

# NICOLAS ESSER (HE/HIM) - FOURTH YEAR PHD STUDENT

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🌐 Website: [nicolasesser.github.io](https://nicolasesser.github.io)

📍 Université libre de Bruxelles, Belgium  
Research group in Theoretical Physics

🇧🇪 Belgian, 25 years old

INSPIRE

ORCID

## KEY POINTS

- Theoretical physicist with observational expertise; interested in faint Milky Way satellites & dark matter
- 3 first-author and 1 single-author publications within the first 3 years of PhD
- Submitted first observation proposal with FLAMES@VLT (ESO) in 2025
- PhD thesis expected June 2026
- ~ 20 talks delivered; attended ~ 10 conferences and 3 doctoral schools
- 300+ hours of teaching, supervision, and outreach in the last 3 years

## RESEARCH INTERESTS

- Ultra-faint dwarf galaxies & their dark matter content
- Stellar dynamics & dynamical friction
- Primordial black holes
- Dark matter phenomenology & interactions with stars
- Bayesian analysis; synthetic and observed stellar populations
- Strong background in theoretical particle physics

3 first-author papers and 1 single-author paper in peer-reviewed journals, publication list available on [ADS](#).

## ACADEMIC SUPERVISORS AND MENTORS

- **(Theory)** [Prof. Peter Tinyakov](#) — Ph.D. Advisor ✉ petr.tiniakov@ulb.be  
Université libre de Bruxelles
- **(Astronomy)** Prof. Sven De Rijcke — Collaborator ✉ sven.derijcke@ugent.be  
Ghent University
- **(Theory)** Prof. Sébastien Clesse — Thesis advisory committee ✉ sebastien.clesse@ulb.be  
Université libre de Bruxelles

## EDUCATION

- Oct. 2022 – [expected June 2026](#) **Ph.D. in Physics** – Université libre de Bruxelles  
*Primordial black holes & main sequence stars: constraints and signatures*
- Sept. 2020 – June 2022 **M.Sc. in Physics** – Université libre de Bruxelles Grade: 17.3/20  
*Major: theoretical physics; minor: stellar astrophysics*
- Sept. 2017– June 2020 **B.Sc. in Physics** – Université libre de Bruxelles Grade: 15.5/20

## GRANTS

- 🏛 2023 [FRIA PhD research grant](#)  
Granted by the FNRS (Belgian national research agency)
- 🏛 2022 **Fully funded teaching assistant PhD position**  
Left the position early upon obtaining the FRIA research grant

## AWARDS

- 🏆 2024 **Audience award**, 'My thesis in 180 seconds' science communication contest  
At the Belgian finals
- 🏆 2022 **AScBr prize**  
For the best master thesis in natural sciences (first prize)

## CONFERENCES, TALKS, AND SEMINARS

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~ 20 research presentations (invited, contributed, seminar, and poster formats). Selected recent highlights:

- **Invited Talk** – News From the Dark 10 Montpellier, France, Sept. 2025
- **Poster + Contributed talk** – Invisibles25 @ CERN Geneva, Switzerland, Sept. 2025
- **Seminar Talk** – Max Planck Institute for Astronomy Heidelberg, Germany, July 2025
- **Contributed talk** – European Astronomical Society Annual Meeting Cork, Ireland, June 2025

A full list of my presentations is available on my website.

## PROFESSIONAL EXPERIENCE

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### Research Experience

- **Graduate Researcher (Ph.D. candidate)** – Université libre de Bruxelles Oct. 2022 – expected June 2026  
Supervised by Prof. Peter Tinyakov. *Investigating the interactions of primordial black holes with stars and their potential observable signatures in ultra-faint dwarf galaxies.*
- **Graduate Researcher (M. Sc. student)** – Université libre de Bruxelles Sept. 2021 – June 2022  
Supervised by Prof. Peter Tinyakov. *Research on the dynamics of primordial black hole capture by stars.*
- **Graduate Research Intern** – Université libre de Bruxelles Jan. – June 2021  
Supervised by Prof. Geoffrey Compère. *Working on black hole thermodynamics.*
- **Undergraduate Research Intern** – Université libre de Bruxelles Jan. – June 2020  
Supervised by Prof. Nicolas Chamel. *Testing the impact of Gaussian noise on simulated neutron star crust structures.*

### Observing Proposals

- **ESO P117 – FLAMES@VLT (Pending): "Determining the nature of DELVE 1 with multi-epoch spectroscopy"**  
PI: Esser, N. – Co-Is: Merle, T. & Planquart L. – 8 hours

## TEACHING & MENTORING

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250+ hours of teaching and supervision during my PhD. Details:

✍ Supervised research intern <b>Nour Mouhssine</b>	2024 – 2025
<i>Bachelor thesis on 'A simple model of dark matter-star encounters'</i>	
✍ <b>Teaching assistant</b>	2023 – 2024
<i>Assistant for general physics and special relativity, 4 hours/week</i>	
✍ <b>Teaching assistant</b>	2022 – 2023
<i>Assistant for general physics, 8 hours/week</i>	
✍ <b>Lab assistant</b>	2022 – 2023
<i>Mechanics &amp; electricity, 4 hours/week</i>	
✍ <b>General physics tutor</b>	2021 – 2022

## UNIVERSITY AND DEPARTMENTAL SERVICE

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- 👥 **Co-chair of Local Organizing Committee** – Université libre de Bruxelles  
Conference: *New Horizons in Primordial Black Hole Physics 3*, 19-22 May 2025.
- 👥 **Member of Local Organizing Committee** – Université libre de Bruxelles  
Workshop: *News from the Dark 8*, 11-13 September 2023

## OUTREACH & LEADERSHIP

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I consider outreach to be a fundamental part of the researcher's role. Recent highlights include:

- **Brussels public lectures of astronomy** Upcoming Jan. – Feb. 2026  
*I will present 4 public lectures on dark matter as part of the historic general public astronomy lectures of Brussels, held since 1823*

- **FNRS (Belgian national research agency) annual report** 2024  
*Produced an audio capsule*
- **Invited on Canadian radio – Quirks & Quarks, CBC radio one** May 2024  
*Presented my recent research on primordial black holes to a national audience*
- **Université des enfants** (children's university) 2023 – present  
*Monthly Saturday morning workshops for 6–12 year olds on electricity*
- **'Qui a mangé le soleil ? (Who ate the sun?)' interactive conference** 2024 – 2025  
*Interactive conference on space & cosmology for children, with Prof. Sébastien Clesse & Dr. Jean Kimus*
- **My thesis in 180 seconds – Belgian qualifiers and finals** 2024  
*Audience award winner*

More details on my outreach activities are available on my website.

## LANGUAGES

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- </> **Programming:** Python (Proficient) C/C++ Fortran Mathematica
- 🌐 **Natural:** French (Native) English (Proficient) Dutch (Intermediate)