

# GABI WENZEL

Research Scientist · Laboratory Astrophysicist  
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## EDUCATION

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

## EXPERIENCE

<b>Massachusetts Institute of Technology</b> <i>Research Scientist, Laboratory Astrochemistry</i> Our recent <b>discovery of PAHs in space</b> 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, USA
<b>Center for Astrophysics   Harvard &amp; Smithsonian</b> <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 <b>PAH chemistry and physics in the interstellar medium</b> . During this SAO Visiting Scientist Fellowship in the <a href="#">McCarthy Group</a> , I investigate potential formation and destruction pathways of cosmic PAHs.	Oct 2024 – Present Cambridge, MA, USA
<b>Massachusetts Institute of Technology</b> <i>(Senior) Postdoctoral Associate, Laboratory Astrochemistry</i> Designing, constructing, and leveraging a <b>cavity-enhanced and chirped-pulse Fourier Transform microwave spectrometer</b> to study molecular systems of astrochemical interest while leading the rotational spectroscopy efforts in the <a href="#">McGuire Group</a> , including supervision of graduate students in the laboratory and beyond.	Oct 2022 – Nov 2024 Cambridge, MA, USA
<b>Center for Interstellar Catalysis (<a href="#">InterCat</a>), Aarhus University</b> <i>Postdoctoral Research Fellow, Laboratory Astrophysics</i> The research concentrated on the experimental investigation of <b>catalytic effects of astrophysical relevant (functionalized) PAHs</b> 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
<b>Institut de Recherche en Astrophysique et Planétologie (<a href="#">IRAP</a>)</b> <i>Marie Skłodowska-Curie Early Stage Researcher (ESR)</i> Conducted research and received training in the <b>interdisciplinary field of laboratory astrophysics</b> within the <a href="#">MSCA ITN EUROPAH</a> under the supervision of Dr. Christine Joblin. This included collaborations with theoretician Dr. Aude Simon ( <a href="#">LCPQ</a> ) and extended stays at research facilities in the Netherlands, working together with Dr. Sandra Brünken at the <a href="#">FELIX Laboratory</a> , and in Italy, collaborating with Dr. Giacomo Mulas at <a href="#">INAF, Cagliari</a> .	Jun 2017 – Jul 2020 Toulouse, France
<b>Hidden Analytical Ltd.</b> <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 ( <a href="#">TPD</a> ) and secondary ion mass spectrometry ( <a href="#">SIMS</a> ) experiments on differently coated silicon samples.	Mar 2019 – May 2019 Warrington, United Kingdom
<b>Institute(s) of (Theoretical) Physics, University of Münster</b> <i>Student Assistant</i> Teaching undergraduate students. Details see ‘Teaching Experience’.	Nov 2013 – Mar 2017 Münster, Germany
<b>Technologieförderung Münster GmbH</b> <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

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*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 C<sub>60</sub> 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

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*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

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

## PUBLICATIONS

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[21] Slumstrup, L.; Thrower, J. D.; Hopkinson, A. T.; **Wenzel, G.**; Jaganathan, R.; Schrauwen, J. G. M.; Redlich, B.; Ioppolo, S.; Hornekær, L. CO Desorption from Interstellar Icy Grains Induced by IR Excitation of Superhydrogenated PAHs. *arXiv* July 10, 2025.

- [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

<b>Committee on Space Research (COSPAR) Meeting</b>	Florence, Italy, Aug 2026
<b>Exploring the Aromatic Universe in the JWST Era</b>	London, Canada, Jul 2026
<b>Virtual International Microwave Seminar</b>	Hamburg, Germany, Jul 2025
<b>Press Briefing at the 246<sup>th</sup> Meeting of the American Astronomical Society</b>	Anchorage, AL, USA, Jun 2025
<b>3<sup>rd</sup> COST NanoSpace Joint Scientific Meeting</b>	Kaunas, Lithuania, May 2025
<b>Atomic and Molecular Physics Seminar, CfA</b>	Cambridge, MA, USA, Mar 2025
<b>InterCat Seminar, Aarhus University</b>	Aarhus, Denmark, Mar 2025
<b>Green Bank Telescope (GBT) Webinar</b>	Green Bank, WV, USA, Dec 2024
<b>Öberg &amp; Andrews Seminar, CfA</b>	Cambridge, MA, USA, Nov 2024
<b>Annual German LabAstro Meeting</b>	Tegernsee, Germany, Sep 2024
<b>CfA Seminar, Center for Astrophysics   Harvard &amp; Smithsonian</b>	Cambridge, MA, USA, Mar 2024
<b>CFEL Molecular and Ultrafast Science Seminars, DESY</b>	Hamburg, Germany, Jan 2023
<b>Colloquium at the Istituto Nazionale di Astrofisica (INAF)</b>	Cagliari, Italy, Dec 2018

## CONFERENCE CONTRIBUTIONS

<b>International Symposium on Molecular Spectroscopy (ISMS) (2 Talks)</b>	Champaign, IL, USA, Jun 2025
<b>American Astronomical Society, 246<sup>th</sup> Meeting (Talk)</b>	Anchorage, AK, USA, Jun 2025
<b>International Symposium on Molecular Spectroscopy (ISMS) (2 Talks)</b>	Champaign, IL, USA, Jun 2024
<b>IAU S383: Astrochemistry VIII (Poster)</b>	Traverse City, MI, USA, Jul 2023
<b>International Symposium on Molecular Spectroscopy (ISMS) (Talk)</b>	Champaign, IL, USA, Jun 2023
<b>Life Cycle of Cosmic PAHs Symposium (Talk &amp; Poster)</b>	Aarhus, Denmark, Sep 2022
<b>739<sup>th</sup> WE-Heraeus-Seminar (Talk)</b>	Bad Honnef, Germany, Feb 2022
<b>PAHRTEA Meeting (Talk)</b>	Nijmegen, The Netherlands, Sep 2019
<b>Physics and Chemistry of the Interstellar Medium (Poster)</b>	Avignon, France, Sep 2019
<b>IAU S350: Laboratory Astrophysics Symposium (Poster)</b>	Cambridge, UK, Apr 2019
<b>EPoLM-4 Conference (Talk)</b>	Madrid, Spain, Mar 2019
<b>PCMI National Program Symposium (Poster)</b>	Marseille, France, Jun 2018
<b>Cosmic Dust Symposium (Poster)</b>	Copenhagen, Denmark, Jun 2018
<b>DPG Spring Meeting of the Condensed Matter Section (Talk)</b>	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

<b>Postdoc Representative – Department of Physics &amp; Astronomy</b>	Aarhus University, 2021 – 2022
<b>Early Stage Researcher Representative</b>	EUROPAH Network, 2018 – 2021
<b>Active Member of UniverSciEl</b>	Science outreach for children, 2017 – 2020
<b>Second PhD Student Representative</b>	IRAP Toulouse, 2017 – 2019

## REFEREES upon request.



July 18, 2025