Jordan Van Beeck

CURRENT POSITION: PhD student Astronomy & Astrophysics, KU Leuven

Contact information

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WoS Researcher ID:	my Clarivate Web of Science researcher ID

Research Interests

My work is related to waves propagating inside stars (i.e. asteroseismology), where I mainly characterize (standing) wave coupling to understand the process of mode amplitude limitation. Formerly trained as a chemist, I am also interested in analytical, computational or theoretical chemistry-related research; for example, the simulation of dust nucleation processes 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
Promoters: Prof. Dr. C. Aerts, Dr. T. Van Reeth, Dr. D. M. Bowman

09/2015–09/2017 | Chemie / Chemistry, MSc.
University of Antwerp (Universiteit Antwerpen)
Thesis title: Characterization of radioactive particles
Promoters: Prof. Dr. K. Janssens, Prof. Dr. B. Salbu, Prof. Dr. O.-C. Lind, MSc. G. Nuyts

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_2O_2 and HO_2
Promoters: Prof. Dr. A. Bogaerts, Prof. Dr. E. Neyts, Dr. C. Verlackt

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.

Teaching Experience

Courses and modules

09/2019-01/2023 | 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

Research Experience

09/2019 (ongoing) | **PhD student at the Institute of Astronomy, KU Leuven, Belgium. Promotors: Prof. Dr. Conny Aerts, Prof. Dr. Tim Van Hoolst and Dr. Dominic Bowman.**

Topic: Asteroseismology of Kepler B stars: internal magnetism and nonlinear mode coupling

Main focus: extending current linear asteroseismological tools (that put models of the stellar interior to the test) by including magnetic fields or nonlinear coupling for slowly pulsating B stars observed by Kepler.

11/2021-06/2022 | Visiting Student Researcher at TAPIR, Caltech
Local mentor: Prof. Dr. Jim Fuller

Topic: Nonlinear asteroseismology: a dynamic step forward.

Main Focus: using nonlinear asteroseismological theory to develop tools that aid in explaining amplitude limitation in slowly pulsating B stars.

10/2018-6/2019 | Master's thesis at the Institute of Astronomy, KU Leuven, Belgium.
Promotors: Prof. Dr. Conny Aerts, Dr. Dominic Bowman,
Dr. Timothy Van Reeth

Topic: The influence of an interior magnetic field on gravity-mode oscillations of intermediate-mass stars

Results from work done (partially) during master's thesis: two publications as a co-author, a first-author publication, and a poster presentation.

02/2018 - 05/2018 | Theoretical chemistry project at the Institute of Astronomy,
KU Leuven, Belgium.
Mentors: Prof. Dr. Leen Decin and Dr. David Gobrecht

Topic: Dust cluster nucleation in (carbon-rich) winds of asymptotic giant branch stars.

Contribution to: a (published) technical report.

2016-2017 | Master's thesis at the AXES research group, University of Antwerp, Belgium and at the Centre for Environmental Radioactivity (CERAD), Norwegian University of Life Sciences (NMBU), Norway.
Promotors: Prof. Dr. Koen Janssens, MSc. Gert Nuyts,
Prof. Dr. Ole-Christian Lind (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

Since 2019	Graduate student member of the International Research Network for Nuclear Astrophysics (IReNA).
2020-2022	Graduate student member of the American Astronomical Society (AAS).
2020-2022	Graduate student member of the Royal Netherlands Astronomical Society/Koninklijke Nederlandse Astronomenclub (KNA).
2022	Fellow (graduate student) of the Royal Astronomical Society (RAS).

Conferences and workshops

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

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
July 2022	"Resonant Amplitude Equations for Gravito-Inertial Modes: Mode Coupling in a Slowly Pulsating B star" (POSTER, ADDITIONAL INFORMATION), TASC6/KASC13 workshop/conference at Leuven, Belgium. doi:10.5281/zenodo.6814504
February 2023	"Non-linear gravito-inertial mode coupling in SPB stars" (SEMINAR), ad-valvas seminar of the institute of astronomy, KU Leuven, Belgium.
March 2023	"Non-linear resonant gravito-inertial mode coupling and asteroseismology of Kepler slowly pulsating B stars" (ONLINE SEMINAR), The Good Vibrations seminar series, S3E8.

Conference organisation

July 2022	TASC6/KASC13 at Leuven, Belgium: part of the LOC. More information can be found on this website.

Peer-Reviewed Scientific Publications

As of Aug 2, 2023, my citation metrics are:

- **Google Scholar**: 120 citations, h-index 5
- **NASA ADS**: 128 citations, h-index 6
- **Clarivate Web of Science**: 83 citations, h-index 6

Published articles (listed: # of citations from NASA ADS / Google Scholar / Clarivate WoS)

1. T. Van Reeth, C. Johnston, J. Southworth, J. Fuller, D. M. Bowman, L. Poniatowski, and **J. Van Beeck**. Tidally perturbed gravity-mode pulsations in a sample of close eclipsing binaries. *Astronomy & Astrophysics*, volume 671, article id. A121, March 2023.
   DOI: 10.1051/0004-6361/202245460
2. T. Van Reeth, P. De Cat, **J. Van Beeck**, V. Prat, D. J. Wright, H. Lehmann, A.-N. Chené, E. Kambe, S. L. S. Yang, G. Gentile and M. Joos. The near-core rotation of HD 112429. A γ Doradus star with TESS photometry and legacy spectroscopy. *Astronomy & Astrophysics*, volume 662, article id. A58, June 2022. (Citations: 3 / 4 / 3)
   DOI: 10.1051/0004-6361/202142921

3. T. Van Reeth, J. Southworth, **J. Van Beeck**, and D. M. Bowman. V456 Cyg: An eclipsing binary with tidally perturbed g-mode pulsations. *Astronomy & Astrophysics*, volume 659, article id. A177, March 2022. (Citations: 7 / 9 / 6)
DOI: 10.1051/0004-6361/202142833

4. 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.
(Citations: 9 / 12 / 6) DOI: 10.1051/0004-6361/202142151

5. **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: 15 / 17 / 11)
DOI: 10.1051/0004-6361/202141572

6. **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: 28 / 29 / 21)
DOI: 10.1051/0004-6361/201937363
Inlists: Zenodo link

7. 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: 27 / 27 / 7)
DOI: 10.1051/0004-6361/201937398

8. 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: 38 / 44 / 29)
DOI: 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. (Citations: 1 / 0 / 0)
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