

René Kiefer | Curriculum Vitae

| Researcher in Helio- and Asteroseismology | Stellar Activity Cycles |  kieferastro.eu |

Personal Information

Date/Place of Birth 15.10.1987 in Villingen-Schwenningen, Germany
Nationality German
Marital Status Married
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Research Interests

- Asteroseismology
- Stellar activity cycles
- Evolution of activity cycles
- Helioseismology
- Effect of magnetic fields on global stellar oscillations
- Development of novel methods
- The solar-stellar connection

Employment

November 2017–present **Research Fellow**, *Centre for Fusion, Space and Astrophysics, University of Warwick, Coventry, West Midlands, UK.*

Education

2014–2017 **PhD**, *Albert-Ludwigs-University, Freiburg, Germany, Magna Cum Laude, Average grade: 1.17, Date of defense: 16.05.2018.*

2007–2013 **Diploma in Physics**, *Albert-Ludwigs-University, Freiburg, Average grade: 1.1.*
Diploma thesis: *Methods for Asteroseismic Analysis of Kepler Data - An Estimation of Mass, Radius and Activity of Solar-like Stars, Grade: 1.0*

1998–2007 **Abitur**, *Kolleg St. Sebastian, Stegen, Germany, Average grade: 1.3.*

PhD Studies

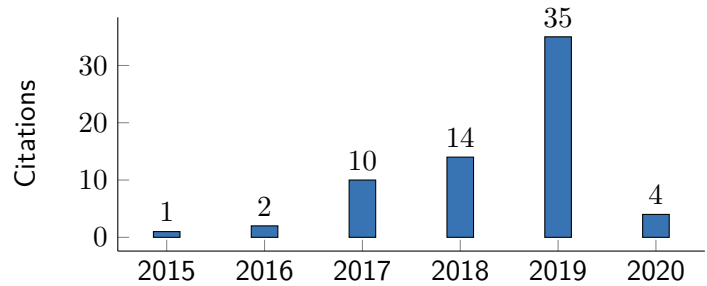
Title Seismic Investigations of Solar and Stellar Magnetic Activity
Supervisor apl. Prof. Dr. Markus Roth
Institute Kiepenheuer Institute for Solar Physics, Freiburg, Germany
Description I developed seismic diagnostics and tools with which solar and stellar magnetic activity can be studied. Additionally, I advanced the seismic detection of stellar activity cycles as well as the investigation of the change of the parameters of the Sun's acoustic oscillations over the solar cycle. My thesis is available here: [Link](#)

Diploma Thesis

Title Methods for Asteroseismic Analysis of Kepler Data - An Estimation of Mass, Radius and Activity of Solar-like Stars
Supervisors Prof. Dr. Oskar von der Lühe and Prof. Dr. Markus Roth
Institute Kiepenheuer Institute for Solar Physics, Freiburg, Germany
Description I analysed data from the NASA *Kepler* satellite with the goal of testing existing and developing new asteroseismic methods to estimate fundamental stellar parameters like mass and radius. I was able to present a novel method to extract these parameters from the data and furthermore found evidence for stellar activity cycles in the investigated sample of stars.

Publications

- Seven refereed first-author papers
- h-index = 5 (Google Scholar)
- Total number of citations: 66
- Links: ADS, Google Scholar, ORCID



- 2020 W. J. Chaplin, A. Serenelli, A. Miglio, T. Morel, J. T. Mackereth, F. Vincenzo, H. Kjeldsen, (et al. including **R. Kiefer**). *Age dating of an early Milky Way merger via asteroseismology of the naked-eye star ν Indi*. Published in *Nature Astronomy*.
- R. Kiefer**, A.-M. Broomhall. *Empirical Relations for the Sensitivities of Solar-like Oscillations to Magnetic Perturbations*. Submitted to *Monthly Notices of the Royal Astronomical Society*.
- 2019 **R. Kiefer**, A.-M. Broomhall, W. H. Ball. *Seismic Signatures of Stellar Magnetic Activity - What Can We Expect from TESS?* Published in *Frontiers in Astronomy and Space Sciences*, 6:52.
- A. R. G. Santos, T. L. Campante, W. J. Chaplin (et al., including **R. Kiefer**) *Signatures of Magnetic Activity: On the Relation between Stellar Properties and p-mode Frequency Variations*. Published in *The Astrophysical Journal*, 883.1:65.
- 2018 **R. Kiefer**, R. Komm, F. Hill, A.-M. Broomhall, and M. Roth. *GONG p-Mode Parameters Through Two Solar Cycles*. Published in *Solar Physics*, 293.11:151.
- A. R. G. Santos, T. L. Campante, W. J. Chaplin, M. S. Cunha, M. N. Lund, **R. Kiefer** et al. *Seismic signatures of magnetic activity in solar-type stars observed by Kepler*. Published in D. Banerjee et al. (Eds.), *Proceedings of the IAU: Long-term Datasets for the Understanding of Solar and Stellar Magnetic Cycles, S340*, 225–228, Cambridge University Press.
- R. Kiefer**. *Seismic investigations of solar and stellar magnetic activity*. PhD Thesis, Albert-Ludwigs-University, Freiburg, Germany.
- R. Kiefer** and M. Roth. *The Effect of Toroidal Magnetic Fields on Solar Oscillation Frequencies*. Published in *The Astrophysical Journal*, 854.1:74.
- A. R. G. Santos, T. L. Campante, W. J. Chaplin, M. S. Cunha, M. N. Lund, **R. Kiefer** et al. *Signatures of magnetic activity in the seismic data of solar-type stars observed by Kepler*. Published in *The Astrophysical Journal Supplement Series*, 237.1:17.
- 2017 **R. Kiefer**, A. Schad, and M. Roth. *Analytical calculation of the general matrix element for general toroidal magnetic fields*. Published in *The Astrophysical Journal*, 846.2:162.
- R. Kiefer**, A. Schad, G. Davies, and M. Roth. *Stellar magnetic activity and variability of oscillation parameters: An investigation of 24 solar-like stars observed by Kepler*. Published in *Astronomy & Astrophysics*, 598:A77.
- 2015 **R. Kiefer**, A. Schad, W. Herzberg, and M. Roth. *Determination of fundamental asteroseismic parameters using the Hilbert transform*. Published in *Astronomy & Astrophysics*, 578:A56.
- J. Amaya, S. Musset, V. Andersson, A. Diercke, C. Höller, S. Iliev, L. Juhász, **R. Kiefer**, et al. *The PAC2MAN mission: a new tool to understand and predict solar energetic events*. Published in *Journal of Space Weather and Space Climate*, 5:A5.

Experience

- 2020 Member in the **ISSI** international team on "*Solar and Stellar Dynamos: A new Era*" as **Young Researcher**.
- 2019-2020 Member in the **ISSI** international team on "*Probing the core of the Sun and the stars*" as **Young Researcher**.
- April 2015–June 2015 **Research stay** (12 weeks) at the National Solar Observatory, Tucson, Arizona on the *Mobility of Young Researchers* grant of the SOLARNET network.
- 2012–2016 **Teaching assistant** over seven semesters covering various courses.
- June 2014–June 2017 **PhD Student Representative** in the strategic committee of the Kiepenheuer Institute for Solar Physics.
- June 2013–2016 Responsible for the setup and maintenance of the **Spacelnn project website**.
- May–October 2012 **Research traineeship**, *Kiepenheuer Institute for Solar Physics*, Freiburg, Germany.
- August–October 2011 **Traineeship**, *Kiepenheuer Institute for Solar Physics*, Freiburg, Germany.
- May 2009–September 2012 **Student assistant**, *m2k-laser*, Freiburg, Germany, Characterisation and quality check of diode lasers.

Conferences and Workshops with Talks

- November 2018 **SOHO-29: 22 years of GOLF and VIRGO: 2 sunspot cycles seen by seismology**, Nice, France.
Contributed talk: GONG p-Mode Parameters Through Two Solar Cycles
- July 2018 **TASC4/KASC11: First Light in a new Era of Astrophysics**, Aarhus, Denmark.
Contributed talk: Modelling Doris' Frequency Shifts. The Impact of Large-Scale Magnetic Fields on Stellar Oscillation Frequencies
- December 2016 **Workshop: Asteroseismology of Stellar Activity Cycles: From the Sun to the Stars**, Nice, France.
Invited talk: Signatures of magnetic activity in the oscillation parameters of solar-like stars observed by *Kepler*
- July 2016 **TASC2 & KASC9 Workshop – SPACEINN & HELAS8 Conference, Seismology of the Sun and the Distant Stars 2016 - Using Today's Successes to Prepare the Future**, Angra do Heroísmo, Terceira-Açores, Portugal.
Contributed talk: Investigation of the frequency shifts of 24 solar-like stars observed by *Kepler*

Conferences, Workshops, and Schools

- August 2019 **Stars and Their Variability Observed from Space, Celebrating the 5th Anniversary of BRITE-Constellation**, Vienna, Austria.
Poster: Detection of Frequency Shifts in Evolved *Kepler* Stars
- July 2017 **TESSting stellar astrophysics — TASC3/KASC10 Workshop**, Birmingham, UK.
Poster: Forward Calculations of the Effect of Large-Scale Toroidal Magnetic Fields on Solar and Stellar Oscillations
- November 2016 **T'DA1, TESS Data for Asteroseismology workshop**, Birmingham, UK.
- July 2016 **IVth Azores International Advanced School in Space Sciences, Asteroseismology and Exoplanets: Listening to the Stars and Searching for New Worlds**, Horta, Faial, Açores, Portugal.
- September 2015 **Solarnet III/HELAS VII/Spacelnn Conference, The Sun, the stars, and solar-stellar relations**, Freiburg, Germany.
Poster presentations: *The Envelope Spectrum, p-Mode Parameters and the Solar Cycle, Signatures of magnetic activity in the p-mode frequencies of solar-type stars observed by Kepler*
- September 2014 **ESPM-14, 14th European Solar Physics Meeting**, Dublin, Ireland.
Poster presentation: *Magnetic Fields and Solar Oscillations*
- September 2014 **HELAS VI, Helioseismology and Applications**, Göttingen, Germany.
Poster presentation: *Magnetic Fields and Solar Oscillations*

December 2013 **FFG Post-Alpbach Workshop 2013**, *Refinement of a space mission, which was designed during the 2013 Alpbach Summer School, Graz, Austria.*

July 2013 **ESA Summer School Alpbach 2013**, *Space Weather: Science, Missions and Systems, Alpbach, Austria.*

Teaching and Outreach Experience

Winter term 2020 **Co-Supervision** of two master students' *Final Year Project*: Improving the prediction of the mode amplitude of solar-like oscillations.

Summer term 2019 **Co-Supervision** of a master student's *Summer Research Project* (8 weeks): Measuring mode amplitudes of solar-like oscillations in *Kepler* stars.

Summer term 2018 **Supervision** of a master student's *Summer Research Project* (8 weeks): Improving the detection of acoustic signatures of stellar activity cycles.

2018-2019 Participation in **outreach events** at a primary school, at a school's science day at the University of Warwick, and the Coventry Summer of Science Festival.

Winter semester 2016 **Supervision** of a master student's term paper on *Stellar dynamo models* with focus on the solar dynamo, the connection of observations and theory, and the detailed discussion of one class of dynamo models.

2015-2016 **Public tours** of the old institute observatory. Including several 30 minute *outreach talks* on the Sun and its activity cycle. Attendance ~ 150 per day.

Winter semester 2016 **Teaching assistant** for *Astrobiology*. Responsible for the creation of the weekly online quizzes.

Summer semester 2014, 2016 Responsible for the preparation of the exercises and teaching of the exercise classes to *Introduction to Astronomy and Astrophysics*

Winter semester 2015 Teaching assistant for *Theoretical Astrophysics I: Stars and Planets*

Summer semester 2013 Teaching assistant for *Physics Lab for Beginners*

Winter semester 2012, 2014 Teaching assistant for *Experimental Physics I*

Community Service

2019 **Panel reviewer** of **NASA** proposals.

Ongoing **Referee** of manuscripts in *Monthly Notices of the Royal Astronomical Society*, *Astronomy & Astrophysics*, and *Frontiers in Astronomy and Space Sciences*.

Computer Skills

Intermediate Python, Typo3, Linux, Microsoft Windows, OpenOffice, Microsoft Office

Advanced IDL, \LaTeX , WordPress

Languages

German **Native speaker**

English **Business fluent**