

LUKAS NEUMANN

European Southern Observatory
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EDUCATION

PhD in Astrophysics , Bonn University, Advisor: Frank Bigiel	11/2021 — 05/2025
Thesis: Dense gas and star formation from the Milky Way to nearby galaxies	Grade: Summa cum laude
Master in Astrophysics , Bonn University, Advisor: Frank Bigiel	04/2019 — 09/2021
Thesis: Dense molecular gas, molecular cloud properties and star formation efficiencies across local spiral galaxies	Grade: 1.5
Master in Physics , Bielefeld University, Advisor: Markus Meinert	04/2017 — 12/2018
Thesis: Influence of the device geometry on spin-orbit torque experiments	Grade: 1.0
Bachelor in Physics , Bielefeld University, Advisor: Markus Meinert	10/2013 — 01/2017
Thesis: Strominduziertes Schalten einer senkrecht magnetisierten Schicht durch den Spin-Hall-Effekt	Grade: 2.0
ERASMUS exchange student at Lund University, Sweden (Winter Semester 2016/17)	

COLLABORATIONS

PHANGS , Physics at High Angular Resolution in Nearby Galaxies	10/2020 — today
LEGO , Line Emission as a tool for Galaxy Observations	10/2021 — today
SFB 1601 , Habits of massive stars across cosmic time	10/2023 — today

EMPLOYMENT

ESO postdoctoral fellow , European Southern Observatory, Garching bei München, Germany	12/2024 — 11/2027
PhD researcher , Argelander-Institute for Astronomy, Bonn University	11/2021 — 11/2024
Research assistant , Center for Spinelectronic Materials and Devices, Bielefeld University	11/2018 — 02/2019

PUBLICATION STATISTICS (FULL LIST ATTACHED AT THE END)

Peer-reviewed papers: **28** total, **596** citations (4 as 1st author + 3 as 1st/2nd author outside of astronomy; ADS library)

MENTORING EXPERIENCE

Tamsyn O’Beirne , PhD Student, European Southern Observatory (ESO)	05/2025 — 02/2027
Lennart Böhm , PhD Student, European Southern Observatory (ESO)	01/2025 — 10/2027
Lorenz Hauer , ESO summer research programme, European Southern Observatory (ESO)	07/2025 — 08/2025
Minou Greve , Master thesis project, Bonn University	08/2024 — 07/2025
Sabrina Stelter , Master thesis project, Bonn University	04/2024 — 04/2025
Niklas Schüler , Master thesis project, Bonn University	03/2024 — 03/2025
Minou Greve , Internship, Bonn University	05/2024 — 06/2025
Selina Ortner , Bachelor thesis project, Bonn University	10/2023 — 01/2024
Patrick Lenz , Bachelor thesis project, Bonn University	06/2023 — 10/2023
Wajdee Chayeb , Internship, Bonn University	04/2023 — 05/2023
Lars van Engelshoven , Bachelor thesis project, Bonn University	10/2022 — 02/2023
Malena Held , Bachelor thesis project, Bonn University	09/2022 — 01/2023
Marius Schuchmann , Bachelor thesis project, Bonn University	06/2022 — 10/2022
Michéle Steinrötter , Bachelor thesis project, Bonn University	04/2022 — 08/2022

TEACHING EXPERIENCE

Lecturer , ESO summer research programme, Lecture on molecular lines, ESO	07/2025
Teaching assistant , Einführung in die Astronomie, Bachelor Course, Bonn University	10/2023 — 03/2024
Teaching assistant , Einführung in die Astronomie, Bachelor Course, Bonn University	10/2022 — 03/2023
Teaching assistant , Physics of the Interstellar Medium, Master Course, Bonn University	04/2022 — 09/2022
Teaching assistant , Theoretical Astrophysics, Master Course, Bonn University	10/2021 — 03/2022
Teaching assistant , Proseminar Präsentationstechnik, Bachelor Course, Bonn University	04/2021 — 09/2021
Teaching assistant , Einführung in die Astronomie, Bachelor Course, Bonn University	10/2020 — 03/2021
Teaching assistant , Einf. in die extragalakt. Astronomie, Bachelor Course, Bonn University	04/2020 — 09/2020

Teaching assistant , Einführung in die Physik 4, Bachelor Course, Bielefeld University	04/2018 — 10/2018
Teaching assistant , Physik für Nicht-Physiker, Bachelor Course, Bielefeld University	10/2017 — 03/2018
Teaching assistant , Einführung in die Physik 2, Bachelor Course, Bielefeld University	04/2017 — 09/2017

COLLOQUIUM & SEMINAR TALKS

PhD Defence , Argelander Institute for Astronomy, Bonn University Germany	05/2025
Scheduled talk , Galaxy Evolution Coffee, European Southern Observatory (ESO), Garching, Germany	01/2025
Scheduled talk , Wine & Cheese Seminar, European Southern Observatory (ESO), Garching, Germany	01/2025
Invited talk , Seminar talk, University of Cologne, Cologne, Germany	07/2024
Invited talk , OGHRES conference, Max Planck Institute for Radio Astronomy (MPIfR), Bonn, Germany	06/2024
Invited talk , Radio seminar, Harvard-Smith. Center for Astrophysics (CfA), Cambridge, USA (<i>virtually</i>)	12/2023
Scheduled talk , ARI Institute Colloquium, Astronomisches Recheninstitut (ARI), Heidelberg, Germany	11/2023
Scheduled talk , MPE coffee, Max Planck Institute for Extraterrestrial Physics (MPE), Garching, Germany	11/2023
Scheduled talk , Galaxy Evolution Coffee, European Southern Observatory (ESO), Garching, Germany	11/2023
Scheduled talk , Lunch talk, European Southern Observatory (ESO), Garching, Germany	11/2023
Scheduled talk , Lunch talk, Leiden Observatory, Leiden, Netherlands	10/2023
Scheduled talk , GC Coffee, Max Planck Institute for Astronomy (MPIA), Heidelberg, Germany	10/2023
Scheduled talk , PSF Coffee, Max Planck Institute for Astronomy (MPIA), Heidelberg, Germany	10/2023
Invited talk , Lunch talk, Lund Observatory, Lund, Sweden (<i>virtually</i>)	04/2023
Talk , IMPRS Conference, Max Planck Institute for Radio Astronomy (MPIfR), Bonn, Germany	04/2023
Invited talk , Seminar talk, University of Cologne, Cologne, Germany	03/2023
Poster prize talk , From Stars to Galaxies II, Chalmers University, Gothenburg, Sweden	06/2022

CONFERENCES & WORKSHOPS

Stellar Origins 2025 , Poster, Vienna, Austria	09/2025
Galactic ecosystems under the microscope , Contributed talk, ESO, Garching, Germany	07/2025
Star Formation, Stellar Feedback, and the Ecology of Galaxies , Poster, Visegrad, Hungary	05/2025
PHANGS team meeting 2025 , Talk, Nice, France	02/2025
OGHRES conference , Talk, MPIfR, Bonn, Germany	06/2024
PHANGS team meeting 2024 , Talk, ESO, Garching, Germany	02/2024
SFB 1601 retreat , Kloster Steinfeld, Kall, Germany	02/2024
IMPRS Bonn/Cologne retreat , Ringberg, Germany	01/2024
IMPRS Bonn/Cologne retreat , Oostende, Belgium	09/2023
IMPRS Heidelberg summer school , Unraveling Galaxy Evolution with JWST, Heidelberg, Germany	09/2023
IMPRS Bonn/Cologne blackboard lecture on turbulence , MPIfR, Bonn, Germany	07/2023
PHANGS team meeting 2023 , Talk, Pasadena, USA	02/2023
11th IRAM interferometry school , Workshop on millimetre astronomy, Grenoble, France	11/2022
IMPRS Bonn/Cologne retreat , Cochem, Germany	11/2022
From Stars to Galaxies II , Poster & poster prize, Chalmers University, Gothenburg, Sweden	06/2022
Multi-line Diagnostics of the Interstellar Medium , Poster, Nice, France	04/2022
10th IRAM 30m school , Workshop on millimetre astronomy, Granada, Spain (<i>virtually</i>)	11/2021
ISM 2021 , Beirut, Structure, characteristic scales, and star formation (<i>virtually</i>)	05/2021
DPG Spring Meeting of the Condensed Matter Section , TU Berlin, Berlin, Germany	03/2018

GRANTS & AWARDS

Poster prize , From Stars to Galaxies II, Chalmers University, Gothenburg, Sweden	06/2022
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OUTREACH EXPERIENCE

ESO Highschool Project , Organiser	04/2025
ESO Supernova Visitor Centre , Presenter (planetarium) and tour guide (exhibition)	02/2025 — today
Astroclub Bonn , Organiser & Website	10/2020 — 11/2024
Public Talk , Astroclub Bonn, “How to produce beautiful RGB images of galaxies”	10/2024
AlfA Highschool Project , Project Andromeda, Assistant	03/2024
Public Talk , Astroclub Bonn, “Finding Longitude”	12/2023
Public Talk , Bonner Sternhimmel, “Sternentstehung in Spiralgalaxien”	11/2023
Outreach Event , Universe on tour (national exhibition) with ALMA telescope model, Bonn, Germany	08/2023
Public Talk , AoT Bonn, “JWST - wie man Schweizer Käse und Fleischbällchen in anderen Galaxien findet”	04/2023
Public Talk , Astroclub Bonn, “Die Venus-Transite des 18. Jahrhunderts”	11/2021

ACADEMIC LEADERSHIP

Galaxy Evolution Coffee Organiser, ESO, Garching	09/2025 — today
Social Day Organiser, ESO, Garching	09/2025
Wine & Cheese Seminar Organiser, ESO, Garching	02/2025 — today
Working Group Lead, PHANGS Array (ALMA) data reduction technical working group	11/2024 — today
SOC Member, Galactic ecosystems under the microscope, Garching, Germany	07/2025
Colloquium Organiser, PHANGS collaboration colloquium organisation team	10/2022 — today
LOC member, IMPRS Bonn/Cologne retreat, Oostende, Belgium	09/2023

OVSERVING PROGRAMS

PI accepted:

ALMA, 2025, cycle 12 (2025.1.01648.S)	(33 hr/12 + 25 hr/7m + 44 hr/TP)
ALMA, 2024, cycle 11 (2024.1.01512.S)	15 hr/12 + 0 hr/7m + 42 hr/TP
APEX, 2024 (M9511A-104)	(not observed)

co-I accepted:

ALMA, 2025, cycle 12 (2025.1.01566.S)	(89 hr/7m + 147 hr/TP)
ALMA, 2025, cycle 12 (2025.1.01491.S)	(6 hr/12 + 35 hr/7m + 4 hr/TP)
ALMA, 2025, cycle 12 (2025.1.01449.S)	(21 hr/12 + 68 hr/7m + 115 hr/TP)
ALMA, 2025, cycle 12 (2025.1.01358.S)	(14 hr/12)
ALMA, 2025, cycle 12 (2025.1.00961.S)	(6 hr/12 + 108 hr/7m)
ALMA, 2025, cycle 12 (2025.1.00914.S)	(24 hr/12 + 63 hr/7m + 108 hr/TP)
NOEMA, 2025, summer (S25BM)	18 hr
ALMA, 2024, cycle 11 (2024.1.01667.S)	15 hr/12m
ALMA, 2024, cycle 11 (2024.1.00844.S)	5 hr/12m + 4 hr/7m + 11 hr/TP
ALMA, 2024, cycle 11 (2024.1.00835.S)	28 hr/12m + 38 hr/7m + 46 hr/TP
NOEMA, 2024, summer (S24BE)	5 hr
ALMA, 2023, cycle 10 (2023.1.01493.S)	59 hr/7m
ALMA, 2023, cycle 10 (2023.1.00884.S)	9 hr/12 + 70 hr/7m + 149 hr/TP
ALMA, 2022, cycle 9 (2022.1.01654.S)	17 hr/12m + 8 hr/7m + 22 hr/TP
ALMA, 2022, cycle 9 (2022.1.01479.S)	12 hr/12m + 59 hr/7m + 130 hr/TP
ALMA, 2021, cycle 8 (2021.1.00740.S)	24 hr/12m + 51 hr/7m + 109 hr/TP

TECHNICAL SKILLS

Programming, Python (very good), GitHub (good), C/C++ (fair), HTML (fair), R (fair)
Software, Carta (very good), SAOImageDS9 (good), CASA (good), GILDAS (fair), GIMP (fair)

PEER-REVIEWED PUBLICATIONS

Summary: **28** peer-reviewed papers, **596** citations (see ADS library)

First- and second-author publications

1. **Neumann**, Jiménez-Donaire, Leroy et al., “Dense gas scaling relations at kiloparsec scales across nearby galaxies with the ALMA ALMOND and IRAM 30 m EMPIRE surveys”, A&A, 693, L13 (2025)
2. **Neumann**, Bigiel, Barnes, et al., “A 260 pc resolution ALMA map of HCN(1-0) in the galaxy NGC 4321”, A&A, 691, A121 (2024)
3. **Neumann**, den Brok, Bigiel et al., “Spectral stacking of radio-interferometric data”, A&A, 675, A104 (2023)
4. **Neumann**, Gallagher, Bigiel et al., “The ALMOND survey: molecular cloud properties and gas density tracers across 25 nearby spiral galaxies with ALMA”, MNRAS, 521, 3348 (2023)

First- and second-author publications outside of astronomy

1. Fritz, **Neumann**, and Meinert, “Ultralow Switching-Current Density in All-Amorphous W-Hf/Co-Fe-B/TaO_x Films”, PhRvP, 14, 034047 (2020)
2. **Neumann** and Meinert, “Influence of the Hall-bar geometry on harmonic Hall voltage measurements of spin-orbit torques”, AIPA, 8, 095320 (2018)
3. **Neumann**, Meier, Schmalhorst et al., “Temperature dependence of the spin Hall angle and switching current in the nc-W(O)/CoFeB/MgO system with perpendicular magnetic anisotropy”, ApPhL, 109, 142405 (2016)

Co-authored publications

1. Meidt, Glover, Klessen et al. **(incl. Neumann)**, “Reconciling extragalactic star formation efficiencies with theory: Insights from PHANGS”, *A&A*, 700, A123 (2025)
2. Galić, Thorp, Bigiel et al. **(incl. Neumann)**, “Surveying the Whirlpool at Arcseconds with NOEMA (SWAN): III. $^{13}\text{CO}/\text{C}^{18}\text{O}$ ratio variations across the M51 galaxy”, arXiv, arXiv:2508.15901 (2025)
3. Ramambason, Chevance, Kim et al. **(incl. Neumann)**, “Duration and properties of the embedded phase of star formation in 37 nearby galaxies from PHANGS-JWST”, arXiv, arXiv:2507.01508 (2025)
4. Stuber, Schinnerer, Usero et al. **(incl. Neumann)**, “The SWAN view of dense gas in the Whirlpool – A cloud-scale comparison of N_2H^+ , HCO^+ , HNC and HCN emission in M51”, arXiv, arXiv:2507.19439 (2025)
5. Romanelli, Chevance, Kruijssen et al. **(incl. Neumann)**, “The impact of spiral arms on the star formation life cycle”, *A&A*, 698, A296 (2025)
6. Chown, Leroy, Sandstrom et al. **(incl. Neumann)**, “Polycyclic Aromatic Hydrocarbon and $\text{CO}(2-1)$ Emission at 50–150 pc Scales in 70 Nearby Galaxies”, *ApJ*, 983, 64 (2025)
7. Laudage, Eibensteiner, Bigiel et al. **(incl. Neumann)**, “Neutral atomic and molecular gas dynamics in the nearby spiral galaxies NGC 1512, NGC 4535, and NGC 7496”, *A&A*, 690, A169 (2024)
8. Bešlić, Barnes, Bigiel et al. **(incl. Neumann)**, “The properties and kinematics of HCN emission across the closest starburst galaxy NGC 253 observed with ALMA”, *A&A*, 689, A122 (2024)
9. Williams, Lee, Larson et al. **(incl. Neumann)**, “PHANGS-JWST: Data Processing Pipeline and First Full Public Data Release”, *ApJS*, 273, 13 (2024)
10. Querejeta, Leroy, Meidt et al. **(incl. Neumann)**, “Do spiral arms enhance star formation efficiency?”, *A&A*, 687, A293 (2024)
11. Stuber, Pety, Schinnerer et al. **(incl. Neumann)**, “Surveying the Whirlpool at Arcseconds with NOEMA (SWAN)- I. Mapping the HCN and N_2H^+ 3mm lines”, *A&A*, 680, L20 (2023)
12. Zakardjian, Pety, Herrera et al. **(incl. Neumann)**, “The impact of H II regions on giant molecular cloud properties in nearby galaxies sampled by PHANGS ALMA and MUSE”, *A&A*, 678, A171 (2023)
13. Belfiore, Leroy, Williams et al. **(incl. Neumann)**, “Calibrating mid-infrared emission as a tracer of obscured star formation on H II-region scales in the era of JWST”, *A&A*, 678, A129 (2023)
14. Panessa, Seifried, Walch et al. **(incl. Neumann)**, “The evolution of HCO^+ in molecular clouds using a novel chemical post-processing algorithm”, *MNRAS*, 523, 6138 (2023)
15. Jiménez-Donaire, Usero, Bešlić et al. **(incl. Neumann)**, “A constant $\text{N}_2\text{H}^+(1-0)$ -to- $\text{HCN}(1-0)$ ratio on kiloparsec scales”, *A&A*, 676, L11 (2023)
16. Teng, Sandstrom, Sun et al. **(incl. Neumann)**, “The Physical Drivers and Observational Tracers of CO -to- H_2 Conversion Factor Variations in Nearby Barred Galaxy Centers”, *ApJ*, 950, 119 (2023)
17. Sun, Leroy, Ostriker et al. **(incl. Neumann)**, “Star Formation Laws and Efficiencies across 80 Nearby Galaxies”, *ApJL*, 945, L19 (2023)
18. Barnes, Watkins, Meidt et al. **(incl. Neumann)**, “PHANGS-JWST First Results: Multiwavelength View of Feedback-driven Bubbles (the Phantom Voids) across NGC 628”, *ApJL*, 944, L22 (2023)
19. Belfiore, Leroy, Sun et al., “Calibration of hybrid resolved star formation rate recipes based on PHANGS-MUSE $\text{H}\alpha$ and $\text{H}\beta$ maps”, *A&A*, 670, A67 (2023)
20. den Brok, Bigiel, Sliwa et al. **(incl. Neumann)**, “A CO isotopologue Line Atlas within the Whirlpool galaxy Survey (CLAWS)”, *A&A*, 662, A89 (2022)
21. den Brok, Chatzigiannakis, Bigiel et al. **(incl. Neumann)**, “New constraints on the $^{12}\text{CO}(2-1)/(1-0)$ line ratio across nearby disc galaxies”, *MNRAS*, 504, 3221 (2021)