

Thibault BOULET

Born on December 20th, 1992 in DIJON

Nationality: FRENCH

CONTACT

thibault.boulet@astro.up.pt

Phone: +33 631193560

RESEARCH INTERESTS

Galactic archeology – Stellar Physics – Asteroseismology – Spectroscopy.

EDUCATION AND TRAINING

2019 - 2024 : **PhD in Astronomy** at University of Porto and the Institute of Astrophysics and Space Sciences in Portugal Under the supervision of Dr. Tiago Campante (IA-U. Porto)

Subject : Galactic Archaeology with red giants in the Milky Way disc

PhD Studentship : Fundação para a Ciência e a Technologia (FCT) Faculdade de Ciências da Universidade do Porto (FCUP) – Instituto de Astrofísica e Ciçenas do Espaço (IA)

- 2018 2019 : Pre-Doctoral Internship under the supervision of Dr. Tiago Campante. <u>Subject</u> : Detecting and characterizing exoplanets around evolved stars with NASA's TESS mission.
- 2017 2018: Pre-Doctoral Internship under the supervision of Pr. Dr. Jean Surdej, Full Prof. and Ambassador of Liège University, FNRS Research Director (Belgium) and past invited professor at Poznan University (Poland) <u>Subject</u>: Nulling interferometry for direct imaging exoplanets
- 2016 2017 : Master 2 Physics Nuclei, Plasmas, Universe (2nd Class Honours) BORDEAUX University
- 2015 2016 : Master 2 Physics specialty Astrophysics, Plasmas, Planets GRENOBLE Alpes University
- 2014 2015 : Master 1 Major Physics Fundamental Physics and Nanosciences J. Fourier GRENOBLE 1 University
- 2010 2014 : Bachelor's Degree in Physics and in Science for Engineers Physics specialty STRASBOURG University

SCIENTIFIC PUBLICATIONS

T. Boulet 2023: A catalogue of asteroseismically calibrated ages for APOGEE DR17. The predictions of a CatBoost machine learning model based on the [Mg/Ce] chemical clock and other stellar parameters - Astronomy and Astrophysics, A&A, 685, A66, https://doi.org/10.1051/0004-6361/202348031

N. Meunier, A.-M. Lagrange, T. Boulet et al. 2019: Activity time series of old stars from late F to early K. I. Simulating radial velocity, astrometry, photometry and chromospheric emission - A&A 627, A56 (2019), https://doi.org/10.1051/0004-6361/201834796

Sean N Raymond, Thibault Boulet et al. 2018: **Migration driven diversity of super-Earth compositions** - *Monthly Notices of the Royal Astronomical Society: Letters*, Volume 479, Issue 1, September 2018, Pages L81–L85, https://doi.org/10.1093/mnrasl/sly100

OPEN-SOURCE CODE

Exoplanet Imaging Yield Simulator: Computes the list of known exoplanets that would be observable with an imaging or interferometric instrument : https://github.com/AmiralVespasien3/Exoplanets_Interferometer_Simulator

TRAININGS & FORMATIONS

September – 2021 : MW-Gaia WG2 PhD School from 21st of September to 23rd of September 2021. Three days of classes on spectroscopy and trainings with spectroscopic analysis softwares

February – 2020 : Two weeks of training, at the Catania observatory in Sicily under the supervision of Dr. Enrico Corsaro, in the use of its asteroseismological analysis programme (DIAMONDS), plus an introduction to another more advanced asteroseismological analysis programme (FAMED).

INTERNSHIPS

Feb- Jul, 2019 (5 months)

Astrophysics and space Science Institute of PORTO (Supervisor: Dr. Tiago Campante) Detecting and characterizing exoplanets around evolved stars with NASA's TESS mission.

	My contribution was to improve a python code to predict the number of false positive exoplanets for the Nasa's Tess mission. I did statistical analysis and plots to understand what we should expect in tems of binairies detectections regarding RGB stars. Grant award from the "Stages Mondes programm (France)"
March – June, 2017 (3 months)	 Astrophysics Laboratory of BORDEAUX – ECLIPSE Team (Supervisor Dr. Sean Raymond) Formation and composition of hot super-Earths. "N-body type numerical simulations of the formation and orbital evolution of hot super-Earths. Confrontation of results with observational constraints on density and water and gas content" My contribution was to set new hypothesis regarding the Sean Raymond's simulation model of super-Eath migration. I had to test these hypothesis by generating data files with the C++ language and load them in the MERCURY simulation code of planets migration. I compared the outputs with Kepler's data.
March, 2017 (2 nights)	<i>Pic du Midi Observatory</i> "Training in the use of telescopes and spectrometers (Planetary transit)"
March – June, 2016 (4 months)	Institute of Planetology and Astrophysics of GRENOBLE – (IPAG) (Supervisors: Dr. Cecilia Ceccareli and Dr. Claudine Kahanne)
	"Methyl formate and dimethyl ether: study of a novel gas-phase chemical network to understand the formation of these two crucial complex organic molecules" My contribution was to fully understand the GRAINOBLE astrochemical simulation code. I had to check every chemical and physical reaction in this model. The purpose was to understand why we could not reproduce the behavior of a given proto-star.
November – December, 2015 (2 weeks)	Haute Provence Observatory "Adequacy of the instrument to objectives, implementation of an observational strategy and data acquisition." Observations nights- Allows acquiring useful skills with a CCD imager on telescope 120 cm - a spectrometer on telescope 150 cm and training in the subtleties of spectroscopy on telescope 193 cm".
April – July, 2015 (3 months)	 Institute of Planetology and Astrophysics of GRENOBLE – (IPAG) (Supervisor: Dr. Nadège Meunier) «Study of the detectability of exoplanets function of the magnetic activity of their host stars» My contribution was to study the detectability of Earth-like exoplanets as a function of the magnetic activity of their host stars, having investigated the impact of stellar activity on radial-velocity measurements of F-, G- and K-type stars. Based on a search of the literature, I was able to compare empirical chromospheric and photospheric laws for these stars. I then simulated radial-velocity signals originating from spots and plages at the stellar surface.
	PROGRAMMING SKILLS

TEACHING EXPERIENCE

2012 - 2015 : (3 years) English Student Monitor: In the Department of Bachelor of Science and Technology - (DLST) of GRENOBLE - At the Language Resource Center (C.R.L.) of Le Bel Institut of STRASBOURG

TALKS

33rd Portuguese National Meeting of Astronomy and Astrophysics (ENAA)
 08/09/2023 14:00, Advancing our understanding of the milky way's formation: Machine learning based stellar age predictions and age mapping

PLATO International conference:

14/10/2021 18:30, From TESS to PLATO: A Galactic archaeology perspective

Stars Clusters: The Gaia Revolution:

06/10/2021 10:15 TESS asteroseismology and the search for Galactic chemical clocks

8th Iberian Meeting on Asteroseismology:

20/10/2021 09:30, The legacy of high-precision asteroseismology in the TESS southern continuous viewing zone for Galactic archaeology

7th Iberian Meeting on Asteroseismology :

06/10/2020 15:00, How to best prepare TESS 2-min cadence light curves of solar-type stars for seismic analysis?

Instituto de Astrofisica do Porto : Presentation of the "DIAMONDS" Bayesian software https://www.youtube.com/watch?v=_vwIU3vVX9I&feature=youtu.be

POSTERS

MW-Gaia WG2 PhD School - Stellar spectroscopy and Astrophysical parametrisation: Research of chemical clocks with TESS and APOGEE (21st of September to 23rd of September 2021)

31st ENAA: Research of chemical clocks with TESS and APOGEE (8th of September to 10th of September 2021)
Encontro Ciência Portuguesa 2021: Galactic archaeology with solar-type stars (28th of June to 30th of June 2021)
30th ENAA: Galactic archaeology with solar-type stars (09 to 11 September 2020)

WORKSHOP

IA - ON 7 "How to prepare a scientific poster" led by Sergio Perreira - 2020

FOREIGN LANGUAGES

- **French** (Mother tongue)

- English: Fluent, May 2016 – Academic Test: IELTS British Council LYON (FRANCE) Result: 6.5

Portuguese: B2 (CEFR scale)