Khaled Al Moulla

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Positions

Since 2025 **SNSF Postdoctoral Fellow**
Center for Astrophysics at the University of Porto (CAUP), Portugal

2024 – 2024 **Postdoctoral Researcher**
University of Geneva, Switzerland

2020 – 2024 **Research and Teaching Assistant**
University of Geneva, Switzerland

Education

2020 – 2024 **PhD in Astronomy and Astrophysics**
University of Geneva, Switzerland
Supervisor: Prof. Xavier Dumusque
Thesis: Pathways Toward a Physical Understanding of Solar-type Variability in EPRVs

2018 – 2020 **MSc in Physics**
Uppsala University, Sweden
Supervisor: Prof. Nikolai Piskunov
Thesis: Advanced Characterization of Exoplanet Host Stars

2015 – 2018 **BSc in Physics**
Uppsala University, Sweden
Supervisor: Dr. Lina Hadid
Thesis: Turbulence at MHD and Sub-Ion Scales in the Magnetosheath of Saturn

Fellowships & Grants

2025 – 2027 **Swiss National Science Foundation (SNSF) Postdoc.Mobility Fellowship**
Project: Resolving and Solving Solar-type Activity with PoET
CHF 108,600 ≈ USD 120,000

2024 **Swiss Society for Astrophysics and Astronomy (SSAA) Travel Grant**
CHF 1,000 ≈ USD 1,100

2020 **F. O. Törnlund Foundation Scholarship**
SEK 26,000 ≈ USD 3,000

2018 – 2019 **A. & A. Löfberg Foundation Scholarship**
SEK 100,000 ≈ USD 11,000

Instrumentation

Consortia

Since 2025 **Paranal solar ESPRESSO Telescope (PoET)**
Member of Science Team

Since 2023 **Near-InfraRed Planet Searcher (NIRPS)**
Member of Science Team

Observations

2024 **ESO 3.6m Telescope**
Observer, Instruments: HARPS & NIRPS, Nights: 7

2021 – 2024 **Swiss Euler 1.2m Telescope**
Observer & Telescope Operator, Instruments: CORALIE & NECAM, Nights: 44

Successful Proposals

INAF AOT52 **Disentangling Granulation and Supergranulation in RV Time Series**
Co-Investigator, Instruments: HARPS-N, Time: 20.5 h

AOT49 **Pushing radial velocity detection limit towards detecting Earth-twins**
Co-Investigator, Instruments: HARPS-N, Time: 16.0 h

ESO P111 **Confirming an Earth-mass planet with ESPRESSO**
Co-Investigator, Instruments: ESPRESSO, Time: 33.3 h

Services

Committees

Since 2025 **Extreme Stellar Signals Project (ESSP)**
Member of Executive Committee

Since 2025 **Institute of Astrophysics and Space Sciences (IA)**
Member of Scientific Council

2022 – 2024 **Diversity, Inclusion and Equity (DEI) Group**, Geneva Observatory
Member of Committee

Conferences

2026 **Exoplanets 6**, Porto, PT
Member of LOC

2025 **Extremely Precise Radial Velocities (EPRV) 6**, Porto, PT
Member of LOC & Organizer of Splinter Session, Participants: 200

2023 **JUnior Researchers' Assembly (JURA) IV**, Leissigen, CH
Member of SOC & LOC, Participants: 47, Budget: CHF 32,000 $\approx$ USD 35,000

Journals

Since 2025 **Astronomy & Astrophysics (A&A)**
Referee

Teaching

Courses

2023 – 2024 **Astrophysics and Data Science**, Teaching Assistant
University of Geneva, Master's Level Course

Students

2023 – 2024 **Romain Eltschinger**, Master's Thesis
University of Geneva, co-supervised with Jeanne Davoult (University of Bern)

Talks (selected)

Conferences

2025 **EPRV 6**, Faculty of Sciences of the University of Porto, Porto, PT
Testing a Universal Activity Indicator with HARPS-N, HARPS and NIRPS Solar Observations

2024 **PoET Workshop #2**, CAUP, Porto, PT
Small-Scale Magnetic Field Proxies in the Optical and Near-Infrared

Exoplanets 5, Stadsgehoorzaal, Leiden, NL
Characterizing Solar-Type Activity with HELIOS

2023 **EPRV 5**, Hilton Beachfront Resort, Santa Barbara, US
Formation Temperature-Dependent Stellar Activity RVs Across Spectral Types

Sun-as-a-Star Workshop, Flatiron Institute, New York City, US
Introducing ARVE: Analyzing Radial Velocity Elements *&*
Which Spectral Segments are Optimal for Radial Velocity Extraction?

PoET Workshop, CAUP, Porto, PT
Understanding the Physics of Stellar Activity at the Spectral Level

2022 **JURA III**, Hotel Meielisalp, Leissigen, CH
Stellar Activity Indicators with Solar Observations

GPRV Workshop, All Souls College, Oxford, UK
Radial Velocity Dependence on Line Formation Temperature

Invited Seminars

2024 **Stockholm University**, Stockholm, SE
Roadblocks to Detect Earth-like Exoplanets: Solar-type Activity in Radial Velocities

Uppsala University, Uppsala, SE
Roadblocks to Detect Earth-like Exoplanets: Solar-type Activity in Radial Velocities

2023 **Weizmann Institute of Science**, Rehovot, IL (online)
Introducing ARVE: Analyzing Radial Velocity Elements

Posters (selected)

Conferences

2025 **ENAA XXXV**, European Maritime Safety Agency, Lisbon, PT
Leveraging the Sun to Enable the Detection of Earth Twins

2023 **Spectral Fidelity**, Istituto degli Innocenti, Florence, IT
NIRPS Sun-as-a-Star Observations

2022 **Cool Stars 21**, Pierre Baudis Centre, Toulouse, FR
Dependence of Solar Activity Signals on the Formation Temperature of Spectral Lines

Publications

A complete list is available on my ADS Public Library.

First Author

4. Al Moulla 2025, A&A, 701, A266
   ARVE: Analyzing Radial Velocity Elements. I.
   The Code
3. Al Moulla et al. 2024, A&A, 683, A106
   Measuring precise radial velocities on individual spectral lines. IV.
   Stellar activity correlation with line formation temperature
2. Al Moulla et al. 2023, A&A, 669, A39
   Stellar signal components seen in HARPS and HARPS-N solar radial velocities
1. Al Moulla et al. 2022, A&A, 664, A34
   Measuring precise radial velocities on individual spectral lines. III.
   Dependence of stellar activity signal on line formation temperature

Second Author

2. Anna John et al. 2025, MNRAS, 543, 1974
   Granulation on a quiet K dwarf: HD 166620. I. Spectral signatures as a function of line-formation temperature
1. Rescigno & Al Moulla 2025, MNRAS, 536, 3601
   Gaussian process regression of temperature-dependent radial velocities

Co-Author

24. Doshi et al. 2025, AJ, 170, 269
    The Interpolation Constraint in the RV Analysis of M Dwarfs Using Empirical Templates
23. Klein et al. 2025, MNRAS, 542, 2714
    Using Doppler imaging to model stellar activity and search for planets around Sun-like stars
22. Parc et al. 2025, A&A, 702, A138
    NIRPS and TESS reveal a peculiar system around the M dwarf TOI-756: A transiting sub-Neptune and a cold eccentric giant
21. Bazinet et al. 2025, A&A, 701, A276
    Quantifying thermal water dissociation in the dayside photosphere of WASP-121 b using NIRPS
20. Bourrier et al. 2025, A&A, 701, A190
    ATREIDES. I. Embarking on a trek across the exo-Neptunian landscape with the TOI-421 system
19. Gomez da Silva et al. 2025, A&A, 700, A177
    Blind search for activity-sensitive lines in the near-infrared using HARPS and NIRPS observations of Proxima and Gl 581
18. Silva et al. 2025, A&A, 700, A93
    A systematic bias in template-based radial velocity extraction algorithms
17. Suárez Mascareño et al. 2025, A&A, 700, A11
    Diving into the planetary system of Proxima with NIRPS: Breaking the metre per second barrier in the infrared
16. Bouchy et al. 2025, A&A, 700, A10
    NIRPS joining HARPS at ESO 3.6 m: On-sky performance and science objectives
15. Vaulato et al. 2025, A&A, 700, A9
    Hydride ion continuum hides absorption signatures in the NIRPS near-infrared transmission spectrum of the ultra-hot gas giant WASP-189b

14. Mercier et al. 2025, A&A, 700, A8
Studying the variability of the He triplet to understand the detection limits of evaporating exoplanet atmospheres

13. Allart et al. 2025, A&A, 700, A7
NIRPS detection of delayed atmospheric escape from the warm and misaligned Saturn-mass exoplanet WASP-69 b

12. Santos et al. 2025, Messenger, 194, 21
PoET: the Paranal solar ESPRESSO Telescope

11. Doyon et al. 2025, Messenger, 194, 13
NIRPS Joins HARPS: Setting New Standards at Infrared Wavelengths

10. Zhao et al. 2025, A&A, 693, A262
Precise and efficient modeling of stellar-activity-affected solar spectra using SOAP-GPU

9. Marchenko et al. 2024, ApJ, 977, 33
Sun-as-a-Star Spectral Line Variability in the 300–2390 nm Wavelength Range

8. Bourrier et al. 2024, A&A, 691, A113
The ANTARESS workflow: I. Optimal extraction of spatially resolved stellar spectra with high-resolution transit spectroscopy

7. Siegel et al. 2024, AJ, 168, 158
Quiet Please: Detrending Radial Velocity Variations from Stellar Activity with a Physically Motivated Spot Model

6. Malo et al. 2024, SPIE, 13096, 1309646
NIRPS near-infrared spectrograph: AITV phase at ESO3.6m/La Silla

5. Artigau et al. 2024, SPIE, 13096, 130960C
NIRPS first light and early science: breaking the 1 m/s RV precision barrier at infrared wavelengths

4. Klein et al. 2024, MNRAS, 531, 4238
Investigating stellar activity through eight years of Sun-as-a-star observations

3. Palumbo et al. 2024, AJ, 168, 46
GRASS. II. Simulations of Potential Granulation Noise Mitigation Methods

2. Jones et al. 2024, A&A, 683, A192
A long-period transiting substellar companion in the super-Jupiter-to-brown-dwarf mass regime and a prototypical warm-Jupiter detected by TESS

1. Zhao et al. 2023, AJ, 166, 173
The Extreme Stellar-signals Project. III. Combining Solar Data from HARPS, HARPS-N, EXPRES, and NEID

Submitted

8. Barka et al., submitted to A&A
   Modelling Solar Radial Velocities and Photometric Variability with SOAP
7. Dumusque et al., submitted to A&A
   A Decade of Solar High-Fidelity Spectroscopy and Precise Radial Velocities from HARPS-N
6. Frensch et al., submitted to A&A
   TOI-3288 b and TOI-4666 b: two gas giants transiting low-mass stars characterised by NIRPS
5. Hahlin et al., submitted to A&A
   Activity correlation and temporal variation of small-scale magnetic fields on young Sun-like stars
4. Lamontagne et al., submitted to A&A
   NIRPS Tightens the Mass Estimate of GJ 3090 b and Detects a Planet Near the Stellar Rotation Period
3. Srivastava et al., submitted to A&A
   Night sky emission correction techniques for high-resolution spectroscopy: a demonstration with NIRPS
2. Ulmer-Moll et al., submitted to A&A
   Detection and characterisation of a 106-day transiting Jupiter : TOI-2449 b / NGTS-36 b
1. Vaulato et al., submitted to A&A
   Atmospheric composition and circulation of the ultra-hot Jupiter WASP-121b with joint NIRPS, HARPS and CRIRES+ transit spectroscopy