

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

 nicolas.esser@ulb.be
 Belgian, 25 years old

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

 Université libre de Bruxelles, Belgium
Research group in Theoretical Physics

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

~ 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

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

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

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

UNIVERSITY AND DEPARTMENTAL SERVICE

- ☒ **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

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

</> **Programming:** Python (Proficient) C/C++ Fortran Mathematica

🌐 **Natural:** French (Native) English (Proficient) Dutch (Intermediate)