

# Alexis Lavail

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## # Research expertise

- **High-resolution stellar spectroscopy and spectropolarimetry** with CRIRES+/VLT, ESPaDOnS/CFHT, (NEO-)NARVAL/TBL, HARPSpol/ESO-3.6m, GIANO-B/TNG, FIES/NOT
- **Stellar magnetic fields:** Zeeman broadening and Zeeman Doppler Imaging
- **Instrumentation** (design, testing, AIT/AIV, commissioning). I worked on CRIRES+/VLT, ANDES/ELT, and the Exomars 2016 descent camera
- **Data reduction and analysis:** pipeline writing, reduction of echelle spectra (e.g CRIRES+, HARPS, HARPSpol), spectrum extraction, stellar spectrum synthesis, parameter inference, MCMC, telluric line modelling

## # Research experience

Feb 2023- **Postdoc** at Institut de Recherche en Astrophysique et Planétologie (IRAP), CNRS – Université Paul Sabatier – CNES, Toulouse

2020–2022 **Thunberg fellow** at Uppsala University (Sweden) and the Swedish Collegium for Advanced Study. **9-month parental leave**

2013–2020 **PhD student in astronomy** at Uppsala University (Sweden) and the European Southern Observatory (Germany)

2013 **ESA Stagiaire** at the European Space Agency ESTEC (Netherlands)

## # Education

2020 PhD in astronomy at Uppsala University. PhD thesis : *Magnetic fields of cool stars from near-infrared spectropolarimetry*

2013 Master degree in space-engineering at Observatoire de Paris (France)

2011 Bachelor degree in physics, Université Aix-Marseille-3, Marseille (France)

## # Computer skills

- Programming: python, bash, IDL/GDL, C
- Misc: git, markdown, LaTeX, HTML/CSS

## # Languages

**French:** native;    **English:** fluent;    **Swedish:** fluent;    **Spanish:** conversational

## # Observing experience

Observations done with CRIRES+/VLT, ESPaDOnS/CFHT, GIANO-B/TNG, FIES/NOT

## # Duties

- Postdoc representative at the IRAP lab council starting Feb 2023
- Representative at the astronomy division council at Uppsala University 2015–2017 & 2022
- Webmaster of the Uppsala University astronomy webpages [[www.astro.uu.se](http://www.astro.uu.se)].
- Organization of conferences and workshop (Cool Stars 19, *Astronomdagarna*, *Rencontres OSAE*, Uppsala/Stockholm astronomy PhD workshops, CRIRES+ consortium meeting)
- Logotype design : Programme National de Physique Stellaire, ELT/ANDES spectrograph, Uppsala University doctoral board.

## # Popular science activities

- Design and presentation of posters at popular science events
- Member of the organizing committee for the “Plage aux Étoiles” festival, Collioure (FR)

## # Student supervision

- Tanguy Franco–Silvestre. Internship (M1), 2024
- Estelle Chabrol. Internship (M1), 2024
- Inès Amestoy & Tanguy Franco–Silvestre. *Projet d’initiation à la recherche*, 2024
- Jonas Zbinden. Master thesis: *Planning observations of terrestrial exoplanets around M type stars with CRIRES+*, 2021  
Isabella Rudengren and Julia Dahlberg. *Experimental characterization of focal ratio degradation of optical fibers due to various coupling technologies*. Bachelor thesis, 2020
- Candice Durandet. Internship on the CRIRES+ spectropolarimeter, 2017
- Milan Rozel. Internship: *Assembly and characterisation of the spectropolarimetric unit of the CRIRES+ spectrometer*, 2017

## # Hobbies

Hiking, bouldering, beer-brewing & fermentations of every kind, cross-country skiing, baking, urban gardening, permaculture, climate justice, world literature and music

## # Publication list

Full list: <https://ui.adsabs.harvard.edu/public-libraries/Qpt21CAPTS-8520AEIYcVg>

Metrics (from ADS) :

- 13 peer-reviewed articles (4 first-authored) and 1 submitted to A&A
- Number of citations : 224
- h-index : 9

## ## Refeered and submitted publications

1. Cont, D., et al.: *Exploring the ultra-hot Jupiter WASP-178b. Constraints on atmospheric chemistry and dynamics from a joint retrieval of VLT/CRIRES+ and space photometric data*, 2024, A&A in press.
2. Belloti, S., et al.: *Spectropolarimetric characterisation of exoplanet host stars in preparation of the Ariel mission. Magnetic environment of HD 63433*, 2024, A&A in press.
3. Kochukhov, O., et al.: *A conclusive non-detection of magnetic field in the Am star o Peg with high-precision near-infrared spectroscopy*, 2024, A&A in press.
4. Nortmann, L., et al.: *CRIRES+ transmission spectroscopy of WASP-127b. Detection of the resolved signatures of a supersonic equatorial jet and cool poles in a hot planet*, 2024, submitted to A&A
5. Lesjak, F., et al.: *Retrieval of the dayside atmosphere of WASP-43b with CRIRES+*, 2023, A&A, 678, A23
6. Bellotti, S., et al.: *Monitoring the large-scale magnetic field of AD Leo with SPIRou, ESPaDOnS, and Narval. Towards a magnetic polarity reversal?*, 2023, A&A, 676, A56
7. Hahlin, A., et al.: *Determination of small-scale magnetic fields on Sun-like stars in the near-infrared using CRIRES+*, 2023, A&A, 675, A91
8. Dorn, R. J., et al.: *CRIRES+ on sky at the ESO Very Large Telescope. Observing the Universe at infrared wavelengths and high spectral resolution*, A&A, 2023, 671, A24
9. Yan, F., et al.: *CRIRES+ detection of CO emissions lines and temperature inversions on the dayside of WASP-18b and WASP-76b*, 2023, A&A, 672, A107
10. **Lavail, A.**, et al.: *The large-scale magnetic field of the eccentric pre-main-sequence binary system V1878 Ori*, MNRAS, 2020, 497, 632
11. **Lavail, A.**, Kochukhov, O., Hussain, G. A. J.: *Characterising the surface magnetic fields of T Tauri stars with high-resolution near-infrared spectroscopy*, A&A, 2019, 630, A99
12. **Lavail, A.**, Kochukhov, O., Wade, G. A.: *A sudden change of the global magnetic field of the active M dwarf AD Leo revealed by full Stokes spectropolarimetric observations*, MNRAS, 2018, 479, 4836
13. **Lavail, A.**, et al.: *Magnetic fields of intermediate mass T Tauri stars*, A&A, 2017, 608, A77
14. Kochukhov, O., **Lavail, A.**: *The Global and Small-scale Magnetic Fields of Fully Convective, Rapidly Spinning M Dwarf Pair GJ65 A and B*, ApJL, 2017, 835, L4

## ## Datasets

1. **Lavail, A.**: *CRIRES+ reduced spectroscopic observations of WASP-178*, 2024, Zenodo, 10.5281/zenodo.11637332
2. **Lavail, A.**: *CRIRES+ reduced spectroscopic observations of WASP-189*, 2024, Zenodo, 10.5281/zenodo.12663685

## ## SPIE proceedings

1. Marconi, A., et al.: *ANDES, the high resolution spectrograph for the ELT: science case, baseline design and path to construction*, SPIE, 2022, 12184, 1218424
2. Dorn, R. J., et al.: *CRIRES+ on sky: high spectral resolution at infrared wavelength enabling better science at the ESO VLT*, SPIE, 2022, 12184, 121841F
3. Brucalassi, A., et al.: *Full system test and early preliminary acceptance Europe results for CRIRES+*, SPIE, 2018, 10702, 1070239
4. Piskunov, N., et al.: *A unique infrared spectropolarimetric unit for CRIRES+*, SPIE, 2018, 10702, 1070234
5. Follert, R., et al.: *Characterizing the cross dispersion reflection gratings of CRIRES+*, SPIE, 2016, 9912, 99122B
6. Dorn, R. J., et al.: *The "+" for CRIRES: enabling better science at infrared wavelength and high spectral resolution at the ESO VLT*, SPIE, 2016, 9908, 99080I