

# Sirio Belli

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**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
- Molecular and ionized gas in high-redshift galaxies
- Spectroscopic observations and data reduction

**ACADEMIC SERVICE** **Co-organizer** of the Lorentz Center Workshop 2017  
*The Physics of Quenching Massive Galaxies at High Redshift*

**Referee** for more than 20 articles for *The Astrophysical Journal*, *The Monthly Notices of the Royal Astronomical Society*, *The Astrophysical Journal Letters*, *Astronomy & Astrophysics*, *Physical Review Letters*

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

## GRANTS

**ERC Starting Grant**

2022

## AWARDED AS PI

“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 *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 Center for Astrophysics, Tufts, Carnegie, UC Berkeley (USA); Royal Observatory Edinburgh (UK); University of Montreal (Canada), Bicocca University, Bologna University, INAF Padova, INAF Arcetri (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 *F1ame*, 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 53 articles published (or currently under review) on major scientific journals (ApJ, ApJL, MNRAS, A&A, Nature). The total number of citations is 3400; the median is 56 citations. My  $h$  index is 33.
- I am the first author of 9 peer-reviewed articles, totaling more than 600 citations. The median is 70 citations per article.

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

20. **Sirio Belli**, Minjung Park, Rebecca L. Davies, et al. 2023, submitted, arXiv:2308.05795  
*Massive and Multiphase Gas Outflow in a Quenching Galaxy at  $z=2.445$*
19. Rebecca L. Davies, **Sirio Belli**, Minjung Park, et al. 2023, submitted, arXiv:2310.17939  
*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<sup>3D</sup> 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*