

Viviana Rosero

National Radio Astronomy Observatory
1003 Lopezville Rd
Socorro, NM 87801
U.S.A.

E-mail: vrosero@nrao.edu

Education

- 08.2010–02.2017 PhD in Physics with Dissertation in Astrophysics, Department of Physics, New Mexico Tech, Socorro, NM, USA
Title: “Weak and Compact Radio Emission in Early High-Mass Star Forming Regions”
Adviser: Prof. Peter Hofner
- 08.2008–05.2010 MSc in Science in Applied Physics, Department of Physics and Astronomy, Northern Arizona University, Flagstaff, AZ, USA
- 07.2008 BS in Physics, Universidad Industrial de Santander, Bucaramanga, Colombia

Academic & Work Experience (Selected)

- 10.2021–Present Assistant Scientist, National Radio Astronomy Observatory (NRAO), NM, USA
- 06.2018–09.2021 Research Associate, National Radio Astronomy Observatory (NRAO), NM, USA
- 12.2017–05.2018 Research Associate, University of Virginia, Charlottesville, VA, USA
- 01.2015–02.2017 Grote Reber Doctoral Fellow, NRAO, NM, USA
- 12.2008–05.2010 Research Assistant, Lowell Observatory, Flagstaff, AZ, USA
- 2007 Summer Research Assistant, Space Telescope Science Institute, Baltimore, MD, USA

Talks & Posters (Selected)

- 01.2023 *i*Poster: “The ngVLA Array Configuration”, American Astronomical Society 241th Meeting, Virtual Meeting.
- 01.2022 *i*Poster: “The ngVLA Reference Array Configuration”, American Astronomical Society

239th Meeting, Virtual Meeting.

- 11.2021 *Virtual Talk: “An Overview of the ngVLA and its Performance Capabilities ”, 37th Annual New Mexico Symposium (NRAO), Socorro, NM, USA*
- 09.2021 *Virtual Invited Talk: “The SOMA Radio Survey and the Evolution of Massive Outflows”, Space Science Institute.*
- 09.2021 *Virtual Colloquium Talk: “Radio Continuum Studies of High-Mass Star Formation”, Department of Physics and Astronomy at the University of Texas Rio Grande Valley.*
- 01.2021 *iPoster: “ngVLA Antenna Configuration Reference Design”, American Astronomical Society 237th Meeting, Virtual Meeting.*
- 01.2020 *Poster: “ngVLA Antenna Configuration Options and Performance Estimates”, American Astronomical Society 235th Meeting, Honolulu, HI, USA*
- 04.2019 *Virtual Talk: “The ngVLA Reference Array Configuration”, NRAO Postdoctoral Symposium, Charlottesville, VA, USA*
- 01.2019 *Poster: “The ngVLA Reference Array Configuration”, American Astronomical Society 233rd Meeting, Seattle, WA, USA*
- 07.2018 *Poster: “The Onset of Ionization Feedback in High-Mass Protostars”, Tracing the Flow: Galactic Environments and the Formation of Massive Stars, Windermere, UK*
- 01.2018 *Talk: “The Earliest Stages of High-Mass Star Formation”, Tuesday UVa / NRAO Astronomy (TUNA) Lunch Talk, Charlottesville, VA, USA*
- 11.2017 *Talk: “The Evolution of Outflows from High-Mass Stars”, The 33rd Annual New Mexico Symposium (NRAO), Socorro, NM, USA*
- 03.2016 *Invited Talk: “Weak and Compact Radio Emission in Early High-Mass Star Formation Regions”, ASTROWIN 2016 University of Florida, Gainesville, FL, USA*
- 12.2015 *Colloquium Talk: “Weak and Compact Radio Emission in Early High-Mass Star Formation Regions”, Physics Department at University of Tasmania, Hobart, Australia*
- 11.2015 *Talk: “Weak and Compact Radio Emission in Early High-Mass Star Forming Regions”, Planet and Star Formation Seminar at MPIA, Heidelberg, Germany*
- 09.2015 *Talk: “Ionized Jet Candidates Associated with Young High-Mass Stars”, Small Scale Seminar at Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA*
- 03.2015 *Talk: “Ionized Jet Candidates Associated with Young High-Mass Stars”, The Soul of High-Mass Star Formation Conference, Puerto Varas, Chile*

Technical Experience

- **Operating Systems:** Linux, OS X, Windows
- **Software General:** Python, bash, IDL, R, L^AT_EX, HTML & CSS
- **Astronomy Software:** CASA, CLASS/gildas, IRAF
- **Observational Skills:**

Radio: PI of VLA proposals 13B–210, 18A–294, 19A–216, 21B–229, 22A–125, 22A–226 and 23A–048 and ATCA proposal C3396. Scheduling of VLA observations. Reduction of Jansky VLA observations with CASA of radio continuum and spectral line data using my own Python scripts and incorporating advanced techniques such as self-calibration and wide-band imaging. Observing remotely at the Arecibo Observatory. Observations with the Green Bank Telescope at L-band. Single dish data analysis with CLASS/gildas (Continuum and Line Analysis Single-dish Software)

Millimeter: PI of cycle 3 (2015.1.00369.S) and cycle 5 (2017.1.01542.S) ALMA proposals. Imaging of millimeter continuum and spectral line data using CASA. CARMA duty astronomer: executing observing schedules and telescope monitoring (1 week)

Optical: Observing at McDonald Observatory, Forth Davis, TX (2.1 and 2.7 m telescopes). Observing remotely at NASA Infrared Telescope Facility using CSHELL. Data reduction using IDL and IRAF (photometry and spectroscopy packages). Photometry with DAOPHOT, experience reducing multi-fiber spectra from WIYN Hydra instrument, spectroscopic data reduction using REDSPEC

Advising Experience

- 2023–
present Postdoctoral Fellow **Ryan Boyden** (Space Science Institution/University of Virginia) *SOMA Radio Survey*
- 2023–
present VICO/University of Virginia **Erum Vohra** (undergraduate at University of Virginia) *SOMA Radio Survey*
- 2023–
present RECA **Ana Sofia Marulanda-Duque** (undergraduate at EAFIT, Colombia) *Searching for Evidence of Accretion towards very Massive Stars*
- 2021–
present NRAO NINE Student **Francisco Sequeira-Murillo** (undergraduate at Universidad de Costa Rica, Costa Rica) *Building Extended Spectral Energy Distributions of Intermediate and High-Mass Protostars as part of the SOMA Survey*
- 2021 CASSUM/Chalmers University Summer Student **Bharat Shamsukha** (undergraduate at University of Waterloo, Canada) *Extended Spectral Energy Distributions in a Massive Protobinary System*

2020 NAC/NRAO Summer Student **Azia Robinson** (undergraduate at Agnes Scott College, USA) *Radio Continuum Observations of Five Massive Protostars to Build Extended Spectral Energy Distributions*

Service Experience

12.2022 Reviewer for NASA Postdoctoral Program (NPP) – November Cycle

2019 – Peer reviewer for The Astrophysical Journal and Astronomy and Astrophysics
Present

09.2018 User Support for CASA helpdesk tickets related with simulations using either the simobserve
– Present task or the sm toolkit at NRAO, USA

09.2017 Software support for CASA providing detailed testing, feedback and validation of new
– 2019 CASA tasks at NRAO, USA

Outreach Activities (Selected)

05.2023 Virtual Talk at Institución Educativa Camacho Carreño, Bucaramanga, Colombia discussing my career path as a scientist with high school students.

02.2021 Podcast discussing recent astronomy highlights with Latin-American science students organized by Universidad de Antioquia, Medellín, Colombia.

11.2020 Virtual Talk at Colegio Max Trummer, Barranquilla, Colombia discussing my career path as a scientist with high school students.

08.2020 Virtual Talk at Universidad de Antioquia, Medellín, Colombia for the 'Orígenes' Program, 'Radio Continuum Studies of High-Mass Star Formation.'

Awards & Grants (Selected)

2022 NSF AST proposal 2206437 entitled 'Collaborative Research: Peering to the Heart of Massive Star Birth', (amount: \$274,064 USD)

03.2018 American Astronomical Society International Travel Grant (amount: \$1650.81 USD)

2015 – NRAO Grote Reber Doctoral Fellowship
2017

List of Publications

- 2023 Crowe, S., Fedriani, R., Tan, J. C., et. al., 2023 A&A Submitted: ‘Near-Infrared Observations of Outflows and YSOs in the Massive Star-Forming Region AFGL 5180’
- 2023 Siang-Tan, W., Araya, E. D., Rigg, C., et. al., 2023 ApJS Submitted: ‘Excited Hydroxyl Outflow in the High-Mass Star-Forming Region G34.26+0.15’
- 2023 Sanchez-Tovar, E., Araya, E. D., **Rosero, V.**, E., Hofner, P., Kurtz, S. 2023 ApJS Accepted: ‘Broadband VLA Spectral Line Survey of a Sample of Ionized Jet Candidates’
- 2023 Rodríguez, M. T., Hofner, P., Edelman, I., Araya, E. D., & **Rosero, V.**, 2023, ApJS, 264, 30, ‘Searching for Molecular Jets from High-Mass Protostars
- 2023 Fedriani, E., Tan, J. C., Telkamp, Z., Zhang, Y., et. al., 2023, ApJ, 942, 7, ‘The SOFIA Massive (SOMA) Star Formation Survey. IV. Isolated Protostars’
- 2022 Zhang, Y., Tanaka, K., Tan, J. C., et al., 2022, ApJ, 936, 68, ‘Massive Protostars in a Protocluster – A Multi-Scale ALMA View of G35.20–0.74N’
- 2021 Costa-Silva, A. R., Fedriani, R., Tan, J. C., et al., 2021, A&A 659, A23: ‘NIR jets from a clustered region of massive star formation: Morphology and composition in the IRAS 18264–1152 region’
- 2021 Rodríguez, M. T., Hofner, P., Araya, E. D., Zhang, Q., et al., 2021, ApJ 922, 66: ‘Discovery of a Highly Collimated Flow from the High-Mass Protostar ISOSS J23053+5953 SMM2’
- 2021 Liu, M., Tan, J. C., Marvil, J., Kong, S., **Rosero, V.**, Caselli, P., & Cosentino, G., 2021, ApJ 921, 96: ‘SiO Outflows as Tracers of Massive Star Formation in Infrared Dark Clouds’
- 2020 Liu, M., Tan, J. C., De Buizer, J., Zhang, Y., Moser, E., Beltrán, M., Staff, J., Tanaka, K. E. I., Whitney, B., **Rosero, V.**, Yang, Y-L., & Fedriani, R., 2020, ApJ, 904, 1: ‘The SOFIA Massive (SOMA) Star Formation Survey. III. From Intermediate- to High-Mass Protostars’
- 2020 Tanaka, K. E. I., Zhang, Y., Hirota, T., Sakai, N., Motogi, K., Tomida, K., Tan, J. C., **Rosero, V.**, Higuchi, A. E, Ohashi, S, Liu, M., & Sugiyama, K., 2020, ApJL, 900, 12: ‘Salt, Hot Water, and Silicon Compounds Tracing Massive Twin Disks’
- 2019 Zhang, Y., Tanaka, K., **Rosero, V.**, Tan, J. C., Marvil, J., Cheng, Y., De Buizer, J., Liu, M., et al. 2019, ApJL, 886, 14, ‘Discovery of a Photoionized Bipolar Outflow towards the Massive Protostar G45.47+0.05’
- 2019 **Rosero, V.**, Hofner, P., Kurtz, S., Cesaroni, R., et al., 2019 ApJ, 880, 99: ‘Weak and Compact Radio Emission in Early High-mass Star Forming Regions: II. The Nature of the Radio Sources’
- 2019 Liu, M., Tan, J. C., De Buizer, J., Zhang, Y., Beltrán, M., Staff, J., Tanaka, K., Whitney, B., & **Rosero, V.**, 2019, ApJ, 874, 16: ‘The SOFIA Massive (SOMA) Star Formation Survey.

II. High Luminosity Protostars ’

- 2019 **Rosero, V.**, Tanaka, K., Tan, J. C., Marvil, J., Liu, M., et al., 2019, ApJ, 873, 20: ‘The SOMA Radio Survey I. Comprehensive SEDs of High-mass Protostars from Infrared to Radio and the Emergence of Ionization Feedback’
- 2018 Selina, R., Murphy, E., McKinnon, M., Beasley, A., Butler, B., Carilli, C. et al., 2018, Science with a Next Generation Very Large Array, ASP Conference Series, Vol. 517: ‘The ngVLA Reference Design’
- 2017 Hofner, P., Cesaroni, R., Kurtz, S., **Rosero., V.**, et al., 2017, ApJ, 843, 2: ‘High Resolution Observations of the Massive Protostar in IRAS 18566+0408’
- 2016 **Rosero, V.**, Hofner, P., Claussen, M., Kurtz, S., Cesaroni, R., et al., 2016, ApJS, 227, 25: ‘Weak and Compact Radio Emission in Early High-mass Star Forming Regions: I. VLA Observations’
- 2015 Montes, V., Hofner, P., Anderson, C., & **Rosero, V.**, 2015, ApJS, 219, 41: ‘X-Ray and Radio Observations of the Massive Star–Formation Region IRAS 20126+4104’
- 2014 **Rosero, V.**, Hofner, P., McCoy, M., Kurtz, S., Menten, K. M., et al., 2014, ApJ, 796, 130: ‘Weak and Compact Radio Emission in Early Massive Star Formation Regions: An Ionized Jet Toward G11.11–0.12P1’
- 2013 **Rosero, V.**, Hofner, P., Kurtz, S., Bieging, J., & Araya, E. D., 2013, ApJS, 207, 12: ‘Methyl Cyanide Observations toward Massive Protostars’
- 2012 Roshi, D. A., Plunkett, A., **Rosero, V.** & Vaddi, S., 2012, ApJ, 749, 49: ‘On the Ionization of Luminous WMAP Sources in the Galaxy: Constraints from He Recombination Line Observations with the GBT’
- 2011 **Rosero, V.**, Prato, L., Wasserman, L. H. & Rodgers, B., 2011, AJ, 141, 13: ‘Orbital Solutions for Two Young, Low-mass Spectroscopic Binaries in Ophiuchus’

Scientific/Technical Memos

- 2022 **Rosero, V.**, Carilli, C., Next Generation Very Large Array Memo No. 106, ‘ngVLA Imaging Science Performance Reference Document’
- 2022 Carilli, C., **Rosero, V.**, Carilli, J., Mason, B., Next Generation Very Large Array Memo No. 100, ‘Configuration: Rev E Staggered Spiral Tests’
- 2021 Carilli, C., Mason, B., Butler, B., **Rosero, V.**, Carilli, J., Murphy, E., Next Generation Very Large Array Memo No. 92, ‘Configuration: Reference Design Rev D Description and Alterations’
- 2021 **Rosero, V.**, Next Generation Very Large Array Memo No. 89, ‘Image Fidelity Study of

KSG 3 (NGA8): Imaging Molecular Gas in Nearby Galaxies'

- 2020 **Rosero, V.**, Carilli, J., Carilli, C., Mason, B., Next Generation Very Large Array Memo No. 85, 'Comparison of Alternative Configurations for the ngVLA Plains Subarray'
- 2020 Narayanan, D., Jiménez-Andrade, E., Murphy, E., Li, Q., **Rosero, V.**, Next Generation Very Large Array Memo No. 83, 'Imaging Cold Gas in High-Redshift Galaxies with the ngVLA'
- 2020 Carilli, C., Erickson, A., Murphy, E., Mason, B., **Rosero, V.**, Butler, B., Next Generation Very Large Array Memo No. 82, 'Configuration: Reference Design RevC.01 Description and Alterations'
- 2020 Carilli, C., Murphy, E., **Rosero, V.** et al., Next Generation Very Large Array Memo No. 78, 'High Resolution, Wide Field, Narrow Band, Snapshot Imaging'
- 2020 **Rosero, V.**, Next Generation Very Large Array Memo No. 76, 'Subarray Selection for the Reference Observing Program'
- 2019 **Rosero, V.**, Next Generation Very Large Array Memo No. 72, 'A Study of ngVLA Subarray Efficiency: Plains + Fractions of the Core'
- 2019 **Rosero, V.**, Next Generation Very Large Array Memo No. 65, 'Sculpting of the Synthesized Beam and Image Fidelity Study of KSG 1: Imaging of Protoplanetary Disks'
- 2019 **Rosero, V.**, Next Generation Very Large Array Memo No. 55, 'Taperability Study for the ngVLA and Performance Estimates'

September 29, 2023