

Anna Małgorzata Suliga

Curriculum Vitae

Education

2018–present **PhD candidate in Astroparticle Physics**

Expected graduation date: August 2021

Niels Bohr Institute, University of Copenhagen, Denmark

Thesis topic: Non-standard neutrino physics in the compact astrophysical sources

Supervisor: Associate Professor Irene Tamborra

9 Jul 2018 **Msc in Physics with specialization in Astrophysics**

Niels Bohr Institute, University of Copenhagen, Denmark

Thesis topic: Diffuse supernova neutrino background

Supervisor: Associate Professor Irene Tamborra

28 Jan 2016 **Engineering degree (BSc) in Technical Physics**

The AGH University of Science and Technology in Kraków, Poland

Thesis topic: Analysis of the impact imposed by neutron spectrum on production and burn-up of actinides in nuclear reactors

Supervisor: Associate Professor Mariusz Kopeć

Research interests

Astroparticle physics, neutrino physics, sterile neutrinos, non-standard neutrino interactions, neutrino and dark matter, physics beyond the Standard Model

Awards

08/2018 **Lørup Scholar Stipend**, award of 50,000 DKK for excellent MSc thesis work, Niels Bohr Institute, Denmark

07/2015 **Internship DESY, Hamburg, Germany**, grant of 2500 € to work with Peter Göttlicher the leader of Analogue Electronics and Microcontroller Applications group in DESY

- Installing and upgrading software on the high sensitivity electronic devices, e.g., pattern generator, logic analyzer, multichannel high voltage supplier.

- Testing the response quality of a new generation of chips and scintillator tiles for the Calice calorimeter (the International Linear Collider (ILC)).

Scientific presentations/seminars

Invited talks:

11/2020 **Astrophysical constraints on the new mediators with non-standard coherent neutrino-nucleus scattering**

Virtual Seminar, Center for Cosmology and Astroparticle Physics, Columbus, Ohio

Hosts: Anna Porredon and Yi-Kuan Chiang

07/2020 **The impact of keV sterile neutrinos on core-collapse supernovae**

Brookhaven Neutrino Theory Virtual Seminar, Brookhaven National Laboratory, Upton, New York, Host: Peter B. Denton

- 07/2020 **The impact of keV sterile neutrinos on core-collapse supernovae**
Virtual Journal Club, Virginia Tech, Blacksburg, Virginia, Host: Natalia Tapia Arellano
- 06/2020 **Non-standard physics scenarios in the supernovae**
Plenary talk, QUARKS 2020, Pereslavl Zalesky, Russia, Host: Sergey Troitsky, Postponed to 2021
- 08/2019 **Tau lepton asymmetry by sterile neutrino emission – Moving beyond one-zone supernova model**
Neutrino Quantum Kinetics in Dense Environments, Copenhagen, Denmark, Host: Shashank Shalgar
- 03/2019 **Determining supernova unknowns with the diffuse supernova neutrino background**
Seminar, Max Planck Institute for Physics, Munich, Germany, Host: Francesco Capozzi
- Contributed talks:**
- 04/2020 **The impact of keV sterile neutrinos on core-collapse supernovae**
Transient Tuesday, DARK, Neils Bohr Institute, Denmark
- 05/2019 **Determining supernova unknowns with the diffuse supernova neutrino background**
Supernova Neutrinos at the Crossroads: astrophysics, oscillation, and detection, Trento, Italy
- 01/2019 **Neutrinos - Introverts among elementary particles**
Introduction to University Pedagogy, Copenhagen, Denmark
- 01/2019 **Determining supernova unknowns with the diffuse supernova neutrino background**
Nordic Winter School on Particle Physics and Cosmology, Skeikampen, Norway
- 06/2018 **Determining supernova unknowns with the diffuse supernova neutrino background**
NBIA and Dark Summer School: Multi-Messengers from Compact Sources, Copenhagen, Denmark
- Posters:**
- 08/2020 **Lifting the core-collapse supernova bounds on keV-mass sterile neutrinos**
SLAC Summer Institute, Menlo Park, California, online
- 06/2020 **Lifting the core-collapse supernova bounds on keV-mass sterile neutrinos**
Neutrino 2020, Chicago, Illinois, online

Additional courses, Phd schools

- 07/2019 **Advancing Theoretical Astrophysics**
Summer school, University of Amsterdam, The Netherlands
- 04/2019 **Responsible Conduct of Research**
PhD course, University of Copenhagen, Denmark
- 01/2019 **Introduction to University Pedagogy**
PhD course, University of Copenhagen, Denmark
- 11/2018 **Elementary Particle Physics**
PhD course, University of Copenhagen, Denmark

Teaching experience

- fall 2020 Teaching Assistant, Applied Statistics, University of Copenhagen
- spring 2020, Teaching Assistant, Computer science for physicists, University of Copenhagen
- fall 2019

Computer skills

Advanced PYTHON, C++, C, L^AT_EX, bash, git, MATLAB, Mathematica, OpenMP

Extracurricular activities

2019 - **Transient Tuesdays**

present Co-organizer of bi-weekly discussions about astrophysical transient objects' physics at DARK, Niels Bohr Institute, Denmark

Students advised/mentored

- 08/2020 - Co-advisor, Daniel Abdulla Bobruk, University of Copenhagen, master's project: Constraining the eV-mass sterile neutrinos with the supernova neutrino signal
- 06/2020 - Mentor, Nanna Marie Baars Støvelbæk, University of Copenhagen, master's project: Dust formation in type II supernovae
- 01/2020 - Mentor, Kristine Simone Nielsen, University of Copenhagen, master's project: Expanding the Physics of Dark Matter - Exploring a new way to explain the acceleration of the Universe
- 04/2020

Referees

The following senior scientists are familiar with my studies and research activity:

1. **Associate Professor Irene Tamborra**
E-mail: tamborra@nbi.ku.dk, Tel: +45 35 33 32 27,
Affiliation: Niels Bohr Institute, University of Copenhagen, Denmark
2. **Assistant Research Fellow Meng-Ru Wu**
E-mail: mwu@gate.sinica.edu.tw, Tel: +886-2-2789-6779,
Affiliation: Institute of Physics, Academia Sinica, Taiwan
3. **Distinguished Professor of Physics George Fuller**
E-mail: gfuller@ucsd.edu, Tel: +1-858-534-9085,
Affiliation: University of California, San Diego, United States

Peer-reviewed publications

3. **Lifting the core-collapse supernova bounds on keV-mass sterile neutrinos**
[Anna M. Suliga](#), Irene Tamborra, and Meng-Ru Wu, JCAP **08** (2020) 018
2. **Tau lepton asymmetry by sterile neutrino emission - Moving beyond one-zone supernova models**
[Anna M. Suliga](#), Irene Tamborra, and Meng-Ru Wu, JCAP **12** (2019) 019
1. **Measuring the supernova unknowns at the next-generation neutrino telescopes through the diffuse neutrino background** (co-first author)
Klaes Møller, [Anna M. Suliga](#), Irene Tamborra, and Peter B. Denton, JCAP **05** (2018) 066

Ongoing projects

Astrophysical constraints on the new mediators with non-standard coherent neutrino-nucleus scattering

[Anna M. Suliga](#) and Irene Tamborra, to appear soon

A closer look at the pp -chain reaction in the Sun: Constraining new light mediators

[Anna M. Suliga](#), Shashank Shalgar and George Fuller, to appear soon

Towards the detection of the non-electron flavor diffuse supernova neutrino background

[Anna M. Suliga](#), Irene Tamborra and John F. Beacom, to appear soon

Diffuse supernova neutrino background and the stellar mass function

Thomas D. P. Edwards, [Anna M. Suliga](#), Irene Tamborra, Shunsaku Horiuchi and Shin'ichiro Ando, in preparation

Constraining the eV-mass sterile neutrinos with the core-collapse supernovae

Daniel Abdulla Bobruk, [Anna M. Suliga](#), Irene Tamborra, and Georg Raffelt, in preparation