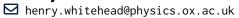
Henry Whitehead



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

- 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].
- 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", *arXiv e-prints*, arXiv:2501.09017, arXiv:2501.09017, Jan. 02 2025. ODOI: 10.48550/arXiv.2501.09017. 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. *O* DOI: 10.48550/arXiv.2412.12086. arXiv: 2412.12086 [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. ODOI: 10.1093/mnras/stae1866. arXiv: 2312.14431 [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.
- **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. Ø 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. 06 2023.

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

Grants & Research Scholarships

July 2024

■ UKRI OPP503: PI for Project APP35272 awarded 3.65 million CPUh on CSD3 (Cambridge Service for Data Driven Discovery)

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

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.