Dr. Julia Victoria Seidel

- ESO Research Fellow -

jseidel@oca.eu
(+33) 743327973
Orchid ID: 0000-0002-7990-9596
Lagrange Lab, Observatoire de la Côte d'Azur,
Nice, France

Scientific expertise

OBSERVATIONAL ASTROPHYSICS
High-resolution spectroscopy
Development of observational strategies

ATMOSPHERIC PHYSICS
Dynamics and wind patterns
Hydrostatic and hydrodynamic modelling

ADVANCED DATA ANALYSIS
Bayesian statistics
Multinested-sampling retrieval
Photometric/spectroscopic data analysis

10/2025 - now **Poincaré Research Fellow (2)**, *Laboratoire Lagrange, Observatoire de la Côte d'Azur, Nice*
2 year independent research fellowship focussed on ELT-ANDES

WORK EXPERIENCE

10/2021 - 09/2025 **ESO Research Fellow (3+1)**, *European Southern Observatory, Chile*
50% Research, 50% Operational support on Paranal, ESPRESSO instrument fellow, 4th year at Observatoire de la Côte d'Azur, Nice, France

06-09/2021 **PostDoctoral Researcher**, *University of Geneva, Geneva, Switzerland (4 months)*
PostDoc position with Prof. Dr. Ehrenreich

05/2017 - 05/2021 **Teaching Assistant**, *Observatory of Geneva, Geneva, Switzerland*
Outreach and teaching activities aside from PhD research (15%)

02-09/2015 **Technical Student**, *CERN, Geneva, Switzerland* (7 months)
Programmer in the Level-1 ATLAS Trigger working group

04-09/2014 **Summer Student**, *CERN, Geneva, Switzerland* (6 months)
GUI interface development for the Level-1 ATLAS Trigger

01-06/2013 **Undergraduate Researcher**, *École Normale Supérieure & LPNHE, Paris, France* (6 months)
Automatic error propagation for Higgs-boson decay channel

EDUCATION

05/2017 - 05/2021 **Ph.D. Astronomy and Astrophysics (Doctorat ès Science)**, *supervised by Prof. Dr. David Ehrenreich and Dr. Vincent Bourrier, University of Geneva, Switzerland*
Title: Modelling Atmospheric Dynamics from high-resolution spectroscopy observations
Grade: très bien (highest possible awarded, defended 21st May 2021)

10/2015 - 05/2017 **Master of Science in Physics with Extended Research**, *Imperial College London, UK*
Thesis: Influence of charge on atmospheric particle propagation after dust explosions
Grade: with Distinction (A+)
- RESEARCH PROJECT (1 year): Universidad de los Andes, Bogotá D.C., Colombia

09/2011 - 01/2015 **Bachelor of Science in Physics**, *Technische Universität Darmstadt, Darmstadt, Germany*
Thesis: Uncertainties in the Higgs-bb decay (CERN)
Grade: 1.0 (A+)
- EXCHANGE with scholarship (1 year): Ecole Normale Superièure (ENS), Paris, France

FUNDING GRANTS, SUCCESSFUL TIME REQUESTS & PRIZES

2024 **MERAC Prize of the EAS,** plenary talk at EAS meeting in Padova, Italy - 25 kEUR

2022 **Edith Alice Müller Award, SSAA**, Best PhD thesis in Switzerland - 1 kCHF

ExoExplorers cohort, NASA, most promising early career researchers in Exoplanet sciences - 1 kUSD

2025-2027 **Poincaré fellowship OCA,** independent research fellowship 2 years

2025 **ESO workshop grant,** 5 kEUR, hosting the ESO Beyond Horizons workshop at OCA

EPEX grant Lagrange, 1k EUR, ESO Beyond Horizons workshop

BQR grant OCA, 3k EUR, ASOS15 conference LOC

AAP grant INSU, 5,7k EUR, ASOS15 conference LOC

2024 **MERAC grant,** 100 kEUR, contributed to the ANDES coronagraph group at Lagrange, OCA

2023 **SSDF grant, ESO,** 5.5 kEUR, to fund Master student

Office for Science funding, ESO, 3 kEUR, to fund 3 months Master internship

2021 **ESO Research Fellowship**, 3+1 years, 3 years at ESO, 1 year transferable funding

2018 - 2020 **Travel Grants**, approx. 4 kEUR

- PlanetS EQUAL Grant
- MERAC Travel Grant
- SSAA Travel Grant

2011 - 2017 **Universal Scholarship of the German People**, Studienstiftung des Deutschen Volkes
Full stipend Bachelor and Master, study abroad stipend, and short-term research stipend, ~160 kEUR

PI - observing proposals (total: 127h, **student led proposals in orange**)

2026 **PI, Prog. 116.2APW (PI: Seidel and Lavail), ESO DDT**, 10 h, ESPRESSO and CRIRES+

2025 **dPI, Prog. 115.2857 (PI: Prinoth and Seidel), ESO**, 50 h, CRIRES+

2024 **dPI, Prog. 113.26KY (PI: Roccetti and Seidel), ESO**, 16 h, FORS2

2023 **PI, Prog. 111.24J8, ESO**, 25 h, ESPRESSO 4-UT

2022 **PI, Prog. 108.21X7, ESO**, 8 h, ESPRESSO

2020 **PI, Prog. 106.20ZN, ESO**, 18 h, ESPRESSO

co-I (total: 100 orbits + 580h)

2025 **MAROON-X**, 10h, GN-2026A-Q-101 (PI: De Lia)

HST, 100 orbits, PID 18108, PID 18104 (PI: Dos Santos)

ESPRESSO 4-UT, 26h, 115.282D (PI: Lendl)

CRIRES+, 44h, 116.28PP, 116.28QS, 115.27XA, (PI: Roccetti)

FORS2, 24h, 116.28PP, 116.28QS (PI: Roccetti)

GHOST, 66h, GS-2025A-Q-230 (PI: Parmentier)

NIRPS, 12h, 115.28C6 (PI: Lillo-Box)

2019 - 2024 **ESPRESSO,** 376h, 112.25BG, 112.25KY, 108.22FQ, 105.202T

NIRPS, 12h, 112.25KU

NIRSPEC, 10h, N165

2017 - 2021 **Swiss telescope observational campaign,** support astronomer, 70 nights

PUBLICATIONS & COMMUNICATIONS

✦ 71 peer-reviewed articles, among which:
12 first-author articles, 2273 citations (H-index=27)

The full list of peer-reviewed publications can be found in the section Publications, a sortable list of all publications, including proceedings, is available on ADS

✦ 57 oral presentations, among which:

16 invited talks, 18 contributed talks, 23 seminars, and additionally 6 posters, most notably a plenary lecture for the MERAC prize at the EAS meeting and two invited review talks

The full list of conferences and seminars can be found in the section Communications

INTERNATIONAL COLLABORATIONS

2025 - now
Instrumentation - calibration ANDES SCAO+IFU, lead of WG with M. N'Diaye (Lagrange), calibration plan development for SCAO+IFU module of ELT - ANDES
ESO WG "ASPEX: Advanced Signal Processing for EXoplanet Spectroscopy", core member (**link**)

2024 - now
Atmospherix, member of the French spectroscopy collaboration
PCS consortium, member of the French science case WG
ANDES consortium
-member of coronagraph group, built at Lagrange in Nice
-lead Work Package SCAO+IFU calibrations (Arcetri, Florence + Lagrange, Nice)
PoET consortium, Paranal solar ESPRESSO Telescope, member of exoplanet atmospheres WG

2020 - 2024
ESPRESSO consortium
- member of science committee
- member of WG2: exoplanet atmospheres
- ESPRESSO instrument fellow at ESO

2018 - 2020
NIRPS consortium - pre-commissioning
- deputy chair and member of WG3: exoplanet atmospheres

2017 - 2021
PlanetS member, member of the Swiss network of exoplanet scientists
Member of project ERC "FOUR ACES", atmospheric characterization of hot Jupiters, PI: Prof. Dr. D. Ehrenreich

SUPERVISION

2025-2026
Master thesis supervisor of B. Gesto Herrera, at Lagrange, OCA with T. Guillot
Master thesis supervisor of M. Stratigou, at Lagrange, OCA with V. Parmentier

2025 - now
Ph.D co-supervisor of V. De Lia, with V. Parmentier at Lagrange, OCA

2025
Master thesis co-supervisor of V. De Lia, with V. Parmentier at Lagrange, OCA
Master thesis supervisor of Said del Cid, University of Honduras, remote

2023 - 2025
Ph.D. supervisor of B. Prinoth, with E. Sedaghati and H.J. Hoeijmakers at ESO

2023 - 2024
Master thesis of Y. Damasceno, ESO, Santiago de Chile, University of Porto, Portugal - now PhD student at University of Porto with N. Santos. He won the Pedro Nunes award for best Iberian Master thesis in Planetary science for this work.

2022
Master thesis of Z. Fowler, International University of Valencia, remote

2020
Master thesis of M. Steiner, Observatory of Geneva - now PhD student at University of Geneva

2019 - 2020
Supervisor 1st year Master Laboratory work, University of Geneva, Astrophysics Lab I + II

2020
Bachelor thesis of L. Grandjean, University of Geneva

2019
Bachelor thesis of T. Moretti, University of Geneva

2018
Bachelor thesis of J. Haefelin, University of Geneva

TEACHING

2026	**PNP Winter School 2026 "Planetary Atmospheres and Interiors: A Two-Way Connection", les Houches, France**, segment on exoplanet atmospheres
2025	**METEOR course, OCA**, Master course on stellar and planetary atmospheres with A. Chiavassa and V. Parmentier
2024	**ESO lectures**, Santiago, Chile, PhD level, "Introduction to machine learning: applications to exoplanet populations"
2022	**Guest lecturer**, University of Antofagasta, Chile, Master level, "High-dispersion transmission spectroscopy and instrumentation"
	ESO astronomy lectures, Santiago, Chile, PhD level, "Exoplanet atmosphere transmission spectroscopy"
2021	**Atmo2021 workshop**, online, Master level, "High-dispersion transmission spectroscopy for exoplanet resolved spectral line studies"
2020	**Guest lecturer**, online, University of Cape Town, South Africa, undergraduate level, "Earth seen as an exoplanet and its implications for climate change"
	Guest lecturer, online, University Sergio Arboleda, Colombia, undergraduate and public level, "Earth as an exoplanet: a perspective on climate change" (in Spanish)
2017 - 2021	**Public lectures**, University of Geneva, Switzerland, public lectures from elementary school to undergraduate levels for visitors
2019 - 2021	**Teaching assistant**, University of Geneva, Master level course on "Exoplanet atmospheres", helped elaborate the accompanying exercises during the first year the Master course was offered

ORGANISATION

2025-26	**3 Horses conference,** SOC member
	ASOS15, The 15th International Colloquium on Atomic Spectra and Oscillator Strengths for Astrophysical and Laboratory Plasmas , LOC co-chair, OCA
	ESO workshop, Beyond Horizons, LOC chair OCA
2024-25	**Exoclimes VII conference,** SOC member
2023 onwards	**IAU junior member,** Division F
	Int. Commission on Planetary Atmospheres and their Evolution (ICPAE), member
2022	**IAU VLTI-HOW workshop**, member of the steering committee and LOC chair
2021	**Exoplanets III conference**, online, conference moderator
2020	**EPSC/DPS annual conference**, Geneva, Switzerland, conference assistant
2019	**JURA II conference**, Beatenberg, Switzerland, LOC and SOC member, PlanetS young scientists conference

COMMUNITY SERVICE

2021 - now	**Referee**, Nature, MNRAS, A&A, PASJ, ApJL, Frontiers
2025	**MASS master evaluation,** Master thesis evaluation jury, OCA
	Organisation journal club exoplanets, Lagrange, OCA
2021 - 2024	**ESO's student selection committee**, member
	Support Astronomer UT1 and UT2 Paranal observatory, total of 250 nights
2024	**Hubble Space Telescope (HST) Cycle 32**, Time Alloc. Committee, external panel member
	Referee, Canadian Research Chair renovation, German Research Foundation proposal

2023	**Hubble Space Telescope (HST) Cycle 31**, Time Alloc. Committee, external panel member
	Gemini Telescope, Time Alloc. Committee, external expert reviewer
2022	**ESO's Hypatia colloquium committee**, selection committee, and session chair
	ESO's visiting senior astronomer committee, member
	ESO Period 110, Time Allocation Committee, Scientific Assistant
2021	**Gemini Telescope,** Time Allocation Committee, external expert reviewer
2017 - 2021	**Swiss Telescope Observational Campaign,** la Silla Observatory with Coralie and EulerCam at the Swiss 1.2m telescope, support astronomer total of 70 nights
2012 - 2013	**Student representation**, technische Universität Darmstadt, students' women representative and student panel member on local scholarship selection panel

DEIA - Diversity, Equity, Inclusion, and Accessibility

2024 - now	**COPIL dialogue**, Lagrange Lab, Nice France - new initiative by the directorate of Lagrange to facilitate discussion around diversity related topics
2022 - now	**Mentor at the Supernova Foundation**, supporting women* students
	ESO student mentor, mentoring historically excluded PhD students
	Women in Science Day, ESO, events on the day and blog post
2019 - 2021	**DEIA committee**, Observatory of Geneva, creator and member
2019	**IAU358 symposium**, Diversity in Astronomy, Tokyo, Japan
2017 - 2019	**Diversity in Science lunches**, Observatory of Geneva, co-organiser
2019 - 2021	**Sustainability Committee**, funding member, Observatory of Geneva, Switzerland

SCIENCE COMMUNICATION

2025	**hr - "alle Wetter", German television:** in the daily weather show on "alien weather"
	BBC World Service Radio - Science in Action, interview about the impact of the new industrial mega-project close to Paranal observatory
	The Conversation, article about the results from Seidel et al. 2025, Nature
	ESO Press release for Seidel et al. 2025, Nature, with worldwide press coverage, e.g. in le Monde
	Journees de la science, deux jours, Place Massena, Nice, France
	L'Observatoire au féminin, outreach talk about exoplanet research to the public (in French)
2019 - 2024	**Salomé project**, Switzerland/Chile, middle school level, comic book outreach project to schools Swiss-wide with virtual classes to children by astronomers, expansion to Chile with a Spanish version under my co-leadership
2024	**ESO Social Media**, Instagram/TikTok post on the solar system planets (in Spanish)
2023	**ESO's the Messenger**, contribution about my life as a research fellow at ESO (link)
	ESO open day, visit of public figures in Chile, e.g. ambassadors and mayors (in Spanish)
	Astronomy round table, Municipality of Cerro Navias, Chile, National week of astronomy (in Spanish)
	German Astronomy Day, Live event from Paranal observatory for the German Ministry of Research (in German)
2022	**Channel 4, UK television,** opinion piece from Paranal observatory regarding the search for exoplanets for the COP biodiversity conference
	Public seminar, Sociedad Astronómica Queretana, Mexico, National day of astronomy celebration (in Spanish)

	Podcast, Radio France, France culture, un été dans les étoiles (in French)
	Skype a Scientist, local school in Valparaiso, Chile (in Spanish)
2021	**Panel discussion, Arts & Science: an intersection**, Pretoria, South Africa (online)
	Faszination Online, Haus der Astronomie, Germany (in German, online)
2020	**Public seminar**, Universidad Sergio Arboleda, Bogota, Colombia (in Spanish, online)
	Panel discussion, Jupiteres calientes, Planetarium of Bogota, Colombia (in Spanish, online)
	Twitter takeover, one week content creation each: @astrotweeps, @people_of_space, @realSci_DE
2017 - COVID	**Public tours and observations**, University of Geneva, guided tours of the observatory with night time observations (in French)
2019	**Cité des métiers (canton-wide job fair)**, Geneva, Switzerland, highlighting the different possible career paths at observatories (in French)
	CHEOPS days, Geneva, Switzerland, one week event on main city square on the Swiss CHEOPS observational satellite (in French)

CODES and TECHNICAL APPLICATIONS

MERC, 'Multinested ETA Retrieval Code', the first 3D atmospheric dynamics retrieval code on narrow-band observations of exoplanets developed based on the ETA (Ehrenreich et al. 2006) and the PyETa (Pino et al. 2018) Codes. Documented in Seidel et al. 2020a, Seidel et al. 2021, Seidel et al. 2023a, Seidel et al. 2025
Link: https://github.com/jseideleso/MERC

SCUBA, ESO, development team of the ESPRESSO instrument scientific quality app in use at Paranal Observatory

StarRotator, open source package to model the Rossiter-McLaughlin effect for exoplanet transits, co-developer, link: https://github.com/Hoeijmakers/StarRotator

p-winds, open source package to model the hydrodynamic regime of upper atmospheres, co-developer, link: https://ui.adsabs.harvard.edu/abs/2022A%26A...659A..62D/abstract

OTHER SKILLS

Programming	Python (formal education, Advanced Academic Python Programming Summer School), C++, C, Julia
	IBM course: Machine Learning with Python - a practical introduction (with certificate)
Group Management	Project management for success in research (2-day workshop)
	Unconscious bias training
	Crucial conversations training
	Disability in the workplace session
Languages	German: Native, French: Fluent, English: Fluent, Spanish: Fluent, Italian: B1

PUBLICATIONS

✦ 71 peer-reviewed articles, among which:

12 first-author articles, 16 major contributions, 41 minor contributions, and 2 review articles, 2273 citations (H-index=27)

A sortable list of all publications, including proceedings, is available on ADS

Highlighted collaborators under my supervision/mentorship: **PhD level**, **Master level**

SUBMITTED- first author

1. Hot Jupiters have non-zero magnetic fields compatible with Jupiter
Seidel, J. V., Parmentier, V.**, Prinoth, B.**, …Debras, F, Guillot, T, et al. (**2026**), **Nature Astronomy**, 2nd review

2. Characterisation of the chemical composition and the layer-by-layer dynamics of the atmosphere of KELT-20b with MAROON-X
De Lia, V., Parmentier, V.**, Seidel, J. V.,**…, et al. (**2026**), A&A, submitted

PEER-REVIEWED, FIRST AUTHOR

11. Vertical structure of an exoplanet's atmospheric jet stream
Nature, arXiv:2502.12261

cited: 18

Seidel, J. V., Prinoth, B., …, Parmentier, V. et al. (**2025**)

Summary: This is the main article coming from our 4-UT ESPRESSO observations, giving us for the first time access to the phase-resolved spectral lines. We investigate the upper atmosphere and atmospheric stability via the H-alpha line and the low atmosphere via cross-correlation traces to contextualize an evolving high-velocity jet stream traced by sodium. This marks the first time an evolving atmospheric dynamical feature has been observed for an exoplanet. The observing programme also provides the first ELT-like high S/N exoplanet transit of a 16-m class telescope equivalent incorporating commissioning data of the mode. It will serve as a theory testing ground as we ramp up to the data quality expected from ELT high-resolution spectrographs such as METIS or ANDES.

10. On the impact of ENSO and Climate Change on ESO telescope sites
Atmosphere: The Impacts of Climate on Astronomical Observations, https://arxiv.org/abs/2309.14734

cited: 6

Seidel, J. V., Otarola, A., and Théron, V. (**2023c**)

Summary: We provide a comprehensive analysis of the historic atmospheric conditions at various ESO observatories in northern Chile, especially PWV, ambient temperature, and seeing and show clear correlations with the ENSO cycle. We additionally confirm the impact of climate change on current and future observational sites. This paper provides a powerful tool for long-term predictions of observing conditions in the ELT era. Additionally, we highlight the use of astronomical sites to establish long-term baselines for climate studies of remote areas of the world - an important new intersection between Earth science and astronomy.

9. Atmospheric composition and dynamics of the bloated hot Jupiter WASP-172b with ESPRESSO
A&A, 678, A150, https://arxiv.org/abs/2308.13622

cited: 11

Seidel, J. V.* and **Prinoth, B.***, et al. (**2023b**)
*both authors contributed equally to this work

Summary: Joint lead author with my PhD student: We report the detections of Fe, Na, and H-alpha for the bloated hot Jupiter WASP-172b and discuss its atmospheric dynamics in the context of bloated hot exoplanets, as well as its strong potential as a JWST target. This target will most likely be one of the most studied bloated planets in the near future.

8. Detection of a high-velocity sodium feature on the ultra-hot Jupiter WASP-121 b

A&A, 673, A125, https://arxiv.org/abs/2303.09376

cited: 36

Seidel, J. V., et al. (**2023a**)

Summary: I explore the observed blueshifted feature next to the sodium doublet of the ultra-hot Jupiter WASP-121b, using a partial transit obtained with the 4-UT mode of ESPRESSO - the largest photon collecting power in the world. Its atmospheric dynamics are made visible across the terminator by splitting the data into mid-transit and egress. With my retrieval framework, I determine that the blueshifted high-velocity absorption component is generated only during the egress part of the transit when a larger fraction of the day side of the planet is visible. The equatorial day-to-night side wind over the evening terminator is due to a localised jet between the substellar point and up to 10 deg to the terminator in longitude, with an opening angle of the jet of at most 60 deg in latitude and a lower boundary in altitude between [1.08,1.15] planetary radii. This paper marks the first foray of narrow-band transmission spectroscopy into resolving atmospheric dynamics in time and is the cornerstone of my future research proposal.

7. The hot Neptune WASP-166 b with ESPRESSO II: confirmation of atmospheric sodium

MNRAS, 513, L15, https://arxiv.org/abs/2203.04494

cited: 19

Seidel, J. V., et al. (**2022**)

Summary: This work is part of a three-part series on the hot Neptune WASP-166b as a follow-up to my work in 2020. The ESPRESSO observations confirmed the sodium feature in its atmosphere, in the ramp-up to its observations with JWST next year. Once the resolved line shape is recovered, the sodium feature will be used to study the atmospheric dynamics of a planet within the elusive Neptune desert for the first time. WASP-166b has quickly become one of the most intriguing exoplanet targets to date with follow-up observations scheduled both from the ground and space to understand why this world has been able to keep its atmosphere, despite its location within the Neptune desert.

6. Into the storm: diving into the winds of the ultra-hot Jupiter WASP-76 b with HARPS and ESPRESSO

A&A, 653, A73, https://arxiv.org/abs/2107.09530

cited: 63

Seidel, J. V., et al. (**2021**)

Summary: As a follow-up work to Ehrenreich et al. (2020), Nature, on the ultra-hot Jupiter WASP-76 b, I combined the available HARPS and ESPRESSO datasets on this target. The increased signal-to-noise ratio allowed to resolve the line shape of the sodium doublet from the absorption well (probing the top of the atmosphere) all the way into the line wings (probing the lower layers of the atmosphere). I upgraded the atmospheric retrieval code MERC from Seidel et al. (2020) to include planetary rotation. With this addition, MERC constructs a 3D atmospheric structure and is able to recover both the atmospheric wind patterns and additionally also to precisely recover the wind speeds, instead of upper limits. I was able to retrieve the same wind pattern and wind speed as proposed by the ‘toy model’ from Ehrenreich et al. (2020), Nature, ruling out competing atmospheric structures as explanations. This work has been a key input to various other studies on magnetic fields, atmospheric dynamics, and atmospheric chemistry since WASP-76b with its easily accessible atmosphere and cloudless skies has become a benchmark system for testing new data analysis techniques and theoretical models.

5. Hot Exoplanet Atmospheres Resolved with Transit Spectroscopy (HEARTS) VI. Non-detection of sodium with HARPS on the bloated super-Neptune WASP-127b

A&A, 643, A45, https://arxiv.org/abs/2009.13386

cited: 35

Seidel, J. V., et al. (**2020c**)

Summary: WASP-127b is one of the puffiest exoplanets found to date, with a mass of only 3.4 Neptune masses, but a radius larger than Jupiter. It is also located at the border of the Neptune desert, which describes the lack of highly irradiated Neptune-sized planets and remains poorly understood. I present combined EulerCam and TESS light curves to recalculate the system's parameters. Additionally, I conducted an in-depth search for sodium in four transit observations previously analysed by another team. Said work claims a detection of sodium incompatible with previous studies of data from both ground and space. I showed that this large sodium detection is actually due to contamination from telluric sodium emissions and the low S/N in the core of the deep stellar sodium lines. These effects will become more crucial in our push towards smaller and cooler planets. My results and the subsequent absorption depth of sodium in this atmosphere were later confirmed independently with the ESPRESSO spectrograph at higher resolution in Allart et al. (2021).

4. Hot Exoplanet Atmospheres Resolved with Transit Spectroscopy (HEARTS) V. Detection of sodium on the bloated super-Neptune WASP-166b
A&A, 641, L7, https://arxiv.org/abs/2007.01783

cited: 31

Seidel, J. V., et al. (**2020b**)

Summary: I present the HARPS transmission spectrum of the bloated super-Neptune WASP-166b, located at the outer rim of the Neptune desert. The sodium detection, amongst the first at the edge of the Neptune desert, shows a tentative indication of line broadening, which could be caused by winds blowing sodium farther into space, a possible manifestation of the bloated character of these highly irradiated worlds. I put this detection into context with previous work, claiming a non-detection of sodium in the same observations and showing that the high noise in the trace of the discarded stellar sodium lines was responsible for the non-detection. This work together with the publication 5. above is seminal in the study of the impact of this low signal-to-noise remnant on detections for exoplanets similar to WASP-166b.

3. Wind of change: retrieving exoplanet atmospheric winds from high-resolution spectroscopy
A&A, 633, A86, https://arxiv.org/abs/1912.02787

cited: 73

Seidel, J. V., et al. (**2020a**)

Summary: This paper is the first introduction of the atmospheric retrieval MERC code, where I use the highly studied hot Jupiter HD189733b as a benchmark case to show that it is possible to infer wind patterns from their Doppler-shift impact on the resolved spectral line shape. I streamlined 1D atmospheric models of exoplanet atmospheres for performance, added the different wind patterns as symmetrical 2D models and was able to combine this sophisticated 2D atmosphere with a Bayesian nested sampling retrieval package due to the superior performance of the code. This allowed for the first time to distinguish the best fit of different wind patterns instead of providing simple fit probabilities for each model separately from each other. As a result we found that the so far observationally unprobed region between the lower zonal winds as modeled with GCMs and the expanding exosphere probed by He and Lyman-alpha lines are connected with a radially outwards pushing wind region. This paper marks one of the most sophisticated observational methods to understand atmospheric winds and has been mentioned in various review papers since then.

2. Hot Exoplanet Atmospheres Resolved with Transit Spectroscopy (HEARTS). II. A broadened sodium feature on the ultra-hot giant WASP-76b
A&A, 623, A166, https://arxiv.org/abs/1902.00001

cited: 115

Seidel, J. V., et al. (**2019b**)

Summary: I present the sodium doublet detection in the atmosphere of WASP-76b with the HARPS spectrograph. This marks the first detection of sodium in the atmosphere of an ultra-hot Jupiter and established WASP-76b as one of the benchmark ultra-hot Jupiter targets with dozens of follow-up publications. To establish the signal without a doubt, I also generated the relative absorption light curves which demonstrate that the sodium signal coincides with the exoplanet transit for all three transits - the confirmation that the sodium signature is planetary. Additionally, I studied the line

broadening which is significantly broadened compared to the instrument resolution. This result, combined with the same observation for HD189733b in Wyttenbach et al. 2015 led to the creation of the MERC code to study resolved spectral line shapes.

1. Relative permittivity estimation of wheat starch: A critical property for understanding electrostatic hazards
Journal of Hazardous Materials, 368, 228-233, https://www.sciencedirect.com

cited: 10

Seidel, J. V., et al. (**2019a**)

Summary: Outcome of my Master thesis on "Influence of charge on atmospheric particle propagation after dust explosions" from 2017. The main components of dust explosions both in illegal mining or industrial settings behave similarly to wheat starch. How is a normally insulating grain charged and how is its ability to be polarized affected by environmental conditions? Here we investigate the dependence of temperature, humidity, and low frequency on the relative permittivity of wheat starch. The results show high values of permittivity (80) at the microscale (single starch grains) compared to low values (10–20) at the macroscale (20 mg of wheat starch). The differences are attributed to the Maxwell–Wagner–Sillars interfacial polarization process on individual grains and potential charge exchange between grains.

POPULAR REVIEW ARTICLES

3. the Conversation: Des vents violents mesurés sur une planète à des millions de milliards de kilomètres
Parmentier, V.* et **Seidel, J. V.*** (**2025**), the Conversation, www.theconversation.com
*Les deux auteurs ont contribué de manière égale à ce travail

2. News and Views: JWST opens a window on exoplanet skies
Seidel, J. V.*, Sarkar, S.*, and Nielsen, L. D. (**2023**), Nature, vol. 614, iss. 7949, p.632-633, https://www.nature.com/articles/d41586-023-00394-6
*Les deux auteurs ont contribué de manière égale à ce travail

1. Keeping Exoplanet Science Caffeinated with ESPRESSO
Nielsen, L.* et **Seidel, J. V.*** (**2022**), the Messenger, ESO, vol. 187, p. 8-11, https://arxiv.org/abs/2208.04323
*Les deux auteures ont contribué de manière égale à ce travail

PEER REVIEWED, SENIOR CO-AUTHOR

6. Planet Earth in reflected and polarized light: II. Refining contrast estimates for rocky exoplanets with ELT and HWO
Roccetti, G., Sterzik, M, **Seidel, J. V.** et al. (**2025b**), A&A, 700, A62, arXiv:2506.04348, citations: 3

5. TiO chemistry in WASP-121 revised with ESPRESSO's 4-UT mode
Prinoth, B., **Seidel, J. V.** et al. (**2025**), A&A, 694, A284, arXiv:2502.12262, citations: 9

4. Highly eccentric warm Jupiters accessible with ANDES/ELT via high-resolution spectroscopy
Prinoth, B., Sedaghati, E., **Seidel, J. V.** et al. (**2024**), ApJ, 168, 3, 133, https://arxiv.org/abs/2406.08558, citations: 6

3. Atmospheric detections of various elements with ESPRESSO for WASP-178b
Damasceno, Y., **Seidel, J. V., Prinoth, B.** et al. (**2024**), A&A, 689, A54, https://arxiv.org/abs/2406.08348, citations: 10

2. Atmospheric characterization and tighter constraints on the orbital misalignment of WASP-94 A b with HARPS
Ahrer, E., **Seidel, J. V.**, […], **Prinoth, B.** et al. (**2024**), MNRAS, 539, 2749-2759, https://arxiv.org/abs/2404.06550, citations: 4

1. HEARTS VIII. Non-detection of sodium in the atmosphere of the aligned planet KELT-10b
Steiner, M., […], **Seidel, J. V.** et al. (**2023**), A&A, 672, A134, https://arxiv.org/abs/2303.05857, citations: 3

PEER REVIEWED, MAIN CO-AUTHOR

10. Planet Earth in reflected and polarized light: I. Three-dimensional radiative transfer simulations of realistic surface-atmosphere systems
Roccetti, G., […], **Seidel, J. V.**, et al. (**2025**), A&A, 697, A170, https://arxiv.org/abs/2504.02048, citations: 7

9. An atlas of resolved spectral features in the transmission spectrum of WASP-189 b with MAROON-X
Prinoth, B., […], **Seidel, J. V.** et al. (**2024**), A&A, 685, A60, https://arxiv.org/abs/2403.08863, citations: 20

8. Doppler shifted transient sodium detection by KECK/HIRES
Unni, A., […], **Seidel, J. V.**, et al. (**2025**), MNRAS, 540, L48-L53, arxiv:2504.03974, citations: 3

7. Redshifted Sodium Transient near Exoplanet Transit
Oza, A., **Seidel, J. V.**, et al. (**2024**), AJ Letters, 973, L53, https://arxiv.org/abs/2409.19844, citations: 6

6. The hot Neptune WASP-166 b with ESPRESSO - III. A blue-shifted tentative water signal constrains the presence of clouds
Lafarga, M., […], **Seidel, J. V.**, et al. (**2023**), MNRAS, 521, 1233-1252, https://arxiv.org/abs/2302.04794, citations: 13

5. Hot Exoplanet Atmospheres Resolved with Transit Spectroscopy (HEARTS) VII. Detection of sodium on the long-transiting inflated sub-Saturn KELT-11 b
Mounzer, D., Lovis, C., **Seidel, J. V.**, […] et al. (**2022**), A&A, 668, A1, https://arxiv.org/abs/2209.00597, citations: 28

4. Titanium oxide and chemical inhomogeneity in the atmosphere of the exoplanet WASP-189 b
Prinoth, B., Hoeijmakers, H. J., Kitzmann, D., Sandvik, E., **Seidel, J. V.** et al. (**2022**), Nature Astronomy, 6, 449, https://arxiv.org/abs/2111.12732, citations: 100

3. TESS Reveals a Short-period Sub-Neptune Sibling (HD 86226c) to a Known Long-period Giant Planet
Teske, J., Díaz, M. R., Luque, R., Močnik, T., **Seidel, J. V.**, et al. (**2020**), AJ, 160, 2, https://arxiv.org/abs/2007.13927, citations: 34

2. Hot Exoplanet Atmospheres Resolved with Transit Spectroscopy (HEARTS) IV. A spectral inventory of atoms and molecules in the high-resolution transmission spectrum of WASP-121 b
Hoeijmakers, H. J., **Seidel, J. V.**, et al. (**2020**), A&A, 641, A123, https://arxiv.org/abs/2006.11308, citations: 152

1. A spectral survey of an ultra-hot Jupiter. Detection of metals in the transmission spectrum of KELT-9 b
Hoeijmakers, H. J., […], **Seidel, J. V.**, et al. (**2019**), A&A, 627, A165, https://arxiv.org/abs/1905.02096, citations: 203

REVIEW ARTICLES, OTHER AUTHOR

1. Effects of the Hunga Tonga–Hunga Ha'apai Volcanic Eruption on Observations at Paranal Observatory
De Rosa, R. J., […], **Seidel, J. V.** (**2023**), the Messenger, ESO, vol. 190, p. 58-61, https://arxiv.org/abs/2305.08620

PEER REVIEWED, OTHER AUTHOR

41. Is the high-energy environment of K2-18b special?
Rukdee, S., […], **Seidel, J. V.**, et al. (**2026**), accepted in A&A, arXiv:2510.06939, citations: 1

40. Planet Earth in reflected and polarized light -- III. Modeling and analysis of a decade-long catalog of Earthshine observations
Roccetti, G., […], **Seidel, J. V.**, et al. (**2025c**), A&A, 702, A262, arxiv:2509.13415, citations: 1

39. NIRPS and TESS reveal a peculiar system around the M dwarf TOI-756: A transiting sub-Neptune and a cold eccentric giant
Parc, L., […], **Seidel, J. V.**, et al. (**2025**), A&A, 702, A138, arXiv:2510.14927, citations: 1

38. Quantifying thermal water dissociation in the dayside photosphere of WASP-121 b using NIRPS
Bazinet, L., […], **Seidel, J. V.**, et al. (**2025**), A&A, 701, A276, arXiv:2508.06626, citations: 3

37. ATREIDES: I. Embarking on a trek across the exo-Neptunian landscape with the TOI-421 system
Bourrier, V., […], **Seidel, J. V.**, et al. (**2025**), A&A, 701, A190, arXiv:2509.15746, citations: 1

36. The star HIP 41378 potentially misaligned with its cohort of long-period planets
Grouffal, S., […], **Seidel, J. V.**, et al. (**2025**), A&A, 701, A173, arXiv:2507.01807, citations: -

35. Blind search for activity-sensitive lines in the near-infrared using HARPS and NIRPS observations of Proxima and Gl 581
Gomez da Silva, J., […], **Seidel, J. V.**, et al. (**2025**), A&A, 700, A177, arXiv:2507.21262, citations: 1

34. The ESPRESSO transmission spectrum of HD189733 b: Extracting the planetary sodium and lithium signatures amid stellar contamination
Mounzer, D., […], **Seidel, J. V.**, et al. (**2025**), A&A, 700, A41, arXiv:2506.21459, citations: 1

33. Diving into the planetary system of Proxima with NIRPS: Breaking the metre per second barrier in the infrared
Suarez-Mascareño, A., […], **Seidel, J. V.**, et al. (**2025**), A&A, 700, A11, arXiv:2507.21751, citations: 12

32. NIRPS joining HARPS at ESO 3.6 m: On-sky performance and science objectives
Bouchy, F., […], **Seidel, J. V.**, et al. (**2025**), A&A, 700, A10, arXiv:2507.21767, citations: 18

31. Time-resolved absorption of six chemical species with MAROON-X points to a strong drag in the ultra-hot Jupiter TOI-1518 b
Simonnin, A., Parmentier, V., […], **Seidel, J. V.**, et al. (**2025**), A&A, 698, A314, arxiv:2412.01472, citations: 7

30. NIRPS detection of delayed atmospheric escape from the warm and misaligned Saturn-mass exoplanet WASP-69 b
Allart, R., […], **Seidel, J. V.**, et al. (**2025**), A&A, 700, A7, arXiv:2507.21284, citations: 7

29. A Closer Look at LTT 9779b: ESPRESSO's Endeavor to Pierce the Atmospheric Veil
Ramirez-Reyes, R., […], **Seidel, J. V.**, et al. (**2025**), A&A, 695, A26, arxiv:2501.17272, citations: 7

28. The obliquity and atmosphere of the hot Jupiter WASP-122b (KELT-14b) with ESPRESSO
Stangret, M., […], **Seidel, J. V.**, et al. (**2024**), A&A, 691, A120, https://arxiv.org/abs/2410.00800, citations: 1

27. ESPRESSO reveals blueshifted neutral iron emission lines on the dayside of WASP-76 b
Costa Silva, A. R., […], **Seidel, J. V.**, et al. (**2024**), A&A, 689, A8 https://arxiv.org/abs/2409.13519 , citations: 8

26. Nondetections of Helium in the Young Sub-Jovian Planets K2-100b, HD63433b, and V1298 Tau c
Alam, M. K., […], **Seidel, J. V.**, et al. (**2024**), AJ, 168, 102 https://arxiv.org/abs/2405.17294, citations: 7

25. The ANTARESS workflow I. Optimal extraction of spatially resolved stellar spectra with high-resolution transit spectroscopy
Bourrier, V., […], **Seidel, J. V.**, et al. (**2024**), A&A, 691, A113, https://arxiv.org/abs/2407.19012, citations: 9

24. An ESPRESSO view of HD 189733 system. Broadband transmission spectrum, differential rotation, and system architecture
Cristo, E., […], **Seidel, J. V.**, et al. (**2023**), A&A, 682, A28, https://arxiv.org/abs/2310.06681, citations: 9

23. The Mantis Network IV: A titanium cold-trap on the ultra-hot Jupiter WASP-121 b
Hoeijmakers, H. J., […], **Seidel, J. V.**, et al. (**2023**), A&A, 685, A139, https://arxiv.org/abs/2210.12847 , citations: 44

22. DREAM. I. Orbital architecture orrery
Bourrier, V., […], **Seidel, J. V.**, et al. (**2023**), A&A, 669, A63, https://arxiv.org/abs/2301.07727, citations: 62

21. Detection of barium in the atmospheres of the ultra-hot gas giants WASP-76b and WASP-121b
Azevedo Silva, T., […], **Seidel, J. V.**, et al. (**2022**), A&A, 666, L10, https://arxiv.org/abs/2210.06892, citations: 43

20. The Hot Neptune WASP-166 b with ESPRESSO - I. Refining the planetary architecture and stellar variability
Doyle, L., […], **Seidel, J. V.**, et al. (**2022**), MNRAS, 516, 298-315, https://arxiv.org/abs/2207.10127, citations: 13

19. Transmission spectroscopy of the ultra-hot Jupiter MASCARA-4 b: Disentangling the hydrostatic and exospheric regimes of ultra-hot Jupiters
Zhang, Y., […], **J. V. Seidel**, et al. (**2022**), A&A, 666, A47, https://arxiv.org/abs/2208.11427, citations: 20

18. Transmission spectroscopy of MASCARA-1b with ESPRESSO: Challenges of overlapping orbital and Doppler tracks
Casasayas-Barris, N., Borsa, F., Palle, E., […], **Seidel, J. V.,** et al. (**2022),** A&A, 664, A121, https://arxiv.org/abs/2206.09443, citations: 25

17. The polar orbit of the warm Neptune GJ436b seen with VLT/ESPRESSO
Bourrier, V., Zapatero Osorio, M. R., […], **Seidel, J. V.,** et al. (**2022**), A&A, 663, A160, https://arxiv.org/abs/2203.06109, citations: 38

16. CaRM: Exploring the chromatic Rossiter-McLaughlin effect. The cases of HD 189733b and WASP-127b
Cristo, E., Santos, N. C., Demangeon, O., […], **Seidel, J. V.,** et al. (**2022**), A&A, 660, A52, https://arxiv.org/abs/2201.06531, citations: 8

15. p-winds: An open-source Python code to model planetary outflows and upper atmospheres
Dos Santos, L. A., Vidotto, A. A., Vissapragada, S., […], **Seidel, J. V.,** et al. (**2022**), A&A, 659, A62, https://arxiv.org/abs/2111.11370, citations: 64

14. Retrieving the transmission spectrum of HD 209458b using CHOCOLATE: a new chromatic Doppler tomography technique
Esparza-Borges, E., […] , **Seidel, J. V.**, et al. (**2022**), A&A, 657, A23, https://arxiv.org/abs/2110.02028, citations: 6

13. The Rossiter-McLaughlin effect revolutions: an ultra-short period planet and a warm mini-Neptune on perpendicular orbits
Bourrier, V., Lovis, C., Cretignier, M., […], **Seidel, J. V.,** et al. (**2021**), A&A, 654, A152, https://arxiv.org/abs/2110.14214, citations: 57

12. TESS Delivers Five New Hot Giant Planets Orbiting Bright Stars from the Full-frame Images
Rodriguez, J. E., Quinn, S. N., Zhou, G., […], **Seidel, J. V.,** et al. (**2021**), AJ, 161, 194, https://arxiv.org/abs/2101.01726, citations: 39

11. NGTS-13b: a hot 4.8 Jupiter-mass planet transiting a subgiant star
Grieves, N., Nielsen, L. D., Vines, J. I., […], **Seidel, J. V.,** et al. (**2021**), A&A, 647, A180, https://arxiv.org/abs/2101.04245, citations: 9

10. ESPRESSO high-resolution transmission spectroscopy of WASP-76 b
Tabernero, H. M., Zapatero Osorio, M. R., […], **Seidel, J. V.,** et al. (**2021**), A&A, 646, A158, https://arxiv.org/abs/2011.12197 , citations: 103

9. TOI-824 b: A New Planet on the Lower Edge of the Hot Neptune Desert
Burt, J. A., […], **Seidel, J. V.**, et al. (**2020**), AJ, 160, 4, https://arxiv.org/abs/2008.11732, citations: 42

8. Probing the atmosphere of HD189733b with the Na I and K I lines
Keles, E., […], **Seidel, J.V.** , et al. (**2020**), MNRAS, 498, 1, https://arxiv.org/abs/2008.04044, citations: 10

7. Search for helium in the upper atmosphere of the hot Jupiter WASP-127 b using Gemini/Phoenix
dos Santos, L. A., Ehrenreich, D., Bourrier, V., […], **Seidel, J. V.,** et al. (**2020**), A&A, 640, A29, https://arxiv.org/abs/2007.06216, citations: 32

6. Mass-loss rate and local thermodynamic state of the KELT-9 b thermosphere from the hydrogen Balmer series
Wyttenbach, A., Mollière, P., Ehrenreich, D., […], **Seidel, J. V.,** et al. (**2020**), A&A, 638, A87, https://arxiv.org/abs/2004.13733, citations: 95

5. Nightside condensation of iron in an ultrahot giant exoplanet
Ehrenreich, D., Lovis, C., Allart, R., […], **Seidel, J. V.,** et al. (**2020**), Nature, 580, 597, https://arxiv.org/abs/2003.05528, citations: 280

4. Mass determinations of the three mini-Neptunes transiting TOI-125
Nielsen, L. D., Gandolfi, D., Armstrong, D. J., […], **Seidel, J. V.,** et al. (**2020**), MNRAS, 492, 5399, https://arxiv.org/abs/2001.08834, citations: 38

3. Three Short Period Jupiters from TESS
Nielsen, L. D., Brahm, R., Bouchy, F., […], **Seidel, J. V.,** et al. (**2020**), A&A, 639, A76, https://arxiv.org/abs/2003.05932, citations: 34

2. Two intermediate-mass transiting brown dwarfs from the TESS mission
Carmichael, T. W., Quinn, S. N., Mustill, A. J., […], **Seidel, J. V.,** et al. (**2020**), AJ, 160, 1, https://arxiv.org/abs/2002.01943, citations: 56

1. The CORALIE survey for southern extrasolar planets. XVIII. Three new massive planets and two low-mass brown dwarfs at greater than 5 AU separation
Rickman, E. L., […], **Seidel, J. V.,** et al. (**2019**), A&A, 625, A71, https://arxiv.org/abs/1904.01573, citations: 44

COMMUNICATIONS

INVITED TALKS

2026 (upcoming)	16. CHASES - CHARTING THE FUTURE OF STELLAR AND EXOPLANET SPECTROSCOPY, review on exoplanet atmosphere studies in high resolution, Elba Italy
	15. VLT/I beyond the 2030s, review exoplanet atmosphere prospects, ESO Headquarters, Munich, Germany
2025	14. Exo-ELT Europe, review atmospheres in the ELT era, ESO Headquarters,Munich, Germany
	13. EAS annual meeting, review atmospheres in the ELT era, Cork, Ireland
	12. French Astronomy Days, review atmospheric dynamics in the ELT era, Toulouse, France
	11. French ARIEL days, review of the intersection between Ariel and ground-based facilities, Paris, France
	10. Exo-ELT French workshop, review on 1gen Instrument Science, Fréjus, France
2024	9. PoET workshop, commissioning of ESPRESSO's solar observatory, Porto, Italy
	8. MERAC prize lecture, EAS annual assembly, Padova, Italy
2022	7. Disks and Planets across ESO facilities, review talk, Munich, Germany
	6. Invited Seminar, API, Amsterdam, the Netherlands
	5. Swiss Society for Astronomy and Astrophysics, PhD Prize talk, Bern, Switzerland
	4. ThinkShop, Potsdam, Germany, review talk
	3. NASA's ExoExplorers seminar series, online
2021	2. Atmo2021 workshop, online, review talk
	1. ESO's Hypathia colloquium, online

CONTRIBUTED TALKS

2025	18. French Astronomy Days, magnetic field trends from hot Jupiter studies, Toulouse, France
2024	17. HALO - HAbitabiLité & vie sur d'autres mOndes, Fréjus, France
	16. Atmospherix workshop, Paris, France
	15. Exoplanets V, Plenary, Leiden, the Netherlands
	14. MIAPdP workshop on Habitability, Munich, Germany
	13. Extreme Solar Systems V, Christchurch, New Zealand
2023	12. Exoclimes VI, Exeter, UK
2022	11. EAS annual conference, Valencia, Spain
	10. Exoplanets IV, Las Vegas, USA - retracted talk due to COVID infection
2021	9. EAS annual conference, online
2020	8. Physikerinnentagung, Hamburg, Germany, online
	7. Eclipsing Exoplanets, canceled - COVID
	6. Towards other Earths, canceled - COVID
	5. EPSC annual conference, online
2019	4. RESCEU symposium, Okinawa, Japan
	3. EPSC/DPS joint annual conference, Geneva, Switzerland
	2. ExoJC conference, Bordeaux, France
	1. PlanetS general assembly, Beatenberg, Switzerland

SEMINARS

2025	23. IRAP, Toulouse, France
	22. LESIA, Paris, France
	21. CEA-Saclay, Paris, France
	20. Max Planck Institute for Astronomy, Heidelberg, Germany
	19. IPAG, Grenoble, France
2024	18. Lagrange Laboratory, Nice, France
	17. University of Antioquia, Medellin, Colombia
	16. LMU, Munich, Germany
2023	15. University Andres Bello, Santiago, Chile
	14. University of Porto, Porto, Portugal
	13. LAM, Marseille, France
	12. ESO Headquarters, Garching by Munich, Germany
	11. University Adolfo Ibañez, Santiago, Chile
2022	10. INAF Arcetri, Florence, Italy
	9. International Commission on Planetary Atmospheres and their Evolution (ICPAE) - online
	8. JPL/Caltech, USA - online
2021	7. University of Concepcion, Chile - online
	6. ESO, Santiago, Chile
	5. University of Lisbon, Portugal - online
2020	4. Observatorio do Valongo, Brazil - online
	3. University of Amsterdam, the Netherlands - online
	2. IAC, Canary Islands - online
	1. Chalmer's University, Sweden - online

POSTERS

2025	7. Exoclimes VII (as SOC member), Montreal, Canada
2023	6. Towards other Earths III, Porto, Portugal
2020	5. Exoplanets III, online, poster + mini talk
2019	4. Extreme Solar Systems IV, Reykjavik, Iceland
	3. Exoclimes V, Oxford, UK
2018	2. Exoplanets II, Cambridge, UK
	1. Recontres du Vietnam II on exoplanetary science, Vietnam