

# AARON BELLO ARUFE

NASA Jet Propulsion Laboratory  
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## Education

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- National Space Institute, Technical University of Denmark, Denmark** 2022  
PH.D., ASTROPHYSICS  
Thesis: *The atmospheres of the hottest exoplanets at high spectral resolution*  
Advisors: Lars Buchhave, João Mendonça
- National Space Institute, Technical University of Denmark, Denmark** 2019  
M.Sc., EARTH AND SPACE PHYSICS AND ENGINEERING  
Honors Program  
Fall 2018: semester abroad, **University of Wisconsin – Madison, USA**  
Thesis: *Exploring exoplanet atmospheric models to study the capabilities of JWST*  
Advisors: Lars Buchhave, João Mendonça
- University of Santiago de Compostela, Spain** 2017  
B.Sc., PHYSICS  
Thesis: *Cosmic ray irradiance in the atmospheres of Earth-like exoplanets orbiting M-dwarfs*  
Advisors: Juan Garzon, Ana Ulla
- Umeå University, Sweden** 2017  
B.Sc., PHYSICS  
Thesis: *Gravitational waves in general relativity*  
Advisor: Michael Bradley

## Research and Professional Experience

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- Oct 2022 - present     **JPL postdoctoral fellow**, NASA Jet Propulsion Laboratory, CA, USA  
Observational studies of exoplanet atmospheres with JWST.
- Oct 2019 - Sep 2022     **“la Caixa” Ph.D. fellow at the Exoplanet Group**, National Space Institute, Denmark  
Advisors: Lars Buchhave, João Mendonça  
Characterization of exoplanet atmospheres through transmission spectroscopy. Atmospheric composition and dynamics. Detrending methods.
- Jan 2022 - Jun 2022     **Visiting student researcher at the Knutson Group**, Caltech, CA, USA  
Advisor: Heather Knutson  
Characterization of exoplanet atmospheres through transmission spectroscopy. Atmospheric composition and escape.
- Jul 2019 - Aug 2019     **Nordic Optical Telescope summer school**, La Palma, Spain  
Intensive training on preparation, execution and reduction of astrophysical data. Science case development. Hands-on experience and training on modern instrumentation.
- Jan 2019 - Jun 2019     **M.Sc. thesis research at the Exoplanet Group**, National Space Institute, Denmark  
Advisors: Lars Buchhave, João Mendonça  
Study of the capabilities of JWST to characterize the atmospheres of terrestrial exoplanets and sub-Neptunes. Simulation of observations. Spectral retrieval.

- Sep 2018 - Apr 2019 **M.Sc. research at the Mars Group**, University of Copenhagen, Denmark  
 Advisor: Morten Bo Madsen  
 Study of ultraviolet irradiance on the Mastcam-Z calibration targets on the Mars 2020 rover.
- Jul 2018 **European Space Agency summer school**, Alpbach, Austria  
 End-to-end design of a space mission and instrumentation to explore minor bodies in the Solar System. Coordination of an international and multi-disciplinary team of scientists and engineers.
- Jan 2017 - Jul 2017 **B.Sc. thesis research**, University of Santiago de Compostela, Spain  
 Advisors: Juan Garzon, Ana Ulla  
 Modeling of stellar cosmic ray irradiance on the atmospheres of terrestrial exoplanets.
- Nov 2016 - Jun 2017 **B.Sc. thesis research**, Umeå University, Sweden  
 Advisor: Michael Bradley  
 Linearization of general relativity. Gravitational waves.
- Sep 2016 - Oct 2016 **Data Analysis intern**, *MeteoGalicia* (regional meteorological agency), Spain  
 Analysis of ozone concentration data during the 2016 summer season. Calculation of back trajectories of air masses. Comparison between rural and industrial air quality stations.

## Publications

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- Bello-Arufe, A.**, et al. (2022), *Metals and a potential extended outflow in the atmosphere of HAT-P-67b, the puffiest gas giant*, submitted to AJ
- Bello-Arufe, A.**, et al. (2022), *Exoplanet atmospheres at high resolution through a modest-size telescope: Fe II in MASCARA-2b and KELT-9b with FIES on the Nordic Optical Telescope*, A&A, 662, A51
- Bello-Arufe, A.**, et al. (2022), *Mining the Ultrahot Skies of HAT-P-70b: Detection of a Profusion of Neutral and Ionized Species*, AJ, 163, 96
- Cabot, S., **Bello-Arufe, A.**, et al. (2021), *TOI-1518b: A Misaligned Ultra-hot Jupiter with Iron in its Atmosphere*, AJ, 162, 218
- Kjærsgaard, R., **Bello-Arufe, A.**, et al. (2021), *Unsupervised Spectral Unmixing For Telluric Correction Using A Neural Network Autoencoder*, NeurIPS, 23
- Bitsch, B., Raymond, S. N., Buchhave, L. A., **Bello-Arufe, A.**, et al. (2021), *Dry or water world? How the water contents of inner sub-Neptunes constrain giant planet formation and the location of the water ice line*, A&A, 649, L5
- Stangret, M., Pallé, E., Casayas-Barris, N., Oshagh, M. **Bello-Arufe, A.**, et al. (2021), *The obliquity and atmosphere of the ultra-hot Jupiter TOI-1431b (MASCARA-5b)*, A&A, 654, A73
- Addison, B. C., ... **Bello-Arufe, A.** et al. (2021). *TOI-1431b/MASCARA-5b: An Ultra-hot Jupiter Orbiting One of the Hottest & Brightest Known Exoplanet Host Stars*, AJ, 162, 292
- Kinch, K. M., ... **Bello-Arufe, A.**, et al. (2020). *Radiometric Calibration Targets for the Mastcam-Z Camera on the Mars 2020 Rover Mission*, Space Science Reviews, 216, 141

## Selected Awards, Grants and Honors

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- 2022 **JPL Postdoctoral Fellowship**, NASA Jet Propulsion Laboratory
- 2022 **Niels Bohr grant**, Royal Danish Academy of Sciences and Letters
- 2019-2021 **“la Caixa” fellowship for studies abroad**, “la Caixa” Foundation
- 2017-2019 **Barrié postgraduate fellowship for studies abroad**, Barrié Foundation
- 2018 **Nordea scholarship**, Nordea Foundation
- 2018 **Oticon scholarship**, Oticon Foundation

## Accepted Observing Proposals

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PI, *A first look at the exotic atmosphere of one of the hottest and most recent discoveries from TESS*, **TNG**, 8 hours  
PI, *A world close to catastrophic mass loss? A first look at the extreme atmosphere of WASP-178b*, **VLT**, 6 hours  
PI, *Exploring ultra-hot Jupiters in multiple-star systems with GIARPS — insights on atmospheres and formation*, **TNG**, 5 hours  
PI, *Studying the atmosphere of HAT-P-70b, one of the hottest exoplanets*, **TNG**, 5.5 hours  
Co-I, *A comparative study of the atmospheres of ultra-hot Jupiters* (PI: A. Ulla), **Calar Alto 3.5m telescope**, 1.8 nights  
Co-I, *Exploring the Atmospheric Evaporation of a Terrestrial Exoplanet* (PI: S. Gandhi), **Gemini South**, 3.2 hours  
Co-I, *Exploring the morning and evening limbs of a transiting exoplanet* (PI: N. Espinoza), **JWST**, 15.6 hours  
Co-I, *Probing the Terrestrial Planet TRAPPIST-1c for the Presence of an Atmosphere* (PI: A. Rathcke), **JWST**, 24.9 hours  
Co-I, *The first near-infrared spectroscopic phase-curve of a super-Earth* (PI: N. Espinoza), **JWST**, 14.9 hours  
Co-I, *Revealing an atmosphere shrouded in mystery with high-resolution spectroscopy* (PI: H. Diamond-Lowe), **VLT**, 8 hours  
Co-I, *Transmission spectroscopy of our newest terrestrial neighbor only 8 pc away* (PI: H. Diamond-Lowe), **VLT**, 13 hours

## Selected Presentations

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Contributed talk, *240<sup>th</sup> Meeting of the American Astronomical Society*, Pasadena, CA, USA (2022)  
Invited talk, *Exoplanet Journal Club*, NASA JPL, CA, USA (2022)  
Poster, *Exoplanets IV*, Las Vegas, NV, USA (2022)  
Invited talk, *Planetary Science Seminar*, Caltech, CA, USA (2022)  
Invited talk, *Knutson Group Meeting*, Caltech, CA, USA (2022)  
Contributed talk, *Annual Danish Astronomy Meeting*, Virtual (2021)  
Poster, *Annual Danish Astronomy Meeting*, Nyborg, Denmark (2019)  
Invited talk, *Astrophysics and Atmospheric Physics Science Club*, DTU Space, Kgs. Lyngby, Denmark (2019)  
Poster, *36<sup>th</sup> Biennial Meeting of the Spanish Royal Physics Society*, Santiago de Compostela, Spain (2017)  
Contributed talk, *36<sup>th</sup> Biennial Meeting of the Spanish Royal Physics Society*, Santiago de Compostela, Spain (2017)

## Selected Teaching, Outreach, and Media

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*Smaller, Ground-Based Telescopes can Study Exoplanet Atmospheres too*, coverage of our work by [Universe Today](#) (2022)  
Interview for [Yale Daily News](#) on the discovery and characterization of TOI-1518 (2021)  
Teaching assistant: *30120 Astrophysics*, and *30230 Data Analysis and Modeling in Geoscience and Astrophysics* (2020-2021)  
Speaker at the outreach event *Space Night*, Copenhagen Geological Museum (2019)  
Instructor of a specialized study project for high school students (2018)

## Languages

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Spanish	Native
Galician	Native
English	Fluent
French	Proficient