

Khaled Al Moulla

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Education

- 2020 – 2024 **PhD in Astrophysics**, University of Geneva, Switzerland
Thesis: Pathways Toward a Physical Understanding of Solar-type Variability in EPRVs
Supervisor: Prof. Xavier Dumusque
- 2018 – 2020 **MSc in Physics: Astronomy**, Uppsala University, Sweden
Thesis: Advanced Characterization of Exoplanet Host Stars
Supervisor: Prof. Nikolai Piskunov
- 2015 – 2018 **BSc in Physics: Astronomy**, Uppsala University, Sweden
Thesis: Turbulence at MHD and Sub-Ion Scales in the Magnetosheath of Saturn
Supervisor: Dr. Lina Hadid

Instrumentation

Consortia

- Since 2023 **Keck Planet Finder (KPF)**, Member of Science Team
- Since 2023 **Near-InfraRed Planet Searcher (NIRPS)**, Member of Science Team

Proposals

- 2024 **INAF AOT49**, Co-Investigator, Telescope: TNG, Time: 16.0 h
- 2022 **ESO P111**, Co-Investigator, Telescope: VLT, Time: 33.3 h

Observations

- 2024 **ESO 3.6m Telescope**, HARPS & NIRPS, 7 nights
- 2021 – 2024 **Swiss Euler 1.2m Telescope**, CORALIE & NECAM, 44 nights

Teaching

Courses

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

Students

- 2023 – 2024 **Romain Eltschinger**, Co-Supervisor of Master's Thesis Project
Thesis: Synthetic Periodograms for the Bern Planetary Population Model
- 2023 **Fabrice Reymond**, Supervisor of Bachelor's Advanced Course Project
Project: Studying Solar Activity to Enhance Radial Velocity Exoplanet Detection

Service

- 2023 **JUnior Researchers' Assembly (JURA) IV**, Member of SOC/LOC
Planetary Science Conference, Participants: 47, Budget: CHF 32,000 \approx USD 35,000
- Since 2022 **DEI Group, Geneva Observatory**, Member of Committee

Grants & Scholarships

- 2024 **SSAA Travel Grant**, CHF 1,000 \approx USD 1,100
2020 **F. O. Törnlund Foundation Scholarship**, SEK 26,000 \approx USD 3,000
2018 – 2019 **A. & A. Löfberg Foundation Scholarship**, SEK 100,000 \approx USD 11,000

Talks

6 conferences, 4 science meetings, 3 invited seminar, 5 campus seminars.

Conferences

- 2024 **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

Science Meetings (selected)

- 2024 **HARPS-N Science Team Meeting**, Online
Magnetic Field Proxies in the Optical and Near-Infrared
- 2023 **NIRPS Science Team Meeting**, University of Montreal, Montreal, CA
HELIOS-NIRPS Initial Results
- 2022 **EPRV RCN Meeting**, Online
Stellar Signal Components seen in HARPS and HARPS-N Solar RVs

Posters

2 conferences, 2 science meetings.

Conferences

- 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

Science Meetings

- 2023 **NCCR PlanetS Site Visit**, University of Geneva, Geneva, CH
Stellar Signals in HARPS and HARPS-N Solar Radial Velocities
- 2022 **NCCR PlanetS General Assembly 8**, Sunstar Hotel, Grindelwald, CH
Radial Velocity Dependence on Line Formation Temperature

Publications

A complete list is available on my [ADS Public Library](#).

First Author

3. Al Moulla, K., Dumusque, X., & Cretignier, M. 2024, A&A, 683, A106
Measuring precise radial velocities on individual spectral lines. IV.
Stellar activity correlation with line formation temperature
2. Al Moulla, K., Dumusque, X., Figueira, P., et al. 2023, A&A, 669, A39
Stellar signal components seen in HARPS and HARPS-N solar radial velocities
1. Al Moulla, K., Dumusque, X., Cretignier, M., 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

Coauthor

6. Artigau, É., Bouchy, F., Doyon, R., et al. 2024, arXiv, 2406.08304
NIRPS first light and early science: breaking the 1 m/s RV precision barrier at infrared wavelengths
5. Bourrier, V., Delisle, J.-B., Lovis, C., et al. 2024, arXiv, 2407.19012
The ANTARESS workflow. I. Optimal extraction of spatially-resolved stellar spectra with high-resolution transit spectroscopy
4. Jones, M. I., Reinarz, Y., Brahm, R., 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
3. Klein, B., Aigrain, S., Cretignier, M., et al. 2024, MNRAS, 531(4), 4238
Investigating stellar activity through eight years of Sun-as-a-star observations
2. Palumbo, M. L., Ford, E. B., Gonzalez, E. B., et al. 2024, AJ, 168(1), 46
GRASS. II. Simulations of Potential Granulation Noise Mitigation Methods
1. Zhao, L. L., Dumusque, X., Ford, E. B., et al. 2023, AJ, 166, 173
The Extreme Stellar-signals Project. III. Combining Solar Data from HARPS, HARPS-N, EXPRES, and NEID

Submitted & In Preparation

5. Al Moulla, K., in preparation
ARVE: Analyzing Radial Velocity Elements. I. The Code
4. Al Moulla, K., Dumusque, X., & Cretignier, M., et al., in preparation
Stellar variability tracers in the optical and near-infrared. I. Unsigned magnetic flux proxy from solar disk-integrated, high-resolution intensity spectra observed with HARPS-N, HARPS, and NIRPS
3. Rescigno, F., & Al Moulla, K., submitted to MNRAS
Gaussian Process regression of temperature-dependent radial velocities
2. Siegel, J. C., Halverson, S., Luhn, J. K., et al., submitted to AJ
Quiet Please: Tracing Anomalous Radial Velocity Variations with a Physically Motivated Spot Model
1. Zhao, Y., Dumusque, X., & Cretignier, M., et al., submitted to A&A
Precise and efficient modeling of stellar-activity-affected solar spectra using SOAP-GPU