Chloe Elizabeth Fisher

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INTERESTS

I am working on developing atmospheric retrieval methods involving machine learning techniques for extrasolar planets. I use both high- and low-resolution data, and also study the theory of transmission spectra. I aim to use machine learning to analyse multiple datasets simultaneously and consider three-dimensional effects.

Key words: *Exoplanet atmospheres, machine learning, Bayesian inference*

EMPLOYMENT

University of Oxford, UK — 06/2022 - 06/2024
SNF Mobility Fellow
Brasenose College Nicholas Kurti Junior Research Fellow

University of Bern, Switzerland — 09/2021 - 06/2022
Scientific Researcher

EDUCATION

University of Bern, Switzerland — 08/2017 - 09/2021
PhD in Astrophysics, summa cum laude

University of Cambridge, UK — 10/2012 - 06/2016
MSci., Natural Sciences, first class honours
BA., Mathematics, upper second class honours

PUBLICATIONS

11. **Fisher, C.**, & Heng, K. 2022, ApJ, 934, 31
How Do We Optimally Sample Model Grids of Exoplanet Spectra?
10. Prinoth, B., Hoeijmakers, H.J., Kitzmann, D., Sandvik, E., Seidel, J.V., Lendl, M., Borsato, N.W., Thorsbro, B., Anderson, D.R., Barrado, D., Kravchenko, K., Allart, R., Bourrier, V., Cegla, H.M., Ehrenreich, D., **Fisher, C.**, Lovis, C., Guzmán Mesa, A., Grimm, S., Hooten, M., Morris, B.M., Oreshenko, M., Pino, L., & Heng, K. 2021, Nature Astronomy
Titanium oxide and chemical inhomogeneity in the atmosphere of the exoplanet WASP-189 b
9. Grimm, S.L., Malik, M., Kitzmann, D., Guzmn Mesa, A., Hoeijmakers, H.J., **Fisher, C.**, Mendona, J.M., Yurchenko, S.N., Tennyson, J., Alesina, F., Buchschacher, N., Burnier, J., Segransan, D., Kurucz, R.L., & Heng, K. 2021, ApJS, 253, 30
HELIOS-K 2.0 Opacity Calculator and Open-source Opacity Database for Exoplanetary Atmospheres
8. Guzmán Mesa, A., Kitzmann, D., **Fisher, C.**, Burgasser, A.J., Hoeijmakers, H.J., Márquez-Neila, P., Grimm, S.L., Mandell, A.M., Sznitman, R., & Heng, K. 2020, AJ, 160, 15
Information Content of JWST NIRSpec Transmission Spectra of Warm Neptunes
7. **Fisher, C.**, Hoeijmakers, H.J., Kitzmann, D., Márquez-Neila, P., Grimm, S.L., Sznitman, R., & Heng, K. 2020, AJ, 159, 192
Interpreting High-resolution Spectroscopy of Exoplanets using Cross-correlations and Supervised Machine Learning
6. Oreshenko, M., Kitzmann, D., Márquez-Neila, P., Malik, M., Bowler, B.P., Burgasser, A.J., Sznitman, R., **Fisher, C.**, & Heng, K. 2020, AJ, 159, 6
Supervised Machine Learning for Intercomparison of Model Grids of Brown Dwarfs: Application to GJ 570D and the Epsilon Indi B Binary System
5. **Fisher, C.**, & Heng, K. 2019, ApJ, 881, 25
How Much Information Does the Sodium Doublet Encode? Retrieval Analysis of Non-LTE Sodium Lines at Low and High Spectral Resolutions
4. Hoeijmakers, H.J., Ehrenreich, D., Kitzman, D., Allart, R., Grimm, S.L., Seidel, J.V., Wyttenbach, A., Pino, L., Nielsen, L.D., **Fisher, C.**, Rimmer, P.B., Bourrier, V., Cegla, H.M., Lavie, B., Lovis, C., Patzer, A.B.C., Stock, J.W., Pepe, F.A., & Heng, K. 2019, A&A, 627, A165
A spectral survey of an ultra-hot Jupiter: Detection of metals in the transmission spectrum of KELT-9b

3. Seidel, J.V., Ehrenreich, D., Wyttenbach, A., Allart, R., Lendl, M., Pino, L., Bourrier, V., Cegla, H.M., Lovis, C., Barrado, D., Bayliss, D., Astudillo-Defru, N., Deline, A., **Fisher, C.**, Heng, K., Joseph, R., Lavie, B., Melo, C., Pepe, F., Ségransan, D., & Udry, S. 2019, A&A, 623, A166
Hot Exoplanet Atmospheres Resolved with Transit Spectroscopy (HEARTS) - II. A broadened sodium feature on the ultra-hot giant WASP-76b

2. **Fisher, C.**, & Heng, K. 2018, MNRAS, 481, 4698
Retrieval analysis of 38 WFC3 transmission spectra and resolution of the normalization degeneracy

1. Márquez-Neila, P., **Fisher, C.**, Sznitman, R., & Heng, K. 2018, Nature Astronomy, 2, 719
Supervised machine learning for analysing spectra of exoplanetary atmospheres

REFEREEING

Referee for ApJ, ApJ Letters, and PSJ	02/2020-Present

FELLOWSHIPS & AWARDS

Nicholas Kurti Junior Research Fellowship, Brasenose College	2022
SNSF Postdoc.Mobility Fellowship	2022-2024
IAU Division F Honorable PhD Prize	2022
University of Bern Physics and Astronomy Faculty PhD Award	2021
SSAA MERAC Funding and Travel Award (4500 CHF)	2021
University of Bern International 2021 PhD Fellowship	2017-2020
Bundy Scholarship, University of Cambridge	2016
Magdalene College Natural Sciences Award, University of Cambridge	2016

PROFESSIONAL TALKS

• Astro@Home: Astrophysics and AOPP	06/2022
• The Next Generation of European Extrasolar Scientists Conference (Virtual)	04/2022
• SSAA GA (Virtual)	10/2021
• ESO Atmo Conference (Virtual)	08/2021
• KPIC Mini workshop (Virtual)	06/2021
• Young Physicists Forum, Switzerland (Virtual)	04/2021
• California Institute of Technology, California, USA (Virtual)	09/2020
• University of Chicago Journal Club, Chicago, USA (Virtual)	08/2020
• ESP Summer School, Bern, Switzerland (Virtual)	06/2020
• CSH Symposium, Bern, Switzerland	02/2020
• AMLD, Lausanne, Switzerland	01/2020
• DPS, EPSC, Geneva, Switzerland	09/2019
• Junior Researchers Assembly, Vitznau, Switzerland	09/2019
• ESP Summer School, Lenzerheide, Switzerland	06/2019
• CSH Symposium, Bern, Switzerland	01/2019
• Machine Learning Series, Oxford, UK	11/2018
• SPI-MAX, Oxford, UK	11/2018
• Bern Exoplanet Retreat, Monte Verita, Switzerland	09/2018
• Spectroscopy of Exoplanets, Windsor, UK	07/2018
• DTU Workshop, Copenhagen, Denmark	05/2018

ORGANISATION

LOC & SOC for PlanetS Junior Researchers' Assembly	04/2022
SOC for ESO Atmo 2021 Conference	08/2021

TEACHING & MENTORING

Supervisor for a Bachelor's summer project — 07-08/2022
University of Oxford, UK

Mentor for visiting refugee high-school student — 09/2018 - present
University of Bern, Switzerland

TA for Bachelor's Physics Exercises and Lab Courses — 2020-2021
University of Bern, Switzerland

TA for Master's Course *"Advanced Statistical Methods for Physicists"* — 02-06/2019
University of Bern, Switzerland

Physics A-level teaching assistant — 05-07/2017
The Cherwell School, UK

Student mentor for Cambridge STEP school — 04-06/2013; 08/2014
University of Cambridge, UK

OUTREACH

Invited talk at the Young Physicists Forum, Switzerland (Virtual) — 04/2021
Bern, Switzerland

Astronomy introduction sessions with a primary school child — 04/2021
Oxford, UK

Talk at A-Level certificates evening — 12/2019
The Cherwell School, UK

Video for International Relations — 11/2019
University of Bern, Switzerland

Talk at Pint of Science — 05/2019
Bern, Switzerland

OTHER SKILLS

Programming: Python, Matlab

Languages: English (native), German (B1 level), French (AS level), Spanish (AS level)