

Max-Planck Institute for Astronomy  
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# Romain A. Meyer

## RESEARCH INTERESTS

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Using a wide range of observational probes and facilities from the optical and infrared to the millimeter domain, I aim to understand the properties of the first galaxies the first billion years of the Universe, their impact on cosmic hydrogen reionisation and their co-evolution with their central supermassive black holes.

**Keywords:** Reionisation, First Galaxies, First Quasars, IGM Absorption studies

## EMPLOYMENT

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### Postdoctoral Researcher

Max-Planck Institute for Astronomy, Germany

*Galaxies and Quasars in the First Billion Years*

Advisor: Dr. Fabian Walter

October 2020 -

## EDUCATION

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### PhD in Astrophysics

University College London, United Kingdom

*Thesis: The Role of Galaxies and Quasars in Reionising the High Redshift Intergalactic Medium*

Supervisor: Prof. Richard S. Ellis

September 2017 - August 2020

### Msc in Physics

Ecole Polytechnique Fédérale de Lausanne, Switzerland

*Thesis: PSF Interpolation via Artificial Neural Networks*

Supervisors: Prof. Frédéric Courbin, Dr. Thibault Kuntzer

2015-2017

### Bsc in Physics

Ecole Polytechnique Fédérale de Lausanne, Switzerland

*Erasmus year at Imperial College, London*

*Thesis: Cross-calibration of the Herschel SPIRE instruments*

Supervisor: Prof. Dave Clements, Dr. Rosalind Hopwood

2012-2015

## PUBLICATIONS

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14 (7 first-author) refereed papers published in A&A, MNRAS and ApJ since 2018(2019), totalling 199 (90) citations for an h-index of 8(5). A full list of my publications can be found below or on [NASA ADS](#).

## FULL PUBLICATION LIST

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- [1] Yana Khusanova, Eduardo Bañados, Chiara Mazzucchelli, Sofía Rojas-Ruiz, Emmanuel Momjian, Fabian Walter, Roberto Decarli, Bram Venemans, Emanuele Paolo Farina, **Romain A. Meyer**, Feige Wang, and Jinyi Yang. The [CII] and FIR properties of  $z > 6$  radio-loud quasars. *accepted in A&A*, page arXiv:2204.08973, April 2022.
- [2] **Romain A. Meyer**, Fabian Walter, Claudia Cicone, Pierre Cox, Roberto Decarli, Roberto Neri, Mladen Novak, Antonio Pensabene, Dominik Riechers, and Axel Weiss. Physical Constraints on the Extended Interstellar Medium of the  $z = 6.42$  Quasar J1148+5251: [C II] $_{158\mu m}$ , [N II] $_{205\mu m}$ , and [O I] $_{146\mu m}$  Observations. *ApJ*, 927(2):152, March 2022.

- [3] Fabian Walter, Marcel Neeleman, Roberto Decarli, Bram Venemans, **Romain A. Meyer**, Axel Weiss, Eduardo Bañados, Sarah E. I. Bosman, Chris Carilli, Xiaohui Fan, Dominik Riechers, Hans-Walter Rix, and Todd A. Thompson. ALMA 200 pc Imaging of a  $z \sim 7$  Quasar Reveals a Compact, Disk-like Host Galaxy. *ApJ*, 927(1):21, March 2022.
- [4] **Romain A. Meyer**, Roberto Decarli, Fabian Walter, Qiong Li, Ran Wang, Chiara Mazzucchelli, Eduardo Bañados, Emanuele P. Farina, and Bram Venemans. Constraining Galaxy Overdensities around Three  $z \sim 6.5$  Quasars with ALMA and MUSE. *MNRAS*, 927(2):141, March 2022.
- [5] N. Laporte, **R. A. Meyer**, R. S. Ellis, B. E. Robertson, J. Chisholm, and G. W. Roberts-Borsani. Probing cosmic dawn: Ages and star formation histories of candidate  $z \geq 9$  galaxies. *MNRAS*, 505(3):3336–3346, August 2021.
- [6] Sarah E. I. Bosman, Frederick B. Davies, George D. Becker, Laura C. Keating, Rebecca L. Davies, Yongda Zhu, Anna-Christina Eilers, Valentina D’Odorico, Fuyan Bian, Manuela Bischetti, Stefano V. Cristiani, Xiaohui Fan, Emanuele P. Farina, Martin G. Haehnelt, Joseph F. Hennawi, Girish Kulkarni, Andrei Mesinger, **Romain A. Meyer**, Masafusa Onoue, Andrea Pallottini, Yuxiang Qin, Emma Ryan-Weber, Jan-Torge Schindler, Fabian Walter, Feige Wang, and Jinyi Yang. Hydrogen reionisation ends by  $z = 5.3$ : Lyman- $\alpha$  optical depth measured by the XQR-30 sample. *accepted in MNRAS*, page arXiv:2108.03699, August 2021.
- [7] **Romain A. Meyer**, Nicolas Laporte, Richard S. Ellis, Anne Verhamme, and Thibault Garel. Double-peaked Lyman  $\alpha$  emission at  $z = 6.803$ : a reionization-era galaxy self-ionizing its local H II bubble. *MNRAS*, 500(1):558–564, January 2021.
- [8] Sarah E. I. Bosman, Koki Kakiichi, **Romain A. Meyer**, Max Gronke, Nicolas Laporte, and Richard S. Ellis. Three Ly $\alpha$  Emitting Galaxies within a Quasar Proximity Zone at  $z \sim 5.8$ . *ApJ*, 896(1):49, June 2020.
- [9] **Romain A. Meyer**, Koki Kakiichi, Sarah E. I. Bosman, Richard S. Ellis, Nicolas Laporte, Brant E. Robertson, Emma V. Ryan-Weber, Ken Mawatari, and Adi Zitrin. The role of galaxies and AGN in reionizing the IGM - III. IGM-galaxy cross-correlations at  $z \sim 6$  from eight quasar fields with DEIMOS and MUSE. *MNRAS*, 494(2):1560–1578, May 2020.
- [10] **Romain A. Meyer**, Sarah E. I. Bosman, and Richard S. Ellis. New constraints on quasar evolution: broad-line velocity shifts over  $1.5 < z < 7.5$ . , 487(3):3305–3323, August 2019.
- [11] **Romain A. Meyer**, Timothée Delubac, Jean-Paul Kneib, and Frédéric Courbin. Quasi-stellar objects acting as potential strong gravitational lenses in the SDSS-III BOSS survey. *A&A*, 625:A56, May 2019.
- [12] **Romain A. Meyer**, Sarah E. I. Bosman, Koki Kakiichi, and Richard S. Ellis. The role of galaxies and AGNs in reionizing the IGM - II. Metal-tracing the faint sources of reionization at  $5 < z < 6$ . *MNRAS*, 483(1):19–37, February 2019.
- [13] Koki Kakiichi, Richard S. Ellis, Nicolas Laporte, Adi Zitrin, Anna-Christina Eilers, Emma Ryan-Weber, **Romain A. Meyer**, Brant Robertson, Daniel P. Stark, and Sarah E. I. Bosman. The role of galaxies and AGN in reionizing the IGM - I. Keck spectroscopy of  $5 < z < 7$  galaxies in the QSO field J1148+5251. *MNRAS*, 479(1):43–63, September 2018.
- [14] I. Valtchanov, R. Hopwood, G. Bendo, C. Benson, L. Conversi, T. Fulton, M. J. Griffin, T. Joubaud, T. Lim, N. Lu, N. Marchili, G. Makiwa, **R. A. Meyer**, D. A. Naylor, C. North, A. Papageorgiou, C. Pearson, E. T. Polehampton, J. Scott, B. Schulz, L. D. Spencer, M. H. D. van der Wiel, and R. Wu. Correcting the extended-source calibration for the Herschel-SPIRE Fourier-transform spectrometer. *MNRAS*, 475(1):321–330, March 2018.

## AWARDED TELESCOPE TIME

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- The Large-Scale Environment of the First Quasars (2021.1.01557.S)  
**14.6h ALMA, PI: Romain A. Meyer**
- Extreme Super-Eddington Star Formation in a Quasar Host at  $z \sim 7$ ? (2021.1.01350.S)  
**16.3h ALMA, PI: Romain A. Meyer**
- Can luminous  $z > 6$  galaxies self-ionise their own bubbles ?  
**22h on MEGARA/GTC, PI : Jesus Gallego Maestro**
- A search for the missing gravitationally-lensed  $z \sim 6$  quasars (0104.A-0662(A)),  
**4 nights on EFOSC2/NTT, PI: Romain A. Meyer**
- Probing Cosmic Dawn: Estimating the Stellar Ages of  $z \sim 9$  Galaxies (0104.A-0028 (A)),  
**15h on XShooter/VLT, PI: R. S. Ellis**
- Probing Cosmic Dawn: Estimating the Stellar Ages of  $z \sim 9$  Galaxies' (2019.1.00061.S),  
**12.6h on ALMA, PI: R. S. Ellis**
- High-redshift CIV hosts: revealing a new class of early galaxies with ALMA (2019.1.00374.S),  
**14.6h on ALMA, PI: S. E. I. Bosman**
- The Birth of Giants: Assembly of the First Massive Galaxies (2019.1.00111.S),  
**25.6h on ALMA, PI: B. Venemans**
- A New Route to Determining the Escape Fraction of Ionising Photons from Sub-Luminous Star-Forming Galaxies at the End of Cosmic Reionisation, (P103A),  
**23.2h on VLT/MUSE, PI: R. S. Ellis**
- What is causing the first ionised island at  $z = 5.7$ ?, (P103A),  
**12.5h on VLT/FORS2, PI: S. E. I. Bosman**
- Mass distribution of quasars revealed through gravitational lensing, (S19A),  
**2x0.5 nights on Subaru/IRCS+LGS-AO, PI: C. E. Rusu**

## OBSERVING AND TECHNICAL EXPERIENCE

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- Observing: 3 nights on Keck/MOSFIRE, 3 nights on Keck/DEIMOS, 4 nights on NTT/EFOSC2, 3 nights on MEGARA/GTC
- Data reduction: multi-slit spectroscopy (DEIMOS/Keck, MOSFIRE/Keck), IFU (MUSE/VLT), mm interferometry (ALMA/NOEMA)
- Data analysis: IFU/Longslit/MOS spectroscopy (optical/near-infrared), mm interferometry (ALMA/NOEMA), machine learning, neural networks
- Current main developer and maintainer of [interferopy](#); an open-source, public python library for radio/mm interferometry data analysis.
- Summer schools: European Radio Interferometry School 2019, Chalmers, Gothenburg / Astrostat 2021, Penn State (Virtual), ISM Galaxies 2021, Marseille (Virtual)
- Computing: Python, C++, Fortran, IDL
- Astronomy software: CASA, GILDAS, PyeIt, ESORex, ESOReflex, ds9, Topcat, SourceExtractor, VPFit, GalSim, GALFIT

## TALKS

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### *Invited:*

#### **Southampton Astronomy Seminar**

University of Southampton

*Quasar Host Galaxies at Cosmic Dawn*

March 2022

#### **Königstuhl Colloquium**

MPIA Heidelberg

*Finding the sources of reionisation*

April 2021

#### **Galaxies Discussion Group**

Cambridge

*IGM-galaxy cross-correlations during Reionization*

April 2020

#### **MPIA Galaxy Coffee**

MPIA Heidelberg

*Probing reionisation with cross-correlations of galaxies and the Lyman- $\alpha$  forest at  $z \sim 6$*

November 2019

#### **London Cosmology Discussion Meeting**

Royal Astronomical Society, London, UK

*Probing the epoch of reionisation with cross-correlations of high-redshift galaxies and the IGM transmission*

November 2018

### *Contributed:*

#### **Sazerac Sip - Learning the high- $z$ Universe**

Sazerac Conference / Online

*Learning from Quasars with VAEs*

February 2022

#### **Quasars and Galaxies Through Cosmic Time**

Chile / Online

*Constraining galaxy overdensities around three  $z \sim 6.5$  quasars with ALMA and MUSE*

February 2022

#### **RAS Specialist Day - Production and Escape of LyC photons**

RAS London / Online

*Measuring the contribution of  $z \sim 6$  galaxies to reionisation with galaxy-IGM cross-correlations*

January 2022

#### **EAS 2021 - Session 2**

Leiden Observatory / Online

*High-redshift quasar hosts viewed by ALMA and NOEMA*

July 2021

#### **EAS 2021 - Session 7**

Leiden Observatory / Online

*Measuring escape fractions at  $z \sim 6$  with quasar spectra*

July 2021

#### **SAZERAC 2020**

Online

*Measuring the ionising photon escape fraction of  $z \sim 6$  galaxies*

July 2020

#### **EAS 2020**

Leiden Observatory / Online

*Discovery of a double-peaked Lyman alpha emission in a galaxy at  $z = 6.802$*

June 2020

#### **KICC 10th Anniversary Symposium**

Kavli Institute Cambridge, UK

*Probing the epoch of reionisation with cross-correlations of high-redshift galaxies and the IGM transmission*

September 2019

#### **European Week of Astrophysics and Astronomy 2019 (S2)**

Lyon, France

*Evidence for quasar evolution: rest-frame UV broad lines shifts at  $1.5 < z < 7.5$*

June 2019

#### **European Week of Astrophysics and Astronomy 2019 (S3)**

Lyon, France

*A new route to the contribution to reionisation of subluminal  $z \sim 6$  galaxies*

June 2019

#### **What matters between galaxies?**

Abbazia di Spineto, Firenze, Italy

*Metal-tracing the sources of reionisation*

June 2019

## IGM2018: Revealing Cosmology and Reionization History with the Intergalactic Medium

Kavli IPMU, Kashiwa, Japan

*Lightning talk: Faint galaxies reionising the IGM at  $z \sim 5$ : metal-tracing the sources of reionisation*

September 2018

## European Week of Astrophysics and Astronomy 2018

Liverpool, UK

*Poster: Cross-correlating CIV absorbers with the Lyman- $\alpha$  forest*

March 2018

## OUTREACH

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### Astronomy On Tap

University College London

*Co-founder and online host*

2020

### Diploma Club Seminar Organiser

University College London

*Organiser of a seminar series for graduates of the UCL evening class*

*Astronomy course open to the general public*

2019 - 2020

### ORBYTS: Researcher in schools program

Various London highschoools

*Outreach programs for highschoool pupils of 10 weeks of lectures and research on original data*

2017 - 2019

### Mid-Kent Astronomical Society

Bredhurst Village Hall

*Outreach talk: Galaxies in the First billion years"*

January 31 2020

### Bounce Back RAS200 Project

HMP Brixton

*Astronomy outreach to inmates of a London prison in collaboration with the Royal Astronomical Society and the Bounce Back foundation*

November 4 2019

### Future Frontiers Event Careers Networking Event

University City London

*Day of networking/career advice to London pupils from underprivileged background*

July 2019

### International Day of Light / UCL

University College London

*Day of outreach shows and demonstrations for secondary school pupils*

May 2018

## PRESS COVERAGE

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- July 2021: Cosmic dawn occurred 250 to 350 million years after Big Bang" press release linked to preprint [arxiv.org/abs/2104.08168](https://arxiv.org/abs/2104.08168). Covered by the [BBC press](#)/TV/radio, [the Guardian](#), the [Daily Mail](#), the [Evening Standard](#) and other specialised media. Interviewed live with the BBC World News TV (24/06/21).
- July 2020: EAS press release "Discovery of a luminous galaxy reionizing the intergalactic medium 13 billion years ago", covered by [specialised internet media](#).

## TEACHING

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### Tutorial Assistant

University College London

*Classical Mechanics Tutorials*

2019

### Tutorial Assistant

Ecole Polytechnique Fédérale de Lausanne

*Physics Practical Labs*

2016-2017

### Tutorial Assistant

Ecole Polytechnique Fédérale de Lausanne

*General Physics for Engineers Tutorials*

2013-2016

## PROFESSIONAL SERVICE

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**ApJ/AJ Reviewer**  
since 2021

AAS Journals, Washington DC USA

**Galaxy Coffee Seminar Organiser**  
August 2021 -

MPIA, Heidelberg

**MNRAS Reviewer**  
since 2020

MNRAS, London

**Astronomy PhD student representative**  
2017- 2020

University College London