BAYRON PORTILLA REVELO

Department of Astronomy and Astrophysics
The Pennsylvania State University
525 Davey Laboratory, University Park, PA 16802
State College, United States of America
bmp5924@psu.edu
bayronportilla.github.io

Employment

(2024-present) Postdoctoral scholar, The Pennsylvania State University

(2019 - 2023) PhD in Astronomy *(Promovendus)*, University of Groningen, the Netherlands

Education

2023 PhD in Astronomy *(Promovendus)*, University of Groningen, the Netherlands
Advisor: Prof. Dr. Inga Kamp
Co-advisor: Prof. Dr. Ewine van Dishoeck
Thesis: Closing the gap between theory and observations of planet-forming disks with radiative transfer models

2019 MSc, Physics, Universidad de Antioquia, Colombia
Advisor: Prof. Dr. Jorge Iván Zuluaga Callejas.
Research project: The dynamics of S-type planets during the early phases of stellar evolution.

2015 Hon. B.S., Astronomy, University of Antioquia, Colombia
Advisor: Prof. Dr. Pablo Andrés Cuartas Restrepo.
Research project: Dynamical evolution due to bodily tides in multiple planetary systems.

Research interests

Protoplanetary and circumplanetary disks; planet and moon formation; radiative transfer simulations; hydrodynamical simulations; N-body simulations; secular and resonant perturbations; tides and spin-orbit coupling; astrostatistics and machine learning methods for astrophysics; data reduction techniques for sub-mm, infrared and X-ray observations.

Referred publications

First author:

1. XUE: Thermochemical Modeling Suggests a Compact and Gas-Depleted Structure for a Distant, Irradiated Protoplanetary Disk (2025). **B. Portilla-Revelo.**, K. Getman., M. C. Ramírez-Tannus, et al., The Astrophysical Journal, Volume 985, Issue 1, id.72, 14 pp.

2. Constraining the gas distribution in the PDS 70 disk as a method to assess the effect of planet-disk interactions (2023). **B. Portilla-Revelo.**, I. Kamp., S. Facchini., et al., Astronomy and Astrophysics, Volume 677, id.A76,16 pp.

3. Self-consistent modelling of the dust component in protoplanetary and circumplanetary disks: the case of PDS 70 (2022). **B. Portilla-Revelo.**, I. Kamp., Ch. Rab., et al., Astronomy and Astrophysics, Volume 658, id.A89,13 pp.

4. Revisiting the dynamics of planets in binaries: evolutionary time-scales and the effect of early stellar evolution (2019). **B. Portilla-Revelo.,** and J. Zuluaga., Monthly Notices of the Royal Astronomical Society, Vol. 485, Issue 1, Pages 522-540

Additional publications:

5. Radial variations in nitrogen, carbon, and hydrogen fractionation in the PDS 70 planet-hosting disk (2025). L. Rampinelli, et al. (incl. **B. Portilla-Revelo.**), Accepted to Astronomy & Astrophysics.

6. ALMA high-resolution observations unveil planet formation shaping molecular emission in the PDS 70 disk (2024). L. Rampinelli, et al. (incl. **B. Portilla-Revelo.**), Astronomy & Astrophysics, Volume 689, id.A65, 24 pp.

7. MINDS: JWST/NIRCam imaging of the protoplanetary disk PDS 70 (2024). V. Christiaens, et al. (incl. **B. Portilla-Revelo.**), Astronomy & Astrophysics, Volume 685, id.L1, 18 pp.

8. Mapping the Vertical Gas Structure of the Planet-hosting PDS 70 Disk (2024). C. J. Law, et al. (incl. **B. Portilla-Revelo.**), The Astrophysical Journal, Volume 964, Issue 2, id.190, 17 pp.

9. Spin-orbit evolution of GJ 667C system: the effect of composition and other planets' perturbations (2016). P.A. Cuartas-Restrepo, et al., (incl. **B. Portilla-Revelo.**), Monthly Notices of the Royal Astronomical Society, Vol. 463, Issue 2, Pages 1592-1604.

Works in Preparation:

10. MINDS: Determining the C/O ratio in the terrestrial-planet forming zone of the PDS 70 disk. **B. Portilla-Revelo**, I. Kamp, et al.

11. On the multiplicity of CO ice-lines in Circumplanetary Disks. **B. Portilla-Revelo**, I. Kamp., et al.

Grants

- 2025. FAS Research and Academic Exchange Program. Harvard University.
- 2022 & 2023: Leids Kerkhoven-Bosscha Fonds - LKBF. University of Groningen.

Observing Proposals

- James Webb Space Telescope

    1. Co-I: A pocket of last resistance: characterizing the evaporating globule near a massive O-star binary (PI: A. Bik, GO 8185)

Honors and Awards

- 2017-2018: COLCIENCIAS young researcher fellow
- 2016-2017: Teaching assistantship for master students, University of Antioquia
- 2016: Otto de Greiff National Contest. First place in the natural science category
- 2016: 100% Tuition waiver to participate in the Dunlap Summer School-Introduction to Astronomical Instrumentation. University of Toronto.
- 2015: Dean's award to the bachelor thesis, University of Antioquia

Presentations (* invited)

- *May-2025: Protoplanetary Disk Group at the CfA talk, Harvard University. *"Protoplanetary Disks in ExtreIrradiation Environments: A JWST View of the NGC 6357 Star-Forming Region"*
- *Apr-2025: PSF coffee talk, Max-Planck-Institut für Astronomie, Heidelberg. *"Protoplanetary Disks in Extreme Irradiation Environments: A JWST View of the NGC 6357 Star-Forming Region".*
- Jan-2024: Center for Exoplanets and Habitable Worlds Seminar, Department of Astronomy and Astrophysics, The Pennsylvania State University. *"Closing the gap between theory and observations of planet-forming disks with radiative transfer models".*
- *Jun-2023: Institute seminar, Instituto de Astronomía y Ciencias Planetarias, Universidad de Atacama. *"Closing the gap between theory and observations of planet forming regions with thermo-chemical models".*
- *May-2023: PSF coffee talk, Max-Planck-Institut für Astronomie, Heidelberg, Germany. *"Closing the gap between theory and observations of planet forming regions with thermo-chemical models".*
- Feb-2023: Dutch Exomoon and Circumplanetary Disk Meeting, Groningen, The Netherlands. *"On the multiplicity of CO icelines in circumplanetary disks"*
- Nov-2022: Disk and Planets across ESO Facilities, ESO headquarters in Garching, Germany. *"Closing the gap between theory and observations of planet forming regions with thermo-chemical models"*
- Feb-2022: Kapteyn Astronomical Institute, ISM group seminar. *"Modelling the continuum and line emission from the PDS 70 disk"*
- Nov-2021: NOVA Network II meeting, Leiden Observatory. *"Self-consistent modelling of the dust component in protoplanetary and circumplanetary disks: the case of PDS 70"*
- *Aug-2021: Universidad de Antioquia, Programa Orígenes. *"Modelos de transferencia radiativa en regiones de formación planetaria: el caso de PDS 70"*

Training and Complementary Education

- (Oct-2024) ALMA Data Processing Workshop. University of Victoria, Victoria, Canada.
- (Jun-2024) Summer School in Statistics for Astronomers. The Pennsylvania State University, State College, USA.

- (Mar-2024) Cycle 11 ALMA Proposal Preparation Workshop. Carnegie Mellon University, Pittsburgh, USA.
- (Mar-2023) Astronomical Data Science with Python - Netherlands eScience Center workshop. Dwingeloo, the Netherlands.
- (Oct-2022) ALMA Science Archive School. Italian ARC node headquarters.
- (Sep-2022) JWST data reduction workshop. Leiden University.
- (Sep-2022) Ninth European Radio Interferometry School - ERIS 2022. Netherlands Institute for Radio Astronomy & Joint Institute for VLBI.
- (Aug-2022) International Advanced Study Institute Summer School in Celestial Mechanics Theory and Applications (CELTA) - From Stardust to Extrasolar Planets: Dynamics of Exoplanetary and Solar System Bodies. UHI Inverness and Sabhal Mor Ostaig Isle of Skye.
- (Aug-2020) IMPRS Summer School-Planet Formation in Protoplanetary Disks. University of Heidelberg.
- (Aug-2016) Dunlap Institute Summer School-Introduction to Astronomical Instrumentation. University of Toronto.
- (May-2014) Observing trip to Pico dos Dias observatory, Brasil.

Teaching experience

- (2020-2023) Teaching assistant: Interstellar Medium - Tutorial. University of Groningen.
- (2018-2019) Teaching assistant: Computational Methods in Physics - Lecture. Universidad de Antioquia.
- (2017-2018) Teaching assistant: Celestial Mechanics - Lecture. Universidad de Antioquia.
- (2016-2017) Teaching assistant: Celestial Mechanics - Tutorial. Universidad de Antioquia.
- (2015-2017) Teaching assistant: Fundamentals of Science - Tutorial. Universidad de Antioquia.

In the Media

- Penn State News: Unveiling the secrets of planet formation in environments of high UV radiation

Technical skills

- **Programming Languages:** Python, R, C, Bash, Mathematica
- **Specialised software:** MCMax3D, ProDiMo, RADMC-3D, SAOImageDS9, RADEX, TOPCAT, Fargo3D
- **Data reduction software and numerical libraries:** CASA, Astropy, Pandas, Numpy, scikit-learn