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 transimission 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*

EDUCATION

University of Bern, Switzerland — 08/2017 - present
PhD candidate in Astrophysics

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

PUBLICATIONS

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 Letters — 02/2020-Present

FELLOWSHIPS AND AWARDS

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

- Young Physicists Forum, Switzerland (Virtual) — (Invited) 04/2021
  Studying Exoplanet Atmospheres from Earth and Space (with Machine Learning)
- California Institute of Technology, California, USA (Virtual) — (Invited) 09/2020
  "Exoplanet Atmospheric Retrieval using Machine Learning"
- University of Chicago Journal Club, Chicago, USA (Virtual) — (Invited) 08/2020
  "Exoplanet Atmospheric Retrieval using Traditional Methods and Machine Learning"
- ESP Summer School, Bern, Switzerland (Virtual) — 06/2020
  "HELA"
- CSH Symposium, Bern, Switzerland — 02/2020
  "High-Resolution Atmospheric Retrieval for Exoplanets"
- AMLD, Lausanne, Switzerland — (Invited) 01/2020
  "Supervised Machine Learning for Exoplanet Atmospheric Retrieval"
- DPS, EPSC, Geneva, Switzerland — 09/2019
  "Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres"
- Junior Researchers Assembly, Vitznau, Switzerland — 09/2019
  "Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres"
- ESP Summer School, Lenzerheide, Switzerland — 06/2019
  "HELA"
- CSH Symposium, Bern, Switzerland — 01/2019
  "Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres"
- Machine Learning Series, Oxford, UK — (Invited) 11/2018
  "Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres"
- SPI-MAX, Oxford, UK — (Invited) 11/2018
  "Retrieval Analysis of WFC3 Transmission Spectra of Exoplanets"
- Bern Exoplanet Retreat, Monte Verita, Switzerland — 09/2018
  "Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres"
- Spectroscopy of Exoplanets, Windsor, UK — 07/2018
  "Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres"
- DTU Workshop, Copenhagen, Denmark — 05/2018
  "Retrieval Analysis of WFC3 Transmission Spectra"

TEACHING

Mentor for visiting refugee high-school student University of Bern, Switzerland	09/2018 - present
Teaching assistant for Physics 1 University of Bern, Switzerland	Autumn 2020
Physics lab assistant University of Bern, Switzerland	Spring 2020
Teaching assistant for "Advanced Statistical Methods for Physicists" University of Bern, Switzerland	Spring 2019
Physics A-level teaching assistant The Cherwell School, UK	05-07/2017
Student mentor for Cambridge STEP school University of Cambridge, UK	04-06/2013; 08/2014

OUTREACH	Talk at A-Level certificates evening The Cherwell School, UK	12/2019
	Video for International Relations University of Bern, Switzerland	11/2019
	Talk at Pint of Science Bern, Switzerland	05/2019