Sirio Belli

CONTACT INFORMATION

Alma Mater Studiorum - Università di Bologna
DIFA - Dipartimento di Fisica e Astronomia
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APPOINTMENTS

Università di Bologna

Associate Professor — since 2023
Assistant Professor (*RTDb, Programma Rita Levi Montalcini*) — 2022 - 2023

Center for Astrophysics | Harvard & Smithsonian

Clay Fellow — 2019 - 2022

Max Planck Institute for Extraterrestrial Physics

Postdoctoral Researcher — 2015 - 2019

EDUCATION

California Institute of Technology

Ph.D. in Astronomy — 2015
M.S. in Astronomy — 2013

Università di Bologna

Laurea Magistrale in Astrophysics and Cosmology (cum laude) — 2010
Laurea Triennale in Physics (cum laude) — 2008

RESEARCH INTERESTS

- Formation and evolution of massive galaxies
- Stellar populations and kinematics
- Multi-phase gas and outflows in high-redshift galaxies
- Spectroscopic observations and data reduction

Academic Service

Member of the Scientific Organizing Committee for the following conferences

AGN Feedback and Star Formation Across Cosmic Scales and Time (Sirolo, Italy) 2024

The Physical Processes Shaping the Stellar and Gaseous Histories of Galaxies (Pisa, Italy) 2024

The Physics of Quenching Massive Galaxies at High Redshift (Leiden, Netherlands) 2017

Referee for more than 30 articles for *The Astrophysical Journal, The Monthly Notices of the Royal Astronomical Society, The Astrophysical Journal Letters, Astronomy & Astrophysics, Physical Review Letters, Nature Astronomy*

Panel reviewer for the JWST Time Allocation Committee and the NSF Astronomy and Astrophysics Research Grants;
External reviewer for the European Research Council, the French National Research Agency (ANR), the Austrian Science Fund (FWF), and the Canadian Time Allocation Committee

Grants Awarded as PI

ERC Starting Grant 2022

"Red Cardinal": *Unveiling the Formation of Massive Galaxies with the James Webb Space Telescope* (EUR 1.3 million)

Space Telescope Science Institute 2021

JWST Cycle-1 GO 1810: *The Stellar and Gas Content of Galaxies at Cosmic Noon* (USD 0.5 million)

Invited Talks and Colloquia

- Several Invited Presentations at International Conferences, including *Extreme Galaxies in their Extreme Environments at Extremely Early Epochs* (Iceland, 2024); *Subaru Telescope 20th Anniversary Symposium* (USA, 2019); *Birth, Life, and Fate of Massive Galaxies and Their Central Beating Heart* (Italy, 2018); *Advances in Galaxy Evolution* (Germany, 2017); *Deconstructing Galaxies at Cosmic Noon* (Netherlands, 2016), *Census, Evolution, Physics* (USA, 2015)
- Invited Seminars and Colloquia at several institutes including CfA | Harvard & Smithsonian, Tufts, Carnegie, UMass Amherst, UC Berkeley (USA); Royal Observatory Edinburgh (UK); University of Montreal (Canada), Bicocca University, Bologna University, INAF Padova, INAF Arcetri, INAF Trieste (Italy); ESO, LMU (Germany)

Observing Proposals and Experience

- I am the PI of successful observing proposals for JWST (46 hours), MMT (9 nights), Magellan (10 nights), and NOEMA (44 hours). I have also co-authored more than 40

successful observing proposals for a wide range of facilities, including JWST, Keck, VLT, Magellan, MMT, NOEMA, and ALMA.

- I have extensive experience using large ground-based optical and near-infrared telescopes, with a total of about 100 nights at the W. M. Keck Observatory, Very Large Telescope, Large Binocular Telescope, and Palomar Observatory.
- I have developed, documented, and publicly released `Flame`, a spectroscopic data reduction pipeline for optical and near-infrared observations, described in detail in a peer-reviewed article (Belli, Contursi & Davies, 2018, MNRAS, 478, 2097).

SUMMARY OF PUBLICATIONS

- I co-authored 66 articles published (or currently under review) on major scientific journals (ApJ, ApJL, MNRAS, A&A, Nature). The total number of citations is 4900; the median is 51 citations. My h index is 40.
- I am the first author of 10 peer-reviewed articles, totaling more than 900 citations. The median is 78 citations per article.

Here is a list of my first- and second-author publications:

24. Lorenzo Moretti, **Sirio Belli**, Gwen C. Rudie, et al. 2025, submitted, arXiv:2507.07160
Empirical Calibration of Na I D and Other Absorption Lines as Tracers of High-Redshift Neutral Outflows

23. Caterina Liboni, **Sirio Belli**, Letizia Bugiani, et al. 2025, submitted, arXiv:2506.05470
Probing neutral outflows in $z \sim 2$ galaxies using JWST observations of Ca II H and K absorption lines

22. Letizia Bugiani, **Sirio Belli**, Minjung Park, et al. 2025, ApJ, 981, 25
Active Galactic Nucleus Feedback in Quiescent Galaxies at Cosmic Noon Traced by Ionized Gas Emission

21. Minjung Park, **Sirio Belli**, Charlie Conroy, et al. 2024, ApJ, 976, 72
Widespread Rapid Quenching at Cosmic Noon Revealed by JWST Deep Spectroscopy

20. **Sirio Belli**, Minjung Park, Rebecca L. Davies, et al. 2024, Nature, 630, 54
Star formation shut down by multiphase gas outflow in a galaxy at a redshift of 2.45

19. Rebecca L. Davies, **Sirio Belli**, Minjung Park, et al. 2024, MNRAS, 528, 4976
JWST Reveals Widespread AGN-Driven Neutral Gas Outflows in Massive $z \sim 2$ Galaxies

18. Minjung Park, **Sirio Belli**, Charlie Conroy, et al. 2023, ApJ, 953, 119
Rapid Quenching of Galaxies at Cosmic Noon

17. Jee-Ho Kim, **Sirio Belli** & Rainer Weinberger 2023, MNRAS, 523, 849
The Stellar Chemical Abundances of Simulated Massive Galaxies at $z = 2$

16. Shmuel Bialy, **Sirio Belli** & Marco Padovani 2022, A&A, 658, L13
Constraining the cosmic-ray ionization rate and spectrum with NIR spectroscopy of dense clouds. A testbed for JWST

15. Leah D. Zuckerman, **Sirio Belli**, Joel Leja & Sandro Tacchella 2021, ApJL, 922, L32
Reproducing the UVJ *Color Distribution of Star-forming Galaxies at* $0.5 < z < 2.5$ *with a Geometric Model of Dust Attenuation*

14. Debosmita Pathak, **Sirio Belli** & Rainer Weinberger 2021, ApJL, 916, L23
Quenching, Mergers, and Age Profiles for z = 2 Galaxies in IllustrisTNG

13. **Sirio Belli**, Alessandra Contursi, Reinhard Genzel, et al. 2021, ApJL, 909, L11
The Diverse Molecular Gas Content of Massive Galaxies Undergoing Quenching at $z \sim 1$

12. **Sirio Belli**, Andrew B. Newman & Richard S. Ellis 2019, ApJ, 874, 17
MOSFIRE Spectroscopy of Quiescent Galaxies at $1.5 < z < 2.5$*. II. Star Formation Histories and Galaxy Quenching*

11. **Sirio Belli**, Alessandra Contursi & Richard I. Davies 2018, MNRAS, 478, 2097
Flame: A Flexible Data Reduction Pipeline for Near-Infrared and Optical Spectroscopy

10. Andrew B. Newman, **Sirio Belli**, Richard S. Ellis & Shannon G. Patel 2018, ApJ, 862, 126
Resolving Quiescent Galaxies at $z \gtrsim 2$*. II. Direct Measures of Rotational Support*

9. Andrew B. Newman, **Sirio Belli**, Richard S. Ellis & Shannon G. Patel 2018, ApJ, 862, 125
Resolving Quiescent Galaxies at $z \gtrsim 2$*. I. Search for Gravitationally Lensed Sources and Characterization of Their Structure, Stellar Populations, and Line Emission*

8. Allison Man & **Sirio Belli** 2018, Nature Astronomy 2, 695
Star formation quenching in massive galaxies

7. **Sirio Belli**, Reinhard Genzel, Natascha M. Förster Schreiber, et al. 2017, ApJL, 841, 6
KMOS^{3D} *Reveals Low-level Star Formation Activity in Massive Quiescent Galaxies at* $0.7 < z < 2.7$

6. **Sirio Belli**, Andrew B. Newman & Richard S. Ellis 2017, ApJ, 834, 18
MOSFIRE Spectroscopy of Quiescent Galaxies at $1.5 < z < 2.5$*. I. Evolution of Structural and Dynamical Properties*

5. **Sirio Belli**, Andrew B. Newman & Richard S. Ellis 2015, ApJ, 799, 206

Stellar Populations from Spectroscopy of a Large Sample of Quiescent Galaxies at $z > 1$: Measuring the Contribution of Progenitor Bias to Early Size Growth

4. Andrew B. Newman, **Sirio Belli** & Richard S. Ellis, 2015, ApJ, 813, L7
Discovery of a Strongly Lensed Massive Quiescent Galaxy at $z = 2.636$: Spatially Resolved Spectroscopy and Indications of Rotation

3. **Sirio Belli**, Andrew B. Newman, Richard S. Ellis & Nick P. Konidaris 2014, ApJL, 788, 29
MOSFIRE Absorption Line Spectroscopy of $z > 2$ Quiescent Galaxies: Probing a Period of Rapid Size Growth

2. **Sirio Belli**, Andrew B. Newman & Richard S. Ellis 2014, ApJ, 783, 117
Velocity Dispersions and Dynamical Masses for a Large Sample of Quiescent Galaxies at $z > 1$: Improved Measures of the Growth in Mass and Size

1. **Sirio Belli**, Tucker Jones, Richard S. Ellis & Johan Richard 2013, ApJ, 772, 141
Testing the Universality of the Fundamental Metallicity Relation at High Redshift using Low-Mass Gravitationally Lensed Galaxies

Last updated: July 2025