

Louise Welsh

ASTRONOMER

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Research Interests

Chemical evolution across cosmic time, the first stars and galaxies, the stellar initial mass function, reionisation quenching, near-pristine absorption line systems, high resolution spectroscopy, and upcoming quasar surveys.

Employment

University of Milano Bicocca

POSTDOCTORAL RESEARCHER

Milan, Italy

Sep. 2021 - PRESENT

Education

Centre for Extragalactic Astronomy, Durham University

PHD IN ASTROPHYSICS

Durham, UK

Oct. 2017 - Sep. 2021

- Thesis: 'A window to the first stars: An investigation of chemically near-pristine environments'
- Advisors: Dr. Ryan Cooke and Prof. Michele Fumagalli

Lancaster University

MASTER OF PHYSICS (MPHY): 1st CLASS (HONS)

Lancaster, UK

Oct. 2012 - Jul. 2016

- Thesis: 'Investigating cold dark matter candidates'
- Advisor: Dr. John McDonald

Awards

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|------|--|--------------------------|
| 2021 | Keith Nicholas Prize , Awarded for outstanding overall performance by a postgraduate student. | Durham University |
| 2019 | Durham University Learning and Teaching Award , Awarded for developing dedicated teaching practices. | Durham University |
| 2019 | Martin and Beate Block Award , Awarded to a promising young physicist at the Aspen winter meeting 'Into the Starlight'. | Aspen Centre for Physics |
| 2016 | Azzedine Hammiche Prize , Awarded for exceptional fourth year project work. | Lancaster University |

Talks (3 invited, 17 total)

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|-----------|---|-------------------|
| Jan. 2022 | NOAO Friday Lunch Astronomy Seminar Hour (FLASH) , (invited) TBD | Virtual |
| Oct. 2020 | The Rise of Metals and Dust in Galaxies through Cosmic Time , The carbon isotopes of the first stars | Virtual |
| Oct. 2020 | SAZERAC - The First Stars , The chemical enrichment of near-pristine systems | Virtual |
| Oct. 2020 | Cambridge galaxy group discussion , The chemical enrichment of near-pristine systems | Virtual |
| Sep. 2020 | PGR Induction Event , (invited) A Postgrad's experience | Virtual |
| Sep. 2020 | MIT BBL Talk , The chemical enrichment of near-pristine systems | Virtual |
| Jul. 2020 | Isotopes as a Probe of the Growth of Galaxies , (invited) Cancelled due to COVID-19 | Sesto, Italy |
| Jul. 2020 | SAZERAC , Searching for the carbon isotopes of the first stars | Virtual |
| Jul. 2020 | Caltech Tea Talk , The carbon isotopes of the first stars | Virtual |
| Jan. 2020 | DEX XVI Workshop , A bound on the carbon isotope ratio with ESPRESSO | Durham, UK |
| Sep. 2019 | PGR Induction Event , A Postgrad's experience | Durham, UK |
| Jul. 2019 | Small Galaxies, Cosmic Questions , A Window to the First Stars | Durham, UK |
| Mar. 2019 | Into the Starlight: The End of the Cosmic Dark Ages , Modelling chemical enrichment by Pop. III SNe | Aspen, US |
| Mar. 2019 | KIPAC Tea Talk , A window to the first stars | Stanford, US |
| Mar. 2019 | Cosmo Club , A window to the first stars | UC Santa Cruz, US |
| Jan. 2019 | DEX XV , A window to the first stars | Edinburgh, UK |
| Jul. 2018 | Friday Lunch Astronomy Talk , The multiplicity of the first stars | Durham, UK |

Proposal History as Principle Investigator

2021	VLT/UVES , 20 hours, P108.	ESO
2021	Keck I/HIRES , 1 night, 2021B.	NOAO
2020	VLT/ESPRESSO 1-UT , 9 hours, P105.	ESO
2020	VLT/UVES , 20 hours, P105.	ESO
2019	WHT/ISIS , 7 nights, 2019B.	ING

Teaching

2019 - 2021 Demonstrator , Level 2: Stars and Galaxies	Durham University
2018 - 2020 Demonstrator , Level 1: Further Mathematics for Geoscientists	Durham University
2018 - 2019 Demonstrator , Level 1: Maths toolkit for Scientists	Durham University

Committees

2020 – 2021 OCW social , Member of committee responsible for organising department social events.	Durham University
Jan. 2020 DEX XVI , LOC member for the “2020 Vision: progress and tensions in astronomy” workshop.	Durham University
Aug. 2019 Small Galaxies, Cosmic Questions , LOC member for the “Small Galaxies, Cosmic Questions” conference.	Durham University
2018 – 2019 Astronomy Journal Club , Co-convenor of a weekly meeting of first year postgraduate students.	Durham University

Outreach

Planetarium

North East, UK

SHOW PROVIDER

Oct. 2018 - Sep. 2020

Delivered shows on the constellations and planets at events (including multiple science festivals) and local schools using an inflatable planetarium.

Computing Skills

Programming Python, git, \LaTeX , Jupyter notebooks, slurm batch systems, RStudio.

Publications

- **L. Welsh**, R. Cooke, & M. Fumagalli (2021) “The stochastic enrichment of Population II stars”, MNRAS, 500, 5214
- R. Cooke, **L. Welsh**, M. Fumagalli, & M. Pettini (2020) “A limit on Planck-scale froth with ESPRESSO”, MNRAS, 494, 4884
- **L. Welsh**, R. Cooke, M. Fumagalli, & M. Pettini (2020) “A bound on the $^{12}\text{C}/^{13}\text{C}$ ratio in near-pristine gas with ESPRESSO”, MNRAS, 494, 1411
- **L. Welsh**, R. Cooke, & M. Fumagalli (2019) “Modelling the chemical enrichment of Population III supernovae: the origin of the metals in near-pristine gas clouds”, MNRAS, 487, 3363