Jordan Van Beeck

POSITION: PhD student Astronomy & Astrophysics, KU Leuven

Contact information

Office Address:	Institute of Astronomy, Celestijnenlaan 200D, B–3001 Leuven, Belgium
email:	jordan.vanbeeck@kuleuven.be
my website:	my personal website
Researchgate:	my Researchgate page
LinkedIn:	my LinkedIn page
Github:	my Github page
ORCID ID:	0000-0002-5082-3887

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
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 (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

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

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

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

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 Mar 6, 2022, my citation metrics are:

- **Google Scholar**: 69 citations, h-index 3
- **NASA ADS**: 71 citations, h-index 4

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

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
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 / 3)
DOI: 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: 19 / 17)
DOI: 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: 19 / 17)
DOI: 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: 28 / 32)
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)
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