

GABI WENZEL

Research Scientist · Laboratory Astrophysicist
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EDUCATION

University of Toulouse PhD in Laboratory Astrophysics	Jun 2017 – Jul 2020 Toulouse, France
University of Münster Master of Science in Physics	Oct 2014 – Mar 2017 Münster, Germany
University of Münster Bachelor of Science in Physics	Oct 2010 – Sep 2014 Münster, Germany

EXPERIENCE

Massachusetts Institute of Technology <i>Research Scientist, Laboratory Astrochemistry</i> Our recent discovery of PAHs in space demands a thorough follow-up in the laboratory. Most functionalized PAH spectra are unknown and are the focus of my work at MIT. I continue to supervise graduate students while tailoring my own research profile.	Dec 2024 – Present Cambridge, MA
Center for Astrophysics Harvard & Smithsonian <i>SAO Visiting Scientist Fellowship</i> The origin and fate of PAHs at low temperatures are not well understood, and our recent detections of such species in a dark molecular cloud challenge our understanding of PAH chemistry and physics in the interstellar medium . During this SAO Visiting Scientist Fellowship in the McCarthy Group , I investigate potential formation and destruction pathways of cosmic PAHs.	Oct 2024 – Present Cambridge, MA
Massachusetts Institute of Technology <i>(Senior) Postdoctoral Associate, Laboratory Astrochemistry</i> Designing, constructing, and leveraging a cavity-enhanced and chirped-pulse Fourier Transform microwave spectrometer to study molecular systems of astrochemical interest while leading the rotational spectroscopy efforts in the McGuire Group , including supervision of graduate students in the laboratory and beyond.	Oct 2022 – Nov 2024 Cambridge, MA
Center for Interstellar Catalysis (InterCat), Aarhus University <i>Postdoctoral Research Fellow, Laboratory Astrophysics</i> The research concentrated on the experimental investigation of catalytic effects of astrophysical relevant (functionalized) PAHs and the potential formation of the molecular building blocks of life on different cosmic dust grain surface analogues. Main responsibilities included laboratory work, data analysis, dissemination of research results, and the supervision of Bachelor, Master, and PhD students in the astrophysics / astrochemistry laboratory.	Oct 2020 – Sep 2022 Aarhus C, Denmark
Institut de Recherche en Astrophysique et Planétologie (IRAP) <i>Marie Skłodowska-Curie Early Stage Researcher (ESR)</i> Conducted research and received training in the interdisciplinary field of laboratory astrophysics within the MSCA ITN EUROPAH under the supervision of Dr. Christine Joblin. This included collaborations with theoretician Dr. Aude Simon (LCPQ) and extended stays at research facilities in the Netherlands, working together with Dr. Sandra Brünken at the FELIX Laboratory , and in Italy, collaborating with Dr. Giacomo Mulas at INAF, Cagliari .	Jun 2017 – Jul 2020 Toulouse, France
Hidden Analytical Ltd. <i>Advanced Systems Analyst</i> Carried out an internship and gained experience on quadrupole mass spectrometers. Extended surface analysis skills by performing a project combining temperature programmed desorption (TPD) and secondary ion mass spectrometry (SIMS) experiments on differently coated silicon samples.	Mar 2019 – May 2019 Warrington, United Kingdom
Institute(s) of (Theoretical) Physics, University of Münster <i>Student Assistant</i> Teaching undergraduate students. Details see ‘Teaching Experience’.	Nov 2013 – Mar 2017 Münster, Germany
Technologieförderung Münster GmbH <i>Reception Administrative Assistant</i>	Feb 2013 – Dec 2014 Münster, Germany

Main responsibilities included customer service, tenant support as well as preparation and follow-up processing of business events.

OTHER RESEARCH EXPERIENCE

Green Bank Telescope (GBO), WV, USA Mar 2024 – present
Active observer in the GOTHAM collaboration using the 100 m Green Bank Telescope to study aromatic molecules in TMC-1 and trace early-stage star formation chemistry.

LISA@FELIX Laboratory, Nijmegen, The Netherlands May 2022, Sep 2022, Aug 2023
Led IR beamtime to study PAH:ice chemistry at the LISA end-station with FTIR spectroscopy on ASW, CO, and methanol ices.

ELISA, Aarhus, Denmark Mar 2022 – Jun 2022
Led ion storage ring experiments using visible photodissociation spectroscopy to study photostability trends of oxygen-functionalized PAHs.

ASTRID-2 Synchrotron, Aarhus, Denmark Feb 2021
Performed XPS on oxygen-irradiated C₆₀ on HOPG; observed enhanced chemistry under repeated annealing and exposure.

CALMIP HPC Center, Toulouse, France Dec 2019
Ran DFT calculations of PAHs with Turbomole and Octopus; obtained theoretical IR spectra and photoabsorption cross sections.

SOLEIL Synchrotron, France Sep 2017, Jul 2019
Used VUV action spectroscopy to study fragmentation and ionization of large PAHs in a linear ion trap.

FELion@FELIX Laboratory, Nijmegen, The Netherlands Aug 2017, Jun 2019 – Jul 2019
Modified cryogenic ion trap setup; measured IR action spectra of PAH fragments tagged with Ne using FELIX.

DESIREE, Stockholm, Sweden Nov 2018
Studied radiative cooling of anthracene and phenanthrene cations in an electrostatic storage ring.

FLASH, DESY, Hamburg, Germany Aug 2015
Participated in XUV-FEL desorption experiments of astrophysical ices; used TOF-MS to analyze desorption dynamics.

TEACHING EXPERIENCE

Co-Organizer of the Star and Planet Formation Course Apr 2022 – Oct 2022
Mentoring a group of PhD and master level students following the star and planet formation lecture given online by Dr. Melissa McClure at Leiden University. Supervised discussion rounds, seminars, short presentations, and essays.

Tutor for the Undergraduate Modules Physics I – III Mar 2015 – Mar 2017
Marking of first to second year physics students' exercises and giving class explanations of the solutions. These modules covered mechanics, thermodynamics, electromagnetism, analytical mechanics, electrodynamics, optics, special relativity.

Undergraduate Laboratory and General Physics for Scientists Tutor Nov 2013 – Feb 2015
General demonstrating duties assisting undergraduate medical students in their first year performing experimental exercises in the physics laboratory. Responsibilities also included the marking of laboratory reports, students' exercises, and discussions of the solutions during the courses.

AWARDS & GRANTS

Women in Chemistry+ Travel Grant	MIT, Cambridge, MA, 2025
Infinite Expansion Award	MIT, Cambridge, MA, 2024
Best Talk Award	PAHRTEA Meeting Nijmegen, 2019
LASERLAB-EUROPE Grant	2-month stay at FELIX Laboratory, 2019
IAU Travel Grant	IAU S350 Laboratory Astrophysics, 2019
PCMI Travel Grant	Société Française d'Exobiologie, 2018
WE-Heraeus Travel Grant	DPG (German Physical Society) Spring Meeting, 2017
DPG (German Physical Society) A-Levels Award	Arndt High School, Krefeld, 2010

PUBLICATIONS

[20] Slumstrup, L.; Thrower, J. D.; Schrauwen, J. G. M.; Lamberts, T.; Ingman, E. R.; Laurinavicius, D.; DeVine, J.; Terwisscha van Scheltinga, J.; Santos, J. C.; Noble, J. A.; **Wenzel, G.**; McCoustra, M. R. S.; Brown, W. A.; Linnartz, H.; Hornekær, L.; Cuppen, H. M.; Redlich, B.; Ioppolo, S. IR-Induced CO Photodesorption from Pure CO Ice and CO on Amorphous Solid Water. *ACS Earth and Space Chemistry*, 2025, 9, 6, 1607–1621.

- [19] Toru Shay, H.; Scolati, H. N.; **Wenzel, G.**; Lee, K. L. K.; Marimuthu, A. N.; McGuire, B. A. Exploring Effects of Modified Machine Learning Pipelines of Astrochemical Inventories. *The Astrophysical Journal* 2025, 985 (1), 123.
- [18] **Wenzel, G.**; Gong, S.; Xue, C.; Changala, P. B.; Holdren, M. S.; Speak, T. H.; Stewart, D. A.; Fried, Z. T. P.; Willis, R. H. J.; Bergin, E. A.; Burkhardt, A. M.; Byrne, A. N.; Charnley, S. B.; Lipnicky, A.; Loomis, R. A.; Shingledecker, C. N.; Cooke, I. R.; McCarthy, M. C.; Remijan, A. J.; Wendlandt, A. E.; McGuire, B. A. Discovery of the Seven-Ring Polycyclic Aromatic Hydrocarbon Cyanocoronene ($C_{24}H_{11}CN$) in GOTHAM Observations of TMC-1. *The Astrophysical Journal Letters* 2025, 984 (1), L36.
- [17] **Wenzel, G.**; Holdren, M. S.; Stewart, D. A.; Toru Shay, H.; Byrne, A. N.; Xue, C.; McGuire, B. A. Laboratory Rotational Spectra of Cyanocyclohexane and Its Siblings (1- and 4-Cyanocyclohexene) Using a Compact CP-FTMW Spectrometer for Interstellar Detection. *Journal of Physical Chemistry A* 2025, 129 (18), 3986–4001.
- [16] **Wenzel, G.**; Jiménez-Redondo, M.; Ončák, M.; McGuire, B. A.; Brünken, S.; Caselli, P.; Jusko, P. Infrared Spectroscopy of Pentagon-Containing PAHs: Indenyl and Fluorenyl Anions and Indenyl Cation. *Journal of Physical Chemistry Letters* 2025, 16 (16), 3938–3944.
- [15] Remijan, A. J.; Changala, P. B.; Xue, C.; Yuan, E. Q. H.; Duffy, M.; Scolati, H. N.; Shingledecker, C. N.; Speak, T. H.; Cooke, I. R.; Loomis, R.; Burkhardt, A. M.; Fried, Z. T. P.; **Wenzel, G.**; Lipnicky, A.; McCarthy, M. C.; McGuire, B. A. The Missing Link of Sulfur Chemistry in TMC-1: The Detection of $c\text{-}C_3H_2S$ from the GOTHAM Survey. *The Astrophysical Journal* 2025, 982 (2), 191.
- [14] **Wenzel, G.**; Speak, T. H.; Changala, P. B.; Willis, R. H. J.; Burkhardt, A. M.; Zhang, S.; Bergin, E. A.; Byrne, A. N.; Charnley, S. B.; Fried, Z. T. P.; Gupta, H.; Herbst, E.; Holdren, M. S.; Lipnicky, A.; Loomis, R. A.; Shingledecker, C. N.; Xue, C.; Remijan, A. J.; Wendlandt, A. E.; McCarthy, M. C.; Cooke, I. R.; McGuire, B. A. Detections of Interstellar Aromatic Nitriles 2-Cyanopyrene and 4-Cyanopyrene in TMC-1. *Nature Astronomy* 2025, 9 (2), 262–270.
- [13] Remijan, A. J.; Fried, Z. T. P.; Cooke, I. R.; **Wenzel, G.**; Loomis, R.; Shingledecker, C. N.; Lipnicky, A.; Xue, C.; McCarthy, M. C.; McGuire, B. A. High Spectral Resolution Observations of Propynal (HCCCHO) toward TMC-1 from the GOTHAM Large Program on the GBT. *The Astrophysical Journal* 2024, 976 (1), 105.
- [12] **Wenzel, G.**; Cooke, I. R.; Changala, P. B.; Bergin, E. A.; Zhang, S.; Burkhardt, A. M.; Byrne, A. N.; Charnley, S. B.; Cordiner, M. A.; Duffy, M.; Fried, Z. T. P.; Gupta, H.; Holdren, M. S.; Lipnicky, A.; Loomis, R. A.; Shay, H. T.; Shingledecker, C. N.; Siebert, M. A.; Stewart, D. A.; Willis, R. H. J.; Xue, C.; Remijan, A. J.; Wendlandt, A. E.; McCarthy, M. C.; McGuire, B. A. Detection of Interstellar 1-Cyanopyrene: A Four-Ring Polycyclic Aromatic Hydrocarbon. *Science* 2024, 386 (6723), 810–813.
- [11] Fried, Z. T. P.; El-Abd, S. J.; Hays, B. M.; **Wenzel, G.**; Byrne, A. N.; Margulès, L.; Motiyenko, R. A.; Shipman, S. T.; Horne, M. P.; Jørgensen, J. K.; Brogan, C. L.; Hunter, T. R.; Remijan, A. J.; Lipnicky, A.; Loomis, R. A.; McGuire, B. A. Rotational Spectrum and First Interstellar Detection of 2-Methoxyethanol Using ALMA Observations of NGC 6334I. *The Astrophysical Journal Letters* 2024, 965 (2), L23.
- [10] Rasmussen, A. P.; **Wenzel, G.**; Hornekær, L.; Andersen, L. H. Gas-Phase Electronic Action Absorption Spectra of Protonated Oxygen-Functionalized Polycyclic Aromatic Hydrocarbons (OPAHs). *Astronomy & Astrophysics* 2023, 674, A103.
- [9] **Wenzel, G.**; Simon, A.; Banhatti, S.; Jusko, P.; Schlemmer, S.; Brünken, S.; Joblin, C. Infrared Spectroscopy of the Benzylium-like (and Tropylium-like) Isomers Formed in the $-H$ Dissociative Ionization of Methylated PAHs. *Journal of Molecular Spectroscopy* 2022, 385, 111620.
- [8] Banhatti, S.; Rap, D. B.; Simon, A.; **Wenzel, G.**; Leboucher, H.; Joblin, C.; Redlich, B.; Schlemmer, S.; Brünken, S. Formation of the Acenaphthylene Cation as a Common C_2H_2 -Loss Fragment in Dissociative Ionization of the PAH Isomers Anthracene and Phenanthrene. *Physical Chemistry Chemical Physics* 2022, 24, 27343–27354.
- [7] **Wenzel, G.**; Joblin, C.; Giuliani, A.; Castillo, S. R.; Mulas, G.; Ji, M.; Sabbah, H.; Quiroga, S.; Peña, D.; Nahon, L. Astrochemical Relevance of VUV Ionization of Large PAH Cations. *Astronomy & Astrophysics* 2020, 641, A98.
- [6] Joblin, C.; **Wenzel, G.**; Castillo, S. R.; Simon, A.; Sabbah, H.; Bonnamy, A.; Toubanc, D.; Mulas, G.; Ji, M.; Giuliani, A.; Nahon, L. Photo-Processing of Astro-PAHs. *Journal of Physics: Conference Series* 2020, 1412, 062002.
- [5] Bernard, J.; Ji, M. C.; Martin, S.; **Wenzel, G.**; Al-Mogeeth, A.; Stockett, M. H.; Schmidt, H. T.; Zettergren, H.; Joblin, C. Radiative Cooling Dynamics of Anthracene Cations Stored in DESIREE Studied via the Time Evolution of 2-Photon-Absorption Induced Dissociation Rate. *Journal of Physics: Conference Series* 2020, 1412, 232013.
- [4] **Wenzel, G.**; Castillo, S. R.; Mulas, G.; Ji, M.-C.; Bonnamy, A.; Sabbah, H.; Giuliani, A.; Nahon, L.; Joblin, C. Photoprocessing of Large PAH Cations. *Proceedings of the International Astronomical Union* 2019, 15 (S350), 388–389.
- [3] Kleimeier, N. F.; **Wenzel, G.**; Urban, A. J.; Tchalala, M. R.; Oughaddou, H.; Dedkov, Y.; Voloshina, E.; Zacharias, H. Unoccupied Electronic Band Structure of Pentagonal Si Nanoribbons on Ag(110). *Physical Chemistry Chemical Physics* 2019, 21 (32), 17811–17820.

[2] Jusko, P.; Simon, A.; **Wenzel, G.**; Brünken, S.; Schlemmer, S.; Joblin, C. Identification of the Fragment of the 1-Methylpyrene Cation by Mid-IR Spectroscopy. Chemical Physics Letters 2018, 698, 206–210.

[1] Espeter, P.; Keutner, C.; Roese, P.; Shamout, K.; Berges, U.; **Wenzel, G.**; Bignardi, L.; Kleimeier, N. F.; Zacharias, H.; Westphal, C. Facing the Interaction of Adsorbed Silicon Nano-Ribbons on Silver. Nanotechnology 2017, 28 (45), 455701.

INVITED TALKS & SEMINARS

Committee on Space Research (COSPAR) Meeting
Virtual International Microwave Seminar
Press Briefing at the 246th Meeting of the American Astronomical Society
3rd COST NanoSpace Joint Scientific Meeting
Atomic and Molecular Physics Seminar, CFA
InterCat Seminar, Aarhus University
Green Bank Telescope (GBT) Webinar
Öberg & Andrews Seminar, CFA
Annual German LabAstro Meeting
CFA Seminar, Center for Astrophysics | Harvard & Smithsonian
CFEL Molecular and Ultrafast Science Seminars, DESY
Colloquium at the Istituto Nazionale di Astrofisica (INAF)

Florence, Italy, Aug 2026
Hamburg, Germany, Jul 2025
Anchorage, AL, USA, Jun 2025
Kaunas, Lithuania, May 2025
Cambridge, MA, USA, Mar 2025
Aarhus, Denmark, Mar 2025
Green Bank, WV, USA, Dec 2024
Cambridge, MA, USA, Nov 2024
Tegernsee, Germany, Sep 2024
Cambridge, MA, USA, Mar 2024
Hamburg, Germany, Jan 2023
Cagliari, Italy, Dec 2018

CONFERENCE CONTRIBUTIONS

International Symposium on Molecular Spectroscopy (ISMS) (2 Talks)
American Astronomical Society, 246th Meeting (Talk)
International Symposium on Molecular Spectroscopy (ISMS) (2 Talks)
IAU S383: Astrochemistry VIII (Poster)
International Symposium on Molecular Spectroscopy (ISMS) (Talk)
Life Cycle of Cosmic PAHs Symposium (Talk & Poster)
739th WE-Heraeus-Seminar (Talk)
PAHRTEA Meeting (Talk)
Physics and Chemistry of the Interstellar Medium (Poster)
IAU S350: Laboratory Astrophysics Symposium (Poster)
EPoLM-4 Conference (Talk)
PCMI National Program Symposium (Poster)
Cosmic Dust Symposium (Poster)
DPG Spring Meeting of the Condensed Matter Section (Talk)

Champaign, IL, USA, Jun 2025
Anchorage, AK, USA, Jun 2025
Champaign, IL, USA, Jun 2024
Traverse City, MI, USA, Jul 2023
Champaign, IL, USA, Jun 2023
Aarhus, Denmark, Sep 2022
Bad Honnef, Germany, Feb 2022
Nijmegen, The Netherlands, Sep 2019
Avignon, France, Sep 2019
Cambridge, UK, Apr 2019
Madrid, Spain, Mar 2019
Marseille, France, Jun 2018
Copenhagen, Denmark, Jun 2018
Dresden, Germany, Mar 2017

RESEARCH & TECHNICAL SKILLS

Vacuum systems: Ultra-high vacuum (UHV) and high vacuum (HV) equipment use and maintenance
Surface science techniques: AES, LEED, UPS, XPS, IPE, SIMS, STM, TPD, FTIR/RAIRS
Mass spectrometry: Gas-phase ion trap and storage experiments; FT-ICR MS, quadrupole MS (QMS)
Rotational spectroscopy: CP-FTMW, cavity-enhanced FTMW spectroscopy
Photon sources: Use of free electron lasers and synchrotron radiation facilities
Programming and software: Python, LaTeX, C++
Quantum chemistry software: Psi4, Orca, Turbomole, Octopus
Data acquisition and control: LabVIEW, C++/QtCreator
Languages: German (mother tongue), English (fluent, C2), French (advanced, B1/B2), Danish (beginner, A2)

EXTRACURRICULAR ACTIVITIES

Postdoc Representative – Department of Physics & Astronomy
Early Stage Researcher Representative
Active Member of UniverSciEl
Second PhD Student Representative

Aarhus University, 2021 – 2022
EUROPAH Network, 2018 – 2021
Science outreach for children, 2017 – 2020
IRAP Toulouse, 2017 – 2019

REFEREES

Supervisor (MIT)
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