

Karla Ziboney Arellano-Córdova

Curriculum Vitae

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Nationality: Mexican, 18 April 1986

Academic Appointments

- April 2023 – **Postdoctoral Research Associate**, University of Edinburgh School of Physics and Astronomy, Edinburgh, Scotland, UK.
March 2026
○ **Project:** *Inception of the Chemical Elements (ICE)*
○ **Mentor** Fergus Cullen
- November 2020 – **Postdoctoral Fellow**, The University of Texas at Austin, Texas, US.
March 2023
○ **Project:** *Physical properties of local star-forming galaxies using optical and UV spectroscopy*
○ **Mentor** Danielle A. Berg
- November 2018 – **Postdoctoral Fellow (CONAHCYT-Mexico)**, Instituto de Astrofísica de Canarias (IAC), La Laguna, Tenerife, Spain.
October 2020
○ **Project Title:** *Revisiting the radial chemical abundances in the Milky Way using deep spectra of ionized nebulae.*
○ **Mentor** César Esteban

Education

- 2013–2018 **Ph.D. in Astrophysics**, Instituto Nacional de Astrofísica Óptica y Electrónica (INAOE), Puebla, México.
○ **Thesis Title:** *Temperatures and Chemical Abundances in Extragalactic H II regions*
○ **Advisor:** Mónica Rodríguez.
- 2010–2012 **M.Sc. in Astrophysics**, Instituto Nacional de Astrofísica Óptica y Electrónica (INAOE), Puebla, México.
○ **Thesis Title:** *Study of H II Regions in M81 Using GTC Spectra*
○ **Advisor:** Divakara Mayya, Mónica Rodríguez and Daniel Rosa-González.
- 2004–2009 **B.S. in Electronic Engineering**, Instituto Tecnológico de Ciudad Guzmán, Jalisco, México.

Collaboration groups

- 2023 **EXCELS** (PIs: Carnall & Fergus Cullen)| Early eXtragalactic Continuum and Emission Line Survey |The University of Edinburgh, School of Physics and Astronomy
- 2023 **ICE** (PI: Fergus Cullen)|Inception of the Chemical Elements |The University of Edinburgh, School of Physics and Astronomy
- 2020 **CLASSY** (PI: Danielle Berg)|COS Legacy Archive Spectroscopy Survey |The University of Texas at Austin
- 2020 **CHAOS** (PI: Danielle Berg)|CHemical Abundances Of Spirals| Minnesota Institute for Astrophysics
- 2018 **IAC ISM group** |Instituto de Astrofísica de Canarias (IAC)

Publications

Cites: 458, NASA/ADS

Citation count: November, 15th 2023

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Refereed Publications

First author

- 6 **A First Look at the Abundance Pattern – O/H, C/O, and Ne/O– in Galaxies with JWST/NIRSpec**
[Arellano-Córdova, Karla Z.](#), Danielle. A. Berg, John Chisholm, et al., *Accepted in ApJL*, 2022b arXiv:arXiv:2208.02562 (Citations: 54)
- 5 **CLASSY V: The impact of aperture effects on the inferred nebular properties of local star-forming galaxies**
[Arellano-Córdova, K. Z.](#), M. Mingozzi, B. L. James, , D. A. Berg et al. *ApJ*, 935, 74 2022a. DOI:10.3847/1538-4357/ac7854. (Citations: 9)
- 4 **On the radial abundance gradients of nitrogen and oxygen in the inner Galactic disc**
[Arellano-Córdova, K. Z.](#), Esteban C., García-Rojas J, Méndez-Delgado J.E.. *MNRAS*, 502, 225. 2021 DOI:10.1093/mnras/staa3903 [OA] (Citations: 22)
- 3 **The Galactic radial abundance gradients of C, N, O, Ne, S, Cl and Ar from deep spectra of H II regions**
[Arellano-Córdova, K. Z.](#), Esteban C., García-Rojas J, Méndez-Delgado J.E., *MNRAS*, 496, 1051, 2020a. DOI:10.1093/mnras/staa1523 [OA] (Citations: 51)
- 2 **The Te[N II]-Te[O III] temperature relation in H II regions and the reliability of strong-line methods**
[Arellano-Córdova, K. Z.](#) and Rodríguez, M., *MNRAS*, 497, 672. 2020b. DOI:10.1093/mnras/staa1759 [OA] (Citations: 19)
- 1 **The Oxygen Abundance Gradient in M81 and the Robustness of Abundance Determinations in H II Regions.**
[Arellano-Córdova, K. Z.](#), Rodríguez, M., Mayya, Y. D., Rosa-González, D., *MNRAS*, 455, 2667, 2016. DOI:10.1093/mnras/stv2461 [OA] (Citations: 22)

Co-author – major Contribution:

- * **Density biases and temperature relations for DESIRED H II regions**
Méndez-Delgado, J. E., Esteban, C., García-Rojas J., [Arellano-Córdova, K. Z.](#), Kreckel, K., Gómez-Llanos, V., Egorov, O. V., Peimbert, M., Egorov, O., *MNRAS*, 532, 2952, 2023 DOI:10.1093/mnras/stad1569 (Citations: 4)

- * **Interpreting the Si II and C II Line Spectra from the COS Legacy Archive Spectroscopic SurveY Using a Virtual Galaxy from a High-resolution Radiation-hydrodynamic Simulation**
Gazagnes, S., Mauerhofer, V., Berg, Danielle A., Blaizot, J., Verhamme, A., Garel, T., Erb, D. K., [Arellano-Córdova, K. Z.](#) et al. *ApJ*, **952**, 164 **2023** DOI:[10.3847/1538-4357/acda2c](https://doi.org/10.3847/1538-4357/acda2c) (Citations: 2)
- * **CLASSY VII Ly α Profiles: The Structure and Kinematics of Neutral Gas and Implications for LyC Escape in Reionization-Era Analogs**
Hu, W., Martin, C. L., Gronke, M., Gazagnes, S., Hayes, M., Chisholm, J., Heckman, T., Mingozi, M., Roy, N., Senchyna, P., Xu, X., Berg, D. A., James, B. L., Stark, D. P., [Arellano-Córdova, K. Z.](#) et al. *ApJ*, **956**, 39 **2023** DOI:[10.3847/1538-4357/aceefd](https://doi.org/10.3847/1538-4357/aceefd) (Citations: 3)
- * **CLASSY. VI. The Density, Structure, and Size of Absorption-line Outflows in Starburst Galaxies**
Xu, X., Heckman, T., Henry, A., Berg, D. A., Chisholm, J., James, B. L., ; Martin, C. L., Stark, D. P., Hayes, M., [Arellano-Córdova, K. Z.](#) et al. *ApJ*, **948**, 28 **2023** DOI:[10.3847/1538-4357/acbf46](https://doi.org/10.3847/1538-4357/acbf46) (Citations: 4)
- * **CHAOS VII: A Large-Scale Direct Abundance Study in M33**
Rogers N. S. J., Skillman E. D., Pogge R. W., Berg D. A., Croxall K. V., Bartlett J., [Arellano-Córdova, K. Z.](#), Moustakas J., *Accepted in ApJ*. [arXiv:2209.03962](https://arxiv.org/abs/2209.03962) (Citations: 7)
- * **About Metallicity Variations in the Local Galactic Interstellar Medium**
C. Esteban, J. E. Méndez-Delgado, J. García-Rojas, [K. Z. Arellano-Córdova](#) *ApJ*, **931**, 92. **2022**. DOI:[10.3847/1538-4357/ac6b38](https://doi.org/10.3847/1538-4357/ac6b38) (Citations: 12)
- * **The COS Legacy Archive Spectroscopy SurveY (CLASSY) Treasury Atlas**
D. A. Berg, B. L. James, T. King, M. McDonald, J. Chisholm, T. Heckman, C. L. Martin, D. P. Stark. The CLASSY team: A. Aloisi, R. O. Amorín, [K. Z. Arellano-Córdova](#) et al., *ApJS*, **261**, 31, **2022**. DOI:[10.3847/1538-4365/ac6c03](https://doi.org/10.3847/1538-4365/ac6c03) (Citations: 45)
- * **CLASSY II: A technical Overview of the COS Legacy Archive Spectroscopic SurveY**
B. L. James, D. A. Berg, T. King, D. Sahnou. The CLASSY team: J. Chisholm, T. Heckman, C. L. Martin, D. P. Stark, A. Aloisi, R. O. Amorín, [K. Z. Arellano-Córdova](#) et al., *ApJS*, **262**, 37, **2022** DOI:[10.3847/1538-4365/ac8008](https://doi.org/10.3847/1538-4365/ac8008) (Citations: 13)
- * **CLASSY III: The Properties of Starburst-Driven Warm Ionized Outflows**
X., Xu, T., Heckman, A., Henry, D. A. Berg, J. Chisholm, B. L. James,+ ..+ [Arellano-Córdova, K. Z.](#) et al., *Accepted in ApJs*, **2022** DOI:[10.3847/1538-4357/ac6d56](https://doi.org/10.3847/1538-4357/ac6d56) (Citations: 29)
- * **CLASSY IV. Exploring UV Diagnostics of the Interstellar Medium in Local High-z Analogs at the Dawn of the JWST Era**
Mingozi, M., James, B. L., [Arellano-Córdova, K. Z.](#), Berg, D. A., *ApJ*, **939**, 110 **2022** DOI:[10.3847/1538-4357/ac952c](https://doi.org/10.3847/1538-4357/ac952c) (Citations: 23)
- * **Gradients of chemical abundances in the Milky Way from H II regions: distances derived from Gaia EDR3 parallaxes and temperature inhomogeneities**
J. E. Méndez-Delgado, A. Amayo, [K. Z. Arellano-Córdova](#), C. Esteban, J. García-Rojas, G. Delgado-Inglada and L. Carigi. *MNRAS*, **502**, 4436 **2022** DOI:[10.1093/mnras/stab3782](https://doi.org/10.1093/mnras/stab3782) [Open Access, OA] (Citations: 16)
- * **Photoionized Herbig-Haro objects in the Orion Nebula through deep high-spectral resolution spectroscopy II: HH204**
Méndez-Delgado J.E., Henney W.J., Esteban C., García-Rojas J., Mesa-Delgado, A., [Arellano-Córdova, K. Z.](#) *ApJ*, **918**, 27 **2021** DOI:[10.3847/1538-4357/ac0cf5](https://doi.org/10.3847/1538-4357/ac0cf5) [OA] (Citations: 7)

- * **Photoionized Herbig-Haro objects in the Orion Nebula through deep high-spectral resolution spectroscopy I: HH 529 II and III**
Méndez-Delgado J.E., Esteban C., García-Rojas J., Henney, W.J., Mesa-Delgado, A., [Arellano-Córdova, K. Z.](#) *MNRAS*, **502**, 1703 **2021** DOI:[10.1093/mnras/stab068](#) [OA] (Citations: 13)
- * **Helium abundances and its radial gradient from the spectra of HII regions and ring nebulae of the Milky Way**
Méndez-Delgado J.E., Esteban C., García-Rojas J., [Arellano-Córdova, K. Z.](#) and Valerdi, M. *MNRAS*, **496**, 2726, **2020**. DOI:[10.1093/mnras/staa1705](#) [OA] (Citations: 11)
- * **The XMM-Newton/HST view of the obscuring outflow in the Seyfert Galaxy Mrk 335 observed at extremely low X-ray flux**
Longinotti, A. L., Kriss, G., Krongold, Y., [Arellano-Córdova, K.](#), Komossa, S., Gallo, L. and Grupe, D., Mathur, S., Parker, M, and Pradhan, A. and Wilkins, D., *ApJ*, **875**, 150L **2019**. DOI:[10.3847/1538-4357/ab125a](#) [OA] (Citations: 29)
- * **New Quantitative Nitrogen Abundance Estimations in a Sample of Seyfert 2 Active Galactic Nuclei**
Dors Jr. O. L., [Arellano-Córdova, K. Z.](#), Cardaci M. V., Hägele G. F., *MNRAS*, **468**, L113-L117, **2017**. DOI:[10.1093/mnrasl/slx036](#) [OA] (Citations: 31)

Co-author - minor contribution:

- * **Red-giant and main-sequence solar-like oscillators in binary systems revealed by ESA Gaia Data Release 3 – Reconstructing stellar and orbital evolution from binary-star ensemble seismology**
Beck, P. G., Grossmann, D. H., Steinwender, L. ; Schimak, L. S., Muntean, N., Vvard, M., Patton, R. A. ; Merc, J., Mathur, S., Garcia, R. A. ; Pinsonneault, M. H., Rowan, D. M., Gaulme, P., Allende Prieto, C., [Arellano-Córdova, K. Z.](#) et al. *Accepted 2023* ArXiv: [arXiv:2307.10812](#) (Citations: 5)
- * **Everything that glitters is not gold: V1315 Cas is not a dormant black hole**
Zak, J.; Jones, D.; Boffin, H. M. J.; Beck, P. G.; Klencki, J.; Bodensteiner, J.; Shenar, T.; Van Winckel, H.; Skarka, M.; [K. Z. Arellano-Córdova](#); Viuhö, J.; Sowicka, P.; Guenther, E. W.; Hatzes, A. *MNRAS*, **524**, 5749 **2023** DOI:[10.1093/mnras/stad2137](#)
- * **Planet Hunters TESS IV: a massive, compact hierarchical triple star system TIC 47071032**
Eisner, N. L., Johnston, C., Toonen, S. ; Frost, A. J., Janssens, S., Lintott, C. J., Aigrain, S. ; Sana, H., Abdul-Masih, M., [K. Z. Arellano-Córdova](#) et al. *MNRAS*, **511**, 4710, **2022**, DOI:[10.1093/mnras/stab3619](#) (Citations: 12)

Submitted

- * **Evidence for the emergence of dust-free stellar populations at $z > 10$**
Cullen, F., McLeod, D. J., McLure, R. J., Dunlop, J. S., Donnan, C. T., Carnall, A. C., [Arellano-Córdova, K. Z.](#), Bowler, R. A. A., Begley, R., Flury, S. R., Hamadouche, M. L., Stanton, T. M. *Submitted to MNRAS*: Arxiv: [arXiv:2311.06209](#)
- * **CLASSY VIII: Exploring the Source of Ionization with UV ISM diagnostics in local High-z Analogs.**
Mingozzi, Matilde, James, Bethan L., Berg, Danielle, [Arellano-Córdova, K. Z.](#), and the CLASSY team *Under revision to ApJ*: Arxiv: [2023arXiv230615062M](#) (Citations: 1)
- * **Aperture and Resolution Effects on Ultraviolet Star-Forming Properties: Insights from Local Galaxies and Implications for High-Redshift Observations**
Ilyse Clark, Berg Danielle, Claus Leitherer, [Arellano-Córdova, K. Z.](#), Andreas Sander (*Under revision to ApJ*)

Available upon request

- * **CLASSY IX : Chemical Abundance patterns of Ne, S, Cl, and Ar in local Star-Forming Galaxies**
[Arellano-Córdova, K. Z.](#), D. A. Berg , M. Mingozi, B. L. James, and the CLASSY team 2024a.
- * **CLASSY X: Chemical Interpretation of the N/O vs. O/H relation in Star-forming Galaxies Across Cosmic time**
[Arellano-Córdova, K. Z.](#), D. A. Berg , M. Mingozi, B. L. James, and the CLASSY team 2024b.

Proceedings

- 1 **Understanding the chemical evolution of C, O, N, Ne, S, Cl and Ar in the Milky Way using H II regions**
Contributions to the XIV.0 Scientific Meeting (virtual) of the Spanish Astronomical Society, held 13-15 July 2020
[Arellano-Córdova, K. Z.](#), Esteban C., García-Rojas J., and Méndez-Delgado J.E 2020
- 2 **Photoionized Herbig-Haro objects in the Orion Nebula through VLT's deep spectroscopy I: HH529 II-III**
Contributions to the XIV.0 Scientific Meeting (virtual) of the Spanish Astronomical Society
Méndez-Delgado J.E., Henney W.J., Esteban C., García-Rojas J., Mesa-Delgado, A., [Arellano-Córdova, K. Z.](#) 2020
- 3 **The radial abundance gradients of O, Ne, S and Cl of the Milky Way.**
Chemical Abundances in Gaseous Nebulae: open problems in nebular astrophysics
[Arellano-Córdova, K. Z.](#), Esteban C., García-Rojas J. 2019
- 4 **Galactic abundance gradients from deep spectra of H II regions.**
Chemical Abundances in Gaseous Nebulae: open problems in nebular astrophysics
Esteban C., García-Rojas J., [Arellano-Córdova, K. Z.](#), Méndez-Delgado J.E., M. 2019 (Citations: 2)
- 5 **Oxygen abundance gradients in nearby galaxies and the performance of strong-line methods**
XXXth General Assembly of the International Astronomical Union: Radial metallicity gradients in star forming galaxies
[Arellano-Córdova, K. Z.](#), Rodríguez, M. 2018
- 6 **Temperature relations and abundance determinations in H II regions**
Cosmic Feast of the Elements, proceedings of the conference held November, 2017 in Puebla, México. Edited by C. Morisset, G. Delgado-Inglada, and J. García-Rojas.
[Arellano-Córdova, K. Z.](#), Rodríguez, M., Delgado-Inglada, G. 2017
- 7 **Strong-line Methods, Observational Uncertainties, and the Te[N II] - Te[O III] Temperature Relation.**
Chemical Abundances in Ionized Nebulae. Published in BAAA. G. Hägele, M. Cardaci and E. Pérez-Montero eds.
[Arellano-Córdova, K. Z.](#), Rodríguez, M. 2016
- 8 **Temperature Gradients and Chemical Abundances in H II Regions**
Latin American XV Regional IAU Meeting (2016). Short-talk Contribution for the RevMexAA Conference Series.
[Arellano-Córdova, K. Z.](#), Rodríguez, M., Delgado-Inglada, G. 2016

9 **The Oxygen Abundance Gradient in M81**

Massive Star Clusters Near and Far: From the Milky Way to Reionization, 2013 Guillermo Haro Conference, eds. Y. D. Mayya D. Rosa-González & E. Terlevich, INAOE and AMC, mysc.conf, 243. RMxAC, 49, 100

[Arellano-Córdova, K. Z.](#), Rodríguez, M., Mayya, Y. D., Rosa-González, D. **2013**

10 **GTC long-slit spectroscopy of compact stellar clusters in M81**

Fourth Science Meeting with the GTC (Eds. C. Muñoz-Tuñón J. M. Rodríguez-Espinosa) *Revista Mexicana de Astronomía y Astrofísica (Serie de Conferencias)*, 2013, 42, 22

Mayya, Y. D., Rosa-González, D., Santiago-Cortés, M., [Arellano-Córdova, K. Z.](#) **2013** (Citations: 1)