alignment of highly inclined satellites", *arXiv e-prints*, arXiv:2505.23739, arXiv:2505.23739, May 2025. arXiv: 2505.23739 [astro-ph.HE].
- C. Rowan, **H. Whitehead**, G. Fabj, *et al.*, "Prompt gravitational-wave mergers aided by gas in Active Galactic Nuclei: The hydrodynamics of binary-single black hole scatterings", Apr. 2025. ODI: 10.1093/mnras/staf547. arXiv: 2501.09017 [astro-ph.GA].
- C. Rowan, **H. Whitehead**, and B. Kocsis, "Black Hole Merger Rates in AGN: contribution from gas-captured binaries", *arXiv e-prints*, arXiv:2412.12086, arXiv:2412.12086, Dec. 2024. ODI: 10.48550/arXiv.2412.12086. arXiv: 2412.12086 [astro-ph.HE].
- C. Rowan, **H. Whitehead**, T. Boekholt, B. Kocsis, and Z. Haiman, "Black hole binaries in AGN accretion discs II. Gas effects on black hole satellite scatterings", vol. 527, no. 4, pp. 10 448–10 468, Feb. 04 2024. ODI: 10.1093/mnras/stad3641.

Grants & Research Scholarships

Professional Activities

Referee for Monthly Notices of the Royal Astronomical Society (MNRAS)



M. Rozner, A. A. Trani, J. Samsing, and H. B. Perets, "The formation of mini-AGN discs around IMBHs and their dynamical implications",, vol. 537, no. 2, pp. 1220–1231, Feb. 2025. ODOI: 10.1093/mnras/staf072. arXiv: 2409.13805 [astro-ph.HE].

Conference Presentations

June 2025	■ Inclination Damping of BH Satellites in AGN Discs, DYNAMIX, Institute of Astronomy, University of Cambridge
August 2024	Cyclonic Winds: 3D Outflows from Black Holes Embedded in AGN Discs, The Origin of Black Hole Mergers, Niels Bohr Institute
December 2023	■ Disc Novae: Thermodynamics of Gas Assisted Binary Black Hole Formation in AGN Discs RESCEU-NBIA workshop on gravitational-wave sources, University of Tokyo
July 2023	■ Gas Assisted Binary Black Hole Formation in AGN Discs, National Astronomy Meeting, Cardiff University

Skills and Experience

Coding	Python, C, C++, CUDA, with a strong interest to improve further
Simulation	Current user of Athena++, previous experience with PLUTO, MESA and Arepo
Clusters	Regular user of Oxford's High Performance Computing cluster Hydra and the Cambridge Center for Data Driven Discovery's Cascade Lake
Internships	8-week research internship studying the hydrodynamics of flickering relativistic jets in AGN (2021, Institute of Astronomy, Cambridge)
	8-week research internship on the evolution of the convective envelopes of massive stars (2019, Institute of Astronomy, Cambridge)

References

Principle referee Prof. Bence Kocsis (bence.kocsis@physics.ox.ac.uk), others available upon request.