Nicholas Choustikov

nicholas.choustikov@physics.ox.ac.uk +44 7512 647 717

Nationality: British, New Zealander

Denys Wilkinson Building, Keble Road, Oxford, OX1 3RH

Interests

Galaxy formation and evolution, magnetohydrodynamics, high-energy astrophysics, AGN feedback, black holes, simulation forward modelling, reionization, large-scale structure and cosmology

Education

DPhil in Astrophysics *Oriel College, University of Oxford*
PhD program *October 2022 - Present*
***Supervisors**: Professor Julien Devriendt and Professor Adrianne Slyz*
***Thesis title**: The impact of magnetic fields on gas accretion onto supermassive black holes and AGN feedback: the next frontier of galaxy formation cosmological simulations*

BA + MSci in Natural Sciences *Fitzwilliam College, University of Cambridge*
Undergraduate program *October 2018 - July 2022*
***Grade**: Double First Class with Distinction (85%, ranked 3rd)*
***Masters Supervisors**: Dr Zvonimir Vlah and Professor Anthony Challinor*
***Courses**: Astrophysical Fluid Dynamics, General Relativity, Black Holes, Galaxy Formation, Cosmology, Modern Stellar Dynamics, Quantum Field Theory, Field Theory in Cosmology*

Publications

The sizes of bright Lyman-break galaxies at $z \simeq 3-5$ with JWST PRIMER
*Rohan Varadaraj, Rebecca Bowler, Matt Jarvis, Nathan Adams, **Nicholas Choustikov**, Anton Koekemoer, Adam Carnall, Derek McLeod, James Dunlop, Callum Donnan, and Norman Grogin*
Submitted to MNRAS

The Great Escape: On the Connection Between Lyα Emission and LyC Escape in Simulated JWST Analogues
***Nicholas Choustikov**, Harley Katz, Aayush Saxena, Thibault Garel, Julien Devriendt, Adrianne Slyz, Taysun Kimm, Jeremy Blaizot, and Joki Rosdahl*
Submitted to MNRAS

The Sphinx Public Data Release: Forward Modelling High-Redshift JWST Observations with Cosmological Radiation Hydrodynamics Simulations *2023*
*Harley Katz, Joki Rosdahl, Tayun Kimm, Jeremy Blaizot, **Nicholas Choustikov**, Marion Farcy, Thibault Garel, Martin Haehnelt, Leo Michel-Dansac, and Pierre Ocvirk*
Published in the Open Journal

The Physics of Indirect Estimators of Lyman Continuum Escape and their Application to High-Redshift JWST Galaxies *2023*
***Nicholas Choustikov**, Harley Katz, Aayush Saxena, Alex Cameron, Julien Devriendt, Adrianne Slyz, Joki Rosdahl, Jeremy Blaizot, and Leo Michel-Dansac*
Submitted to MNRAS

Optimizing the Evolution of Perturbations in the ΛCDM Universe *2023*
***Nicholas Choustikov**, Zvonimir Vlah, and Anthony Challinor*
Published in Phys. Rev. D

The Einstein Toolkit: A Student's Guide *2020*
Nicholas Choustikov
Released on arXiv

Conferences

National Astronomy Meeting - Cardiff University *2023*
***Talk**: The Physics of Lyman Continuum Escape from High-Redshift JWST Galaxies*
RAMSES User Meeting - University of Oxford (LOC) *2023*
***Talk**: Towards a General Framework of LyC Escape Fraction Diagnostics*

Teaching

CP1: Classical Mechanics *2023 - present*
1st year undergraduate tutorials at Oriel College, Oxford
A3: Quantum Mechanics *2023 - present*
2nd year undergraduate tutorials at Oriel College, Oxford
B2: Symmetry and Relativity *2023 - present*
3rd year undergraduate tutorials at Oriel College, Oxford

Academic Internships

Kavli Institute for Cosmology, University of Cambridge *Summer 2022*
***Project**: Loop-order corrections to the dark matter power spectrum with quintessence dark energy*
***Supervisors**: Dr Zvonimir Vlah and Professor Anthony Challinor*

Mullard Space Science Laboratory, University College London *Summer 2021*
***Project**: Simulating QCD phase transitions in binary neutron star mergers*
***Supervisor**: Professor Kinwah Wu*

AMOP Group, University of Cambridge *Summer 2019*
***Project**: Designing and building a long-lasting millisecond optical shutter*
***Supervisors**: Dr Timon Hilker and Professor Zoran Hadzibabic*

Awards and Societies

Graduate Teaching and Research Scholarship - Oriel College *2023 - present*
Research funding in exchange for teaching undergraduate physics students at Oriel College

STFC Long Term Attachment Grant *2023*
Funding for a 5 month research attachment to Princeton with Professor Romain Teyssier

STFC Stipend *2022 - 2026*
Full PhD stipend plus course fees for 3.5 years

1912 Senior Scholarship + Foundation Scholarship *2022*
Award for achieving a first class result in each year of the undergraduate course

Ronald Walker Scholarship + Rawlins Prize *2021*
Award for best computational project

Elected Fellow of the Royal Astronomical Society (FRAS) 2020

Other Experience

Men's Captain of Cambridge University Eton Fives Club *2020 - 2021*
Organised COVID-19-safe return to play policies for the club
Oversaw and coached in safe training sessions for experienced and beginner players

Organised safe travel and participation for players in Universities/National tournaments
Organised and oversaw a sucessful and COVID-19-secure Varsity match

Self-Run Research Project *2020*
Simulating binary black hole mergers with the Einstein Toolkit
Published: The Einstein Toolkit: A Student's Guide

Secretary of Cambridge University Eton Fives Club *2019 - 2020*
Liaised with other clubs to organise fixtures for both the Mens' and Ladies' Clubs
Coached players of all standards at University and College clubs

Technical skills

Programming Languages	Python, Mathematica, Fortran, Bash, MATLAB, LaTeX, MPI parallel programming
Software/Tools	RAMSES, Einstein Toolkit, High-Performance Computing, VisIT, Microsoft Office
Other	Trained to operate class 3B & 4 lasers, proficient solderer
Languages	English (*native*), Russian (*fluent*), French (*intermediate*), German (*basic*)