

JORDAN VAN BEECK

POSITION: PhD student Astronomy & Astrophysics, KU Leuven

CONTACT INFORMATION

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RESEARCH INTERESTS

Much of my work is related to waves propagating inside stars (i.e. asteroseismology), where I focus on coupling theoretical astrophysics to observations. Within this broad research topic, I characterize the influence of stellar magnetic fields, as well as wave interactions and their implications for stellar structure and evolution. I ponder about astrobiological questions on habitability of (exo)planets and (exo)moons, especially when this can be related to stellar activity, and am broadly interested in planetary sciences. Formerly trained as a chemist (and astrophysicist), I am also interested in analytical or theoretical chemistry-related research, for example, investigating the dust formation mechanism in winds of evolved stars.

SCIENTIFIC EDUCATION

09/2017–07/2019	ASTRONOMY & ASTROPHYSICS, MSc. KU Leuven Thesis title: The influence of an interior magnetic field on gravity-mode oscillations of intermediate-mass stars <i>Promoters: Prof. Dr. C. Aerts, Dr. T. Van Reeth, Dr. D. M. Bowman</i>
09/2015–09/2017	CHEMIE / CHEMISTRY, MSc. University of Antwerp (Universiteit Antwerpen) Thesis title: Characterization of radioactive particles <i>Promoters: Prof. Dr. K. Janssens, Prof. Dr. B. Salbu, Prof. Dr. O.-C. Lind, MSc. G. Nuyts</i>
09/2012–09/2015	CHEMIE / CHEMISTRY, BSc. University of Antwerp (Universiteit Antwerpen) Thesis title: Atomic scale reactive MD studies of DNA oxidation for plasma oncology: the role of H ₂ O ₂ and HO ₂ <i>Promoters: Prof. Dr. A. Bogaerts, Prof. Dr. E. Neyts, Dr. C. Verlackt</i>

AWARDS AND HONORS

2019	Paul Smeyers Prize, KU Leuven Awarded to the annual best master's thesis in Astronomy & Astrophysics at the June examination session.
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TEACHING EXPERIENCE

Courses and modules

09/2019 (ongoing)	Teaching assistant for courses 'Natuurkunde met elementen van wiskunde' I and II (in Dutch, translation: 'Physics with elements of mathematics' I and II) for first year bachelor students in Pharmaceutical sciences, KU Leuven
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RESEARCH EXPERIENCE

11/2021 (ongoing)	Visiting Student Researcher at TAPIR, Prof. Dr. Jim Fuller, Caltech Topic: Nonlinear and magneto- asteroseismology: a dynamic step forward. Main Focus: using nonlinear asteroseismological theory and tools to explain tidally influenced/excited pulsations in gravity-mode pulsating binary stars.
09/2019 (ongoing)	PhD student at Institute of Astronomy / Instituut voor sterrenkunde, Prof. Dr. Conny Aerts, Prof. Dr. Tim Van Hoolst and Dr. Dominic Bowman, KU Leuven Topic: Application of nonlinear asteroseismology to Kepler and TESS space photometry Main focus: extending current linear asteroseismological tools (that put models of the stellar interior to the test) to the nonlinear domain for intermediate-mass gravity-mode pulsating stars.
10/2018-6/2019	Master's thesis research project at the Institute of Astronomy / Instituut voor sterrenkunde, Prof. Dr. Conny Aerts, Dr. Dominic Bowman, Dr. Timothy Van Reeth, KU Leuven Topic: The influence of an interior magnetic field on gravity-mode oscillations of intermediate-mass stars Contributions: two publications as a co-author, a first-author publication, and a poster presentation.
02/2018 (ongoing)	Theoretical chemistry research project at Institute of Astronomy / Instituut voor sterrenkunde, Prof. Dr. Leen Decin and Dr. David Gobrecht, KU Leuven Topic: Dust cluster nucleation in (carbon-rich) winds of asymptotic giant branch stars Contribution: a technical report.
2016-2017	Master's thesis research project at the AXES research group, Prof. Dr. Koen Janssens, MSc. Gert Nuyts, University of Antwerp (Universiteit Antwerpen) and the Centre for Environmental Radioactivity (CERAD), Ole-Christian Lind, Norwegian University of Life Sciences (NMBU) Topic: Characterization of radioactive particles. (Mainly using X-ray analysis techniques to characterize environmental radionuclides.) Research stay: a short research stay in May 2016 at the Deutsches Elektronen-Synchrotron (DESY), providing access to high spatial and spectral resolution X-ray analysis.

GRANTS AND FELLOWSHIPS

2019 - 2023	4-year PhD Fellowship, Department of Physics and Astronomy, KU Leuven
2021 - 2022	FWO long research stay grant, Fonds voor wetenschappelijk onderzoek

MEMBERSHIP OF SCIENTIFIC ORGANIZATIONS

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| Since 2019 | Graduate student member of the International Research Network for Nuclear Astrophysics (IReNA). |
| Since 2020 | Graduate student member of the American Astronomical Society (AAS). |
| Since 2020 | Graduate student member of the Royal Netherlands Astronomical Society/Koninklijke Nederlandse Astronomenclub (KNA). |

CONFERENCES AND WORKSHOPS

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| October 2018 | STFC/MAMSIE mini-workshop |
| April 2019 | STFC/MAMSIE mini-workshop |
| June 2019 | 74th Dutch Astronomy Conference/Nederlandse Astronomenconferentie, Groningen/Paterswolde, the Netherlands. |
| July 2020 | Let's Talk Science: 8th Summer School for Science Communication and Communicative Competences (online) |
| July 2020 | MOBSTER-1 Virtual conference 2020: Stellar variability as a probe of magnetic fields in massive stars (online). |
| August 2021 | 10 th MESA summer school (online) |
| Nov.-Dec. 2021 | Probes of Transport in Stars, Kavli Institute for Theoretical Physics, UCSB, Santa Barbara, CA, USA. (workshop , associated conference) |
| July 2022 | TASC6/KASC13 conference of the asteroseismic community. More information can be found on this website . |

TALKS AND PRESENTATIONS

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| June 2019 | "Constraining magnetic fields in intermediate-mass main-sequence stars with asteroseismology" (POSTER), 74th Dutch Astronomy Conference/Nederlandse Astronomenconferentie, Groningen/Paterswolde, the Netherlands. |
| July 2020 | "Linking detected gravity modes to axisymmetric internal magnetic fields" (CONTRIBUTED TALK), MOBSTER-1 Virtual conference 2020: Stellar variability as a probe of magnetic fields in massive stars (online , hosted by University of Delaware, USA). |
| November 2021 | "Mode Coupling among gravito-inertial modes in Slowly Pulsating B Stars" (CONTRIBUTED TALK), Probes of Transport in Stars conference 2021, Kavli Institute for Theoretical Physics, UCSB, CA, USA). doi:10.26081/K6VH15 |

CONFERENCE ORGANISATION

July 2022 | TASC6/KASC13 at Leuven, Belgium: part of the LOC. More information can be found on [this website](#).

MAIN PEER-REVIEWED SCIENTIFIC PUBLICATIONS

As of Jan 30, 2022, my citation metrics are:

- **Google Scholar:** 61 citations, h-index 3
- **NASA ADS:** 64 citations, h-index 4

Published articles (listed: # of citations from NASA ADS)

1. C. Aerts, K. Augustson, S. Mathis, M. G. Pedersen, J. S. G. Mombarg, V. Vanlaer, **J. Van Beeck**, and T. Van Reeth. Rossby numbers and stiffness values inferred from gravity-mode asteroseismology of rotating F- and B-type dwarfs. Consequences for mixing, transport, magnetism, and convective penetration. *Astronomy & Astrophysics*, volume 656, article id. A121, December 2021.
DOI: [10.1051/0004-6361/202142151](https://doi.org/10.1051/0004-6361/202142151)
2. **J. Van Beeck**, D. M. Bowman, M. G. Pedersen, T. Van Reeth, T. Van Hoolst, and C. Aerts. Detection of non-linear resonances among gravity modes of slowly pulsating B stars: Results from five iterative pre-whitening strategies. *Astronomy & Astrophysics*, volume 655, article id. A59, November 2021. (Citations: 4)
DOI: [10.1051/0004-6361/202141572](https://doi.org/10.1051/0004-6361/202141572)
3. **J. Van Beeck**, V. Prat, T. Van Reeth, S. Mathis, D. M. Bowman, C. Neiner, and C. Aerts. Detecting axisymmetric magnetic fields using gravity modes in intermediate-mass stars. *Astronomy & Astrophysics*, volume 638, article id. A149, June 2020. (Citations: 17)
DOI: [10.1051/0004-6361/201937363](https://doi.org/10.1051/0004-6361/201937363)
Inlists: [Zenodo link](#)
4. V. Prat, S. Mathis, C. Neiner, **J. Van Beeck**, D. M. Bowman, and C. Aerts. Period spacing of gravity modes in rapidly rotating magnetic stars. II. The case of an oblique dipolar fossil magnetic field. *Astronomy & Astrophysics*, volume 636, article id. A100, April 2020. (Citations: 16)
DOI: [10.1051/0004-6361/201937398](https://doi.org/10.1051/0004-6361/201937398)
5. V. Prat, S. Mathis, B. Buysschaert, **J. Van Beeck**, D. M. Bowman, C. Aerts, and C. Neiner. Period spacings of gravity modes in rapidly rotating magnetic stars I. Axisymmetric fossil field with poloidal and toroidal components. *Astronomy & Astrophysics*, Volume 627, article id. A64, July 2019. (Citations: 26)
DOI: [10.1051/0004-6361/201935462](https://doi.org/10.1051/0004-6361/201935462)

Conference proceedings

1. **J. Van Beeck**, V. Prat, T. Van Reeth, S. Mathis, D. M. Bowman, C. Neiner, and C. Aerts. Linking detected gravity modes to axisymmetric internal magnetic fields. *MOBSTER-1 virtual conference: Stellar variability as a probe of magnetic fields in massive stars*, Proceedings of the MOBSTER-1 virtual conference held 12-17 July 2020, id.13.
[NASA ADS link](#)
2. V. Prat, S. Mathis, B. Buysschaert, **J. Van Beeck**, D. M. Bowman, C. Aerts, and C. Neiner. Effect of the magnetic field on period spacings of gravity modes in rapidly rotating stars. *Proceedings of the conference Stars and their Variability Observed from Space*, held in Vienna on August 19-23, 2019. Eds.: C. Neiner, W. W. Weiss, D. Baade, R. E. Griffin, C. C. Lovekin, A. F. J. Moffat. University of Vienna, 2020, pp.105-106
[NASA ADS link](#)