Yves Kini

PhD candidate
Nationality: Burkinabé

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Research interests

- High energy astrophysics: neutron stars, neutron star atmospheres, type-I X-ray bursts, burst oscillations
- Nuclear physics: equation of state of cold ultra-dense neutron matter
- High energy physics: neutrino phenomenology and theory, beyond the standard model phenomenology
- Computational (astro)physics: machine learning, high-performance computing & parallelization, Bayesian inference, nested sampling, Monte Carlo methods.

Education

2020 – onward **PhD Candidate**.

Anton Pannekoek Institute of Astronomy, University of Amsterdam

Topic: Pulse Profile Modeling of Thermonuclear Burst Oscillations

Advisors: Prof. Anna L. Watts, Dr. Phil Uttley

2019 **Msc in Physics**.

University of Ouagadougou

Topic: Radio astronomy: Allocation and coexistence of radio frequency bands in Burkina Faso

Advisors: Prof. Jean Koulidiati, Dr Sié Zacharie Kam

2015 **Air Traffic Control degree**.

Ecole Africaine de Metreorologie et de l'Aviation Civile

Speciality: Tower and Approach

2019 **BSc in Physics**.

University of Ouagadougou

Awards & Scholarships

2021 **Augustus Prince Scholar Award**.

Description: Award sponsored by Brookhaven National Laboratory's African American Advancement Group

2011 – 2013 **National Scholarship**.

Description: Governmental monthly stipend provided to the best students in Burkina Faso

2013 **Amici Di Pietro Annigoni Scholarship**.

Description: Award of about 600 USD provided by the Italian NGO Amici Di Pietro Annigoni to 10 of the undergraduate students in Burkina Faso

2009 **Award of best student 2009**.

Description: Award of 'Le Groupe Essor' to reward the best high school students in Cote d'Ivoire

2008 **Award of merit, excellence of the best student 2008**.

Description: Award of 'Le Conseil National de la Jeunesse de Cote d'Ivoire' to reward the high school best students in Cote d'Ivoire

Scientific presentations & seminars

06/2023 **Pulse profile modeling of thermonuclear burst oscillations**.

Workshop talk, Neutron Rich Matter on Heaven and Earth, Institute for Nuclear Theory, Seattle, US, Hosts: Katerina Chatziioannou, Jorge Piekarewicz & Anna Watts

08/2021 **Tau neutrino cross sections at Ultra-high-energy**.

Award talk, Brookhaven National Laboratory, Upton, New York, US, Hosts: African American Advancement Group

11/2020 **Ultra-high-energy Tau neutrino cross sections with GRAND and POEMMA**.

African School of Physics (ASP) online seminars, Host: Ketevi Assamagan

Administrative duties, teaching experience & public outreach

2023 **Daily supervisor for B.Sc. thesis project of Guru Partap Khalsa, University of Amsterdam**.

Project title: Thermonuclear burst oscillations: Effects of ignoring phase drift in pulse profile modelling

2023 Outreach about astronomy throughout the year including dome tours, star-gazing events, kids events, etc.

2022 Member of the institute Ph.D. & postdoc council

2022 Teaching Assistant, Open Problems in Modern Astrophysics, University of Amsterdam

2021 Teaching Assistant, Extreme Astrophysics, University of Amsterdam

2020 Teaching Assistant, Extreme Astrophysics, University of Amsterdam

Technical skills

Coding & Tools: Python, C++, LaTeX, bash, git, html, css

Telescope operation: 51cm and 40cm optical telescope at Anton Pannekoek Observatory

Grants on the Dutch National Supercomputer (as PI)

2022 **EINF-5862: Inferring super-burster 4U-1636 properties with Pulse Profile Modelling**.

Description: Small NWO allocation of 1 million CPU hours for computing time

2021 **EINF-3731: X-PSI parameter estimation code calibration for thermonuclear burst sources**.

Description: Small NWO allocation of 1 million CPU hours for computing time

Publications

9. **The Radius of the High Mass Pulsar PSR J0740+6620 With 3.6 Years of NICER Data**.

   Tuomo Salmi, Devarshi Choudhury, Yves Kini, Thomas E. Riley, Serena Vinciguerra, Anna L. Watts, Michael T. Wolff, Zaven Arzoumanian, Slavko Bogdanov, Deepto Chakrabarty, Keith Gendreau, Sebastien Guillot, Wynn C. G. Ho, Daniela Huppenkothen, Renee M. Ludlam, Sharon M. Morsink, Paul S. Ray. *Submitted to ApJ*

8. **Pulse profile modelling of thermonuclear burst oscillations II: handling variability**.

   Yves Kini, Tuomo Salmi, Serena Vinciguerra, Anna L. Watts, Devarshi Choudhury, Slavko Bogdanov, Johannes Buchner, Zach Meisel, Valery Suleimanov. *MNRAS, V.523, I. 3, Jan. 2024*

https://doi.org/10.1093/mnras/stad3595

7. **An updated mass-radius analysis of the 2017-2018 NICER data set of PSR J0030+0451**.

   Serena Vinciguerra, Tuomo Salmi, Anna L. Watts, Devarshi Choudhury, Thomas E. Riley, Paul S. Ray, Slavko Bogdanov, Yves Kini, Sebastien Guillot, Deepto Chakrabarty, Wynn C. G. Ho, Daniela Huppenkothen, Sharon M. Morsink, Zorawar Wadiasingh. *ApJ 961 62, Jan. 2024*

   https://doi.org/10.3847/1538-4357/acfb83

6. **X-PSI parameter recovery for temperature map configurations inspired by PSR J0030+0451**.

   Serena Vinciguerra, Tuomo Salmi, Anna L. Watts, Devarshi Choudhury, Yves Kini, Thomas E. Riley. *ApJ 959 55, Dec. 2023*

   https://doi.org/10.3847/1538-4357/acf9a0

5. **Atmospheric effects on neutron star parameter constraints with NICER**.

   Tuomo Salmi, Serena Vinciguerra, Devarshi Choudhury, Anna L. Watts, Wynn C. G. Ho, Sebastien Guillot, Yves Kini, Bas Dorsman, Sharon M. Morsink, Slavko Bogdanov. *ApJ 956 138, Oct. 2023*

   https://doi.org/10.3847/1538-4357/acfb83

4. **Pulse profile modelling of thermonuclear burst oscillations I. The effect of neglecting variability** .

   Yves Kini, Tuomo Salmi, Anna L Watts, Serena Vinciguerra, Devarshi Choudhury, Siem Fenne, Slavko Bogdanov, Zach Meisel, Valery Suleimanov. *MNRAS, V.522, I. 3, Jul. 2023*

   https://doi.org/10.1093/mnras/stad1030

3. **X-PSI: A Python package for neutron star X-ray pulse simulation and inference**.

   Thomas E. Riley, Devarshi Choudhury, Tuomo Salmi, Serena Vinciguerra, Yves Kini, Bas Dorsman, Anna L. Watts, Daniela Huppenkothen, and Sebastien Guillot

   https://doi.org/10.21105/joss.04977

2. **Bhjet: a public multizone, steady state jet+ thermal corona spectral model**.

   M Lucchini, C Ceccobello, S Markoff, Y Kini, A Chhotray, RMT Connors, P Crumley, H Falcke, D Kantzas, D Maitra. *MNRAS, V.517, I. 4, Dec. 2022*

   https://doi.org/10.1093/mnras/stac2904

1. **Ultrahigh-energy tau neutrino cross sections with GRAND and POEMMA**.

   Peter B. Denton and Yves Kini. *Phys. Rev. D 102, 123019*

   https://doi.org/10.1103/PhysRevD.102.123019

Papers in preparation

1. **Pulse profile modeling of thermonuclear burst oscillations III : constraining the properties of XTE J1814-338**.

   Yves Kini, Tuomo Salmi, Serena Vinciguerra, Anna L. Watts, Anna Bilous, Duncan Galloway, Emma van der Wateren, Guru Partap Khalsa, Slavko Bogdanov, Johannes Buchner, Valery Suleimanov. *To be submitted to MNRAS.*

2. **Pulse profile modelling of thermonuclear superburst oscillations from 4U 1636-536**.

   Yves Kini et al., *To be submitted to MNRAS.*

Work experience

08/2019 – 11/2019 **Intern at Brookhaven National Laboratory**.

Description: Worked on constraining ultra-high-energy Tau neutrino cross sections with future neutrino detectors: GRAND and POEMMA.

2015 – 2020 **Air traffic controller**.

Qualifications: Tower & Approach

Description: Monitoring and regulating ground and air traffic. Providing information to pilots. Alerting response teams of safety concerns or emergencies

Workshops attended

2019 **Advancing Theoretical Astrophysics Summer School, Amsterdam, Netherlands**.

Topic covered: Theoretical astrophysics

Comment: This workshop led to an extended collaboration with Prof. Sera Markoff's group and to a research visit

2018 **African School of Fundamental Physics and Applications, Windhoek, Namibia**.

Topic covered: Nuclear and Particle Physics; Astrophysics and Cosmology, Accelerators; Radiation and Medical Physics, Materials Physics; Renewable Energies and Energy Efficiency

Comment: This workshop led to a three-month research visit at Brookhaven National Laboratory and a collaboration with Dr. Mary Bishai and Dr. Peter B. Denton

2017 **West African International Summer School for Young Astronomers Accra, Ghana**.

Topic covered: Radio astronomy