

# Pavel E. Mancera Piña

## Curriculum Vitae

Leiden Observatory

2333 CA, Leiden, NL

✉ [pavel@strw.leidenuniv.nl](mailto:pavel@strw.leidenuniv.nl)

 [orcid.org/0000-0001-5175-939X](https://orcid.org/0000-0001-5175-939X)

Hello, I am Pavel, an astrophysicist interested in galaxy formation and evolution. I am fascinated by the complexity and yet universality of the laws of physics that shape galaxies, and I am committed to the challenging task of understanding them. In particular, I am interested in how are the fundamental parameters of galaxies connected to each other, what are the main physical mechanisms regulating galaxy evolution, and how is the link between the baryonic component of galaxies and their host dark matter haloes.

Currently, I hold a Fellowship at Leiden Observatory studying galaxy evolution through cosmic time and the nature of dark matter.

### Postdoctoral experience

2022 → 2023 Postdoctoral position at Leiden Observatory in the group of Marisk Kriek.

2023 → NWO-Veni Fellow at Leiden Observatory.

### Education

2022 **PhD in Astrophysics (cum laude)**, Kapteyn Astronomical Institute, University of Groningen, the Netherlands, Thesis: *Dark matter and angular momentum in nearby disc galaxies* | Advisors: Filippo Fraternali, Tom Oosterloo, and Elizabeth Adams.

2018 **MSc in Astronomy**, Kapteyn Astronomical Institute, University of Groningen, the Netherlands, Thesis: *The evolution of ultra-diffuse galaxies in nearby galaxy clusters* | Advisor: Reynier Peletier.

2016 **BSc in Physics**, School of Physics, University of Veracruz, Mexico, Thesis: *The globular cluster NGC 6229 seen from its variable stars* | Advisor: Armando Arellano Ferro.

### Publications as first author

ADS library with my [publications as first author](#). ORCID profile  [here](#)

2022 **Mancera Piña, P. E.**, Fraternali, F., Oosterloo, T., et al. MNRAS, 514, 3329, *The impact of gas disc flaring on rotation curve decomposition and revisiting baryonic and dark matter relations for nearby galaxies*.

2022 **Mancera Piña, P. E.**, Fraternali, F., Oosterloo, T., et al. MNRAS, 512, 3230, *No need for dark matter: resolved kinematics of the ultra-diffuse galaxy AGC 114905*.

2021 **Mancera Piña, P. E.**, Posti, L., Pezzulli, G., et al. 2021, A&A, 651, L15, *A tight angular-momentum plane for disc galaxies*.

2021 **Mancera Piña, P. E.**, Posti, L., Fraternali, F., Adams, E. A. K., Oosterloo, T., 2021, A&A, 647, 76, *The baryonic specific angular momentum of disc galaxies*.

2020 **Mancera Piña, P. E.**, Fraternali, F., Oman, K., et al. 2020, MNRAS, 495, 3636, *Robust HI kinematics of gas-rich ultra-diffuse galaxies: hints of a weak-feedback formation scenario*.

2019 **Mancera Piña, P. E.**, Fraternali, F., Adams, E. A. K., et al. 2019, ApJL, 883, L33, *Off the Baryonic Tully-Fisher Relation: A Population of Baryon-dominated Ultra-diffuse Galaxies*.

2019 **Mancera Piña, P. E.**, Aguerri, J.A.L., Peletier, R.F., Venhola, A., Trager, S., Choque Challapa, N., MNRAS, 2019, 485, 1036, *The evolution of ultra-diffuse galaxies in nearby galaxy clusters from the Kapteyn IAC WEAVE INT Clusters Survey*.

- 2018 **Mancera Piña, P. E.**, Peletier, R. F., Aguerri, J.A.L., Venhola, A., Trager, S., Choque Challapa, N., 2018, MNRAS, 481, 4381, *Reviewing the frequency and central depletion of ultra-diffuse galaxies in galaxy clusters from the KIWICS survey.*

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## Publications as co-author

Twelve publications (two second-author). ADS library with my [publications as co-author](#).

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## Fellowships and Awards

- 2023 **VENI Fellowship**, *BY NWO, THE DUTCH RESEARCH COUNCIL.*  
3-year Fellowship to carry out an independent research program.
- 2023 **IAC Early-Career Visitor Fellowship**, *BY THE INSTITUTO ASTROFÍSICO DE CANARIAS, IAC.*  
Fellowship for 2-months visit to the IAC.
- 2022 **Van Swinderen PhD Thesis Prizes**, *BY THE ROYAL SOCIETY FOR NATURAL SCIENCES.*  
Awards (one public and one from the jury) given by the KNG (Koninklijk Natuurkundig Genootschap) to the best cum laude PhD thesis in the faculties of Science and Engineering and Medical Sciences at the University of Groningen
- 2018-2022 **NOVA Fellowship**, *BY THE NETHERLANDS RESEARCH SCHOOL FOR ASTRONOMY (NOVA) AND THE NETHERLANDS INSTITUTE FOR RADIO ASTRONOMY (ASTRON).*  
Fully-funded PhD program.
- 2019 **Mexican National Award for the best MSc thesis in Astronomy**, *BY THE NATIONAL CONGRESS OF ASTRONOMY AND THE NATIONAL CONGRESS OF PHYSICS OF MEXICO.*  
Award given to the best MSc thesis in the field of Astronomy in Mexico/by a Mexican. I won the contest of the period 2017-2018, for my thesis "The evolution of ultra-diffuse galaxies in nearby galaxy clusters".
- 2017 **Mexican National Award for the best BSc thesis in Astronomy**, *BY THE NATIONAL CONGRESS OF ASTRONOMY AND THE NATIONAL CONGRESS OF PHYSICS OF MEXICO.*  
Award given to the best BSc thesis in the field of Astronomy in Mexico/by a Mexican. I won the contest of the period 2015-2016, for my thesis "The globular cluster NGC 6229 seen from its variable stars".
- 2016 **Holland Scholarship**, *BY THE DUTCH MINISTRY OF EDUCATION, CULTURE AND SCIENCE.*  
Scholarship given to outstanding international students who will do a Master's degree in the Netherlands.
- 2016-2018 **NOVA MSc Fellowship**, *BY NOVA.*  
Fellowship given to excellent international students to pursue a degree in Astronomy in the Netherlands.
- 2016-2018 **Conacyt Scholarship**, *BY CONACYT, THE MEXICAN NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY.*  
Scholarship to study my Master's degree at the University of Groningen.
- 2015 **Scholarship "Verano de la Investigación Científica"**, *BY THE MEXICAN ACADEMY OF SCIENCES.*  
Scholarship to spend eight weeks during the summer, doing research at the National Observatory of San Pedro Mártir.
- 2015 **Award to the Academic Performance**, *BY THE UNIVERSITY OF VERACRUZ.*  
Award given to outstanding students due to remarkable participation in congresses or conferences.
- 2014 **Scholarship "Movilidad Universitaria"**, *BY THE UNIVERSITY OF VERACRUZ.*  
An Erasmus-like Scholarship to spend one year at the National University of Mexico.

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## Invited talks

- 2024 **IAU GA session 'Neutral hydrogen in and around galaxies in the SKA era'**, Cape Town, South Africa.
- 2023 **Sexten Conference 'The Sunrise of Ultra-diffuse Galaxies'**, Sesto, Italy.

- 2022 **Colloquium**, *Leiden Observatory*.
- 2022 **Colloquium**, *Astronomisches Rechen-Institut (ARI) Heidelberg University*.
- 2022 **Colloquium**, *University of California Riverside*.
- 2022 **Colloquium**, *Netherlands Institute for Radio Astronomy (ASTRON)*.
- 2022 **Colloquium**, *Instituto de Astrofísica de Canarias (IAC)*.
- 2021 **Lunch talk**, *Cosmic DAWN Center*.
- 2021 **Colloquium**, *University of Oxford*.
- 2021 **Colloquium**, *University College London*.
- 2021 **Colloquium**, *University of Surrey*.
- 2021 **Colloquium**, *Observatoire Astronomique de Strasbourg*.
- 2021 **Lunch talk**, *INAF-Arcetri Astrophysical Observatory*.
- 2021 **Lunch talk**, *ASTRON*.
- 2020 **Colloquium**, *Institute of Astrophysics of Andalusia*.
- 2020 **Lunch talk**, *Astronomy Department of the University of Durham*.
- 2020 **Lunch talk**, *van Swinderen Institute of Particle Physics and Gravity*.
- 2019 **Lunch talk**, *Kapteyn Astronomical Institute*.
- 2019 **Colloquium**, *Faculty of Physics, University of Veracruz, Mexico*.
- 2019 **Colloquium**, *Institute of Astronomy of UNAM*.

## Contributed talks

- 2023 **PHISCC 2023 - HI surveys in full swing**, Cape Town, South Africa.
- 2022 **A holistic view of stellar feedback and galaxy evolution**, Ascona, Switzerland.
- 2022 **Netherlands Astronomers Conference (NAC)**, Duinse Polders, Belgium.
- 2021 **Royal Astronomical Society National Astronomy Meeting, Session Modelling the radio sky in the SKA pathfinder era**, Bath (virtual), UK.
- 2021 **Royal Astronomical Society National Astronomy Meeting, Session The unexplored low-surface-brightness Universe**, Bath (virtual), UK.
- 2020 **European Astronomical Society Annual Meeting, SS19: Crossing the characteristic mass scales in galaxy evolution**, Leiden (virtual), the Netherlands.
- 2020 **European Astronomical Society Annual Meeting, S6: Stellar & gas kinematics in galaxies across cosmic time, connecting observations with theory**, Leiden (virtual), the Netherlands.
- 2019 **KIAA Forum on Gas in Galaxies: Multiple-phase Interstellar medium**, Beijing, China.
- 2019 **MIAPP Workshop: Nine billion years of neutral gas evolution**, Garching, Germany.
- 2019 **IAU meeting: The Realm of the LSB Universe**, Tenerife, Spain.
- 2019 **Workshop on low surface brightness (LSB) galaxies**, Groningen, the Netherlands.
- 2018 **The bewildering nature of Ultra-Diffuse Galaxies**, Leiden, the Netherlands.
- 2017 **Meeting of the Fornax Deep Survey**, Groningen, the Netherlands.
- 2015 **IV National Meeting of Astronomy Students**, Tonantzintla, Mexico.
- 2015 **XIV Meeting of the RedPop**, Medellin, Colombia.
- 2014 **XXIX National Meeting of Science Popularization**, Mazatlan, Mexico.
- 2014 **LVII National Congress of Physics**, Mazatlan, Mexico.
- 2013 **XIII Meeting of the RedPop**, Zacatecas, Mexico.
- 2013 **XXVIII National Meeting of Science Popularization**, San Luis Potosi, Mexico.
- 2012 **XXVII National Meeting of Science Popularization**, Morelia, Mexico.

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## Posters in Conferences

- 2019 **Feedback and its role in galaxy formation**, Spetses, Greece.
- 2018 **LXXIII Netherlands Astronomers Conference (NAC)**, Groningen, the Netherlands.
- 2016 **XIII Physics Meeting in Xalapa**, Xalapa, Mexico.
- 2013 **LVI National Congress of Physics**, San Luis Potosi, Mexico.
- 2012 **LV National Congress of Physics**, Morelia, Mexico.

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## Summer Schools, workshops, and internships (longer than one month)

- 2023 **IAC Early-Career Visitor Program**, *INSTITUTO ASTROFISICO DE CANARIAS, IAC*, Tenerife, Spain.
- 2021 **International Summer School on the Interstellar Medium of Galaxies, from the Epoch of Reionization to the Milky Way**, (*virtual*).
- 2019 **ASTERICS-OBELICS Python School for astrophysics**, *Annecy*, France.
- 2018 **NOVA Fall School**, *ASTRON*, Dwingeloo, the Netherlands.
- 2018 **School “The current and future observing facilities: a guided tour”**, *ASTRONOMICAL OBSERVATORY OF BELGRADE*, Belgrade, Serbia.
- 2017 **Research internship**, *INSTITUTO ASTROFISICO DE CANARIAS, IAC*, Tenerife, Spain.
- 2016 **Workshop in Radioastronomy Basics**, *NATIONAL INSTITUTE OF ASTROPHYSICS, OPTICS AND ELECTRONICS, INAOE*, Tonantzintla, Mexico.
- 2015 **Research internship**, *NATIONAL OBSERVATORY OF SAN PEDRO MÁRTIR*, Ensenada, Mexico.
- 2015 **“Summer School in the Observatory”**, *INSTITUTE OF ASTRONOMY, NATIONAL UNIVERSITY OF MEXICO (UNAM)*, Ensenada, México.
- 2014 **Research internship**, *INSTITUTE OF ASTRONOMY, UNAM*, Mexico City, Mexico.

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## Observing proposals and observing experience

I have been PI in observing proposals using different instruments in different optical and radio telescopes. In the optical: Isaac Newton Telescope (INT, 2.5-M), Gran Telescopio Canarias (GTC, 10.4-M). In radio: VLA, MeerKAT, and the GMRT (co-I). I also have on-site observing experience using BIG optical telescopes.

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## Teaching

I have been the teaching assistant for the following courses.

- 2020,2021 **Physics of Stars**, University of Groningen, Professor: Eline Tolstoy.
- 2021 **Observational Astronomy**, University of Groningen, Professor: Reynier Peletier.
- 2019 **Evolving Universe**, University of Groningen, Professor: Marc Verheijen.
- 2018 **Introduction to Astronomy**, University of Groningen, Professor: Rien van de Weygaert.
- 2017 **Computer-Aided Problem-Solving**, University of Groningen, Professor: Roel Luppens.

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## Student supervision

I have co-supervised the following students in their research projects.

- 2023 Nikki Geesink, **MSc thesis: The angular momentum-mass relation of molecular gas in nearby galaxies**, *Leiden University*.
- 2022 Rosa de Graaff, **BSc thesis: A kinematical study of Malin 1 from its HI emission**, *University of Groningen*, co-supervised with F. Fraternali and M. Verheijen.

- 2021 Stijn Groeneveld, **BSc thesis: Comparing the surface density of ionised and molecular gas in low-redshift galaxies: A step towards mass modelling at higher redshifts**, *University of Groningen*, co-supervised with F. Fraternali.
- 2020 Ben Danzer, **BSc thesis: Kinematic modelling of high redshift galaxies in 3D**, *University of Groningen*, co-supervised with F. Fraternali.
- 2020 Nikki Potze, **BSc thesis: Modelling the dark matter halos of galaxies at  $z \sim 1$  through rotation curve decomposition**, *University of Groningen*, co-supervised with F. Fraternali.
- 2020 Dennis Koopmans, **BSc thesis: Towards an automated way of deriving kinematics of galaxies**, *University of Groningen*, co-supervised with F. Fraternali.

## Software, technical and computing skills

I have significant experience coding in Python (numpy, scipy, astropy, matplotlib, emcee, and spectral-cube are the libraries I use the most). I also know how to use different software for data visualisation such as DS9 and kvis. I am also a regular user of GALPYNAMICS (software to build disc and halo potentials), <sup>3D</sup>BAROLO (software to build 3D kinematic models of emission-line data cubes) and GIPSY (software to perform all kind of operations and tasks related to HI data cubes). I am familiar with robust statistical fitting tools such as MCMC routines and the HyperFit package. I also have a good knowledge of L<sup>A</sup>T<sub>E</sub>X.

## Languages

Spanish (native), English (fluent), Italian (intermediate), French (basic), Dutch (basic)

## Services

I have refereed papers for the Astrophysical Journal (ApJ), Monthly Notices of the Royal Astronomical Society (MNRAS), Nature, Nature Astronomy (NatAs), Astronomy & Astrophysics (A&A) and Astrophysics and Space Science. I have served as a committee member for a PhD defence at the University of Groningen. Within my institutes, I have been part of different committees that organise talks by internal and external speakers, and I have helped with the organisation of NAC, the Dutch Astronomical Conference. I have significant experience in outreach, having been part of different outreach groups during the last 10 years.

## References

- **Prof. Filippo Fraternali** *University of Groningen, fraternali@astro.rug.nl*
- **Prof. Tom Oosterloo** *Netherlands Institute for Radio Astronomy, oosterloo@astron.nl*
- **Prof. James Binney** *University of Oxford, james.binney@physics.ox.ac.uk*
- **Dr. Elizabeth Adams** *Netherlands Institute for Radio Astronomy, adams@astron.nl*