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The colours of the extreme universe

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Publications

First and second author

1. Resolving the ISM at the peak of cosmic star formation with ALMA - The distribution of CO and dust continuum in $z=2.5$ sub-millimetre galaxies
Calistro-Rivera, Gabriela; Hodge, J. A.; Smail, Ian; Swinbank, A. M.; Weiss, A.; Wardlow, J. L.; Walter, F.; Rybak, M.; Chen, Chian-Chou; Brandt, W. N.; Coppin, K.; da Cunha, E.; Dannerbauer, H.; Greve, T. R.; Karim, A.; Knudsen, K. K.; Schinnerer, E.; Simpson, J. M.; Venemans, B.; van der Werf, P. P. 2018, *ApJ*, 863, 56C.
2. The LOFAR window on star forming galaxies and AGNs - curved radio SEDs and IR-radio correlation at $0 < z < 2.5$,
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3. AGNfitter: A Bayesian MCMC Approach to Fitting Spectral Energy Distributions of AGNs,
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4. Resolved [CII]/CO/FIR continuum multi-tracer study of two $z = 3$ dusty, star-forming galaxies
Rybak, Matus; **Calistro-Rivera, Gabriela**; Hodge J. A. Smail I.; Walter F.; van der Werf, P. E. da Cunha; Chian-Chou Chen; Dannerbauer H. ; Ivison R. J. ; Karim A. ; Simpson J. M.; Swinbank A. M. and Wardlow A. M. et al. 2018, *ApJ*, submitted.
5. LOFAR-Boötes: Properties of high- and low-excitation radio galaxies at $0.5 < z < 2.0$,
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Contributing author

6. The Far-Infrared Radio Correlation at low radio frequency with LOFAR/H-ATLAS, Read, S.C. et al. (including **Calistro-Rivera, Gabriela**) 2018, *MNRAS*, 480, 5625R
7. LOFAR/H-ATLAS: the low-frequency radio luminosity-star formation rate relation, Gürkan, G. et al. (including **Calistro-Rivera, Gabriela**) 2018, *MNRAS*, 475, 3010G
8. A Spatially Resolved Study of Cold Dust, Molecular Gas, H II Regions, and Stars in the $z = 2.12$ SMG ALESS67.1,
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9. The LOFAR Two-metre Sky Survey. I. Survey description and preliminary data release, Shimwell, T. W. et al. (including **Calistro-Rivera, Gabriela**) 2017, *MNRAS*, 598A, 104S

10. The Lockman Hole project: LOFAR observations and spectral index properties of low-frequency radio sources,
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11. LoTSS/HETDEX: Optical quasars -I. Low-frequency radio properties of optically selected quasars
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12. The LOFAR Two-metre Sky Survey. II. First data release
Shimwell, T. W., et al. (including **Calistro-Rivera, Gabriela**) 2018, *A&A*, in press
13. Overdensity of SMGs around the $z=2.3$ MAMMOTH-1 nebula – The environment and the powering of an ELAN
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14. LoTSS/HETDEX: Disentangling star formation and AGN activity in lensed radio-quiet quasars
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15. ALMA reveals evidence for spiral arms, bars and rings in high-redshift submillimeter galaxies
Hodge, J. et al. (including **Calistro-Rivera, Gabriela**) 2018, *ApJ*, submitted

Selected non-refereed publications:

16. Resolving the Interstellar Medium at the Peak of Cosmic Star Formation
Calistro-Rivera, Gabriela & Hodge, Jacqueline 2018, *Published in The Messenger (ESO), No. 173 (Sept 2018)*
17. Fitting Spectral Energy Distributions of AGN - A Markov Chain Monte Carlo Approach
Calistro-Rivera, Gabriela 2014, *Published in Proceedings of the IAU Symposia, IAU S304*

Curriculum Vitae

I was born on 24 March, 1990 in Huacho, a small coast city two hours away from Lima, the capital of Perú. I was raised by my grandparents in a peaceful neighbourhood right in front of the ocean. I went to my first school years here, to the Maria Auxiliadora primary school. At the age of 8, I moved with my parents to the capital city, Lima, and at the age of 10, I was accepted in the Peruvian-German School Alexander von Humboldt. There, I had the opportunity to learn several languages and was educated within a multicultural system with excellent Peruvian and German teachers in both STEM and humanities areas. Throughout my childhood, my father often shared with me his fascination for the enigmatic phenomena in the Universe, such as black holes and special relativity, and these stories woke up my curiosity for the Cosmos from early on. Although in most high-school years I had a preference for literature and arts, the last school years gave me the opportunity to attend inspiring Physics and Maths classes. The physics lectures by Herr Edgar Droll gave me the opportunity to learn about more advanced topics in Physics, introducing me to my first science magazines (Spektrum der Wissenschaft) and Physics TV-shows (Alpha-Centauri), reinforcing in this way my interest for the challenging aspects of Physics and Astronomy.

After graduating from the German Abitur in the Fall of 2007, I decided to study Physics. I was offered a full scholarship by the German Academic Exchange Service (DAAD) to move to Germany to embark my Bachelor studies. This scholarship was given to a group of high-school students selected among German-international schools from 120 different countries. This gave me the opportunity to start my undergraduate studies in the fall of 2008 in the Faculty of Physics and Astronomy of the University of Heidelberg. My first Bachelors research project was the morphological study of Ultra Compact Dwarf Galaxies under the supervision of Dr. Thorsten Lisker (Astronomisches Recheninstitut, Heidelberg). I graduated in 2012, with a thesis project on theoretical cosmology titled ‘The Lensed Temperature Anisotropy of the CMB’, as part of the group led by Prof. Matthias Bartelmann (Institute for Theoretical Astrophysics, Heidelberg). In the fall of 2012, I was awarded a DAAD full scholarship to pursue my Masters of Science degree in Physics at the Heidelberg University. In 2013, I joined the Max Planck Institute for Astronomy to conduct my Master thesis project on the spectral energy distributions of AGN under the supervision of Dr. Joseph Hennawi and Dr. Elisabeta Lusso. In this period, I had the opportunity to join observing trips to the La Silla ESO observatories, in Chile, and to present the results of my thesis in Germany, Armenia, and Australia.

In 2014, I was offered a PhD position at the Leiden Observatory. My PhD work focused on the panchromatic emission of star forming galaxies and active galactic nuclei across cosmic time, focusing on the characterization of fundamental properties for the evolution of galaxies such as star formation and black hole growth. Here, I worked as part of the low-frequency radio group led by Prof. Huub Röttgering and the dusty galaxies group, led by Dr. Jacqueline Hodge. As a PhD student, I became a member of two major collaborations studying radio and the sub-mm emission of galaxies, the LOFAR Surveys and the ALESS collaboration. During my PhD, I was able to participate in observing runs in La Palma, Spain, and to give invited and contributed talks on my research in numerous conferences and institutions, including Argentina, Colombia, France, Germany, Italy, the Netherlands, Japan, Spain, UK and USA. During my PhD, I had the opportunity to be teaching assistant to the course ‘Galaxies: Structure and Dynamics’ given by Dr. Rychard Bouwens and to develop and supervise three undergraduate projects.

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Going back to the beginning, this story would have not started without my exceptional and inspiring Physics and Maths teachers during high-school. Vielen Dank an Herrn Droll, Herrn Lanzendörfer und Herrn Biernoth. Moving to Germany and carrying out my undergraduate studies at the Heidelberg University would have not been possible without the support of the DAAD program. I would like to thank the DAAD for giving me this unique opportunity. In this period, I was also lucky to meet the Willmann family. My Gasteltern, Valentin and Ortrud Willmann, were always there for me as I started my life as an independent adult. Lieber Valentin und liebe Ortrud, vielen Dank für eure Unterstützung in diesen Jahren und ich hoffe wir bleiben in Kontakt in die Zukunft. Through my University years in Heidelberg they were many great professors and supervisors I have learn so much from, and I am thankful to all of them. I would like to especially thank Prof. Matthias Bartelmann, who inspired and motivated me to persevere through the difficult parts of my career, always with an extremely contagious passion for science and unique wisdom and modesty. Lieber Matthias, vielen Dank für die wunderbare Vorlesungen, Rate und Unterstützung. Liebe Physiker Freunde in Heidelberg, ohne euch hätte ich die Analysis-zetteln und die harte Bar3/Bar133/ Küche Nächte nicht überleben/erleben können, vielen Dank für die viele wunderbare Jahre. Pingüis, con ustedes me llegó la familia a Alemania. Gracias por hacerse querer tanto, por darle color a nuestra época de maestría y ser la mejor compañía de esas que sabes que no se acaban. Sofi y Elena, muchísimas gracias por la hermandad y las mil aventuras que compartimos durante estos años, y espero que vengan muchas más.

My research career in observational astronomy started as part of the ENIGMA group at MPIA in Heidelberg. Thanks to all my ENIGMates from whom I learned so much and who welcomed me and made me feel part of the group from the first moment. Beta Lusso, grazie per avermi aiutato a formare le basi per la mia ricerca e per essere ancora sempre disponibile per me. Spero di poter rimanere la tua collaboratrice anche nel futuro. Joe Hennawi, my career would have been half as it is without having you as my supervisor. Thank you so much for teaching me how to conduct good science, for always motivating and valuing my work, and for being a truly caring and generous supervisor to me. Thank you as well for all your support to my future career, and I hope to have the pleasure to have you as a collaborator in future projects.

My years as a PhD student at the Leiden Sterrewacht has given me the opportunity to meet many wonderful people. I am very grateful to Xander Tielens, whose support was crucial throughout my PhD. Thank you, Xander, for your advice and all your efforts to help me construct the best environment possible for my research. I cannot express my gratitude enough to Jacqueline Hodge for welcoming me in her group, introducing me to the ALMA research and teaching me so much about the scientific career. I feel very lucky to be your first PhD student and I hope we remain close collaborators in the future. I would also like to thank Huub Röttgering for giving me the opportunity to embark a PhD, for welcoming in the LOFAR group, and for giving me his trust to choose my own research path.

All work in research is a collaborative work, and the chapters presented here would have not been possible without the LOFAR and ALESS collaborations. Thanks to all members of these collaborations, to those in Leiden and around the world, who have contributed with many insightful comments and suggestions to this thesis. I would like to specially thank Ian Smail and Martin Hardcastle, for their crucial guidance throughout the projects carried out in this thesis and their support and valuable advice for my future career.

Life in Leiden would have been half as happy, without the wonderful friends and colleagues who accompanied me in these years. Thanks to all the members the LOFAR group and Dusty Galaxies groups at the Sterrewacht for the interesting and fun group-meetings. Special thanks go to my co-supervisees Hiddo Algera and Dieuwertje van den Kamp, for helping me with the Dutch translation of the summary of this thesis. Wendy Williams, it has been a pleasure to have you as a collaborator. Thank you for your company both in Leiden and Hertfordshire and for your contributions to the development of AGNfitter. Matus Rybak, thank you for the many interesting conversations about science and life, and for all your support in this last period of my PhD. I have been very lucky to have you as a close collaborator and friend, and I hope we remain in contact. I would like to thank all my Leiden colleagues and friends for the many interesting and fun scientific and non-scientific discussions and useful advice on different topics, especially Jarle Brinchman, Rychard Bouwens, Michael Maseda, Allison Hill, Corentin Schreiber, Yannik Bahe, Julius Donnert, Alexandra Candian and Themiya Nanayakkara. I would like to thank as well the ALLEGRO team, Luke Maud, Liz Gomez, Yanett Contreras, Carmen Toribio and Daniel Harsono, for your technical advice on my ALMA research and fun lunch conversations. Leo Burtscher, es hat mich sehr gefreut, dass Du in Leiden angekommen bist und wir unsere AGN Begeisterung zusammen ausdrücken konnten. Vielen Dank für deine motivierende Wörter und die viele interessante Diskussionen über alles Mögliche, von der gemeinsamen Entwicklung von Galaxien und AGN, bis boodschappen doen op de markt.

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