

# AAROODD UJJAYINI RAMACHANDRAN

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## Education and Training

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### Master of Science in Physics

Rheinisch-Westfälische Technische Hochschule Aachen

*Master Thesis: Sterile neutrino production mechanisms in presence of Non-Standard Interactions*

Oct 2019 – Jan 2022

Aachen, Germany

Astroparticle Physics and Cosmology track

GPA: 1,6

### Bachelor of Technology in Engineering Physics

National Institute of Technology Calicut

*Bachelor Thesis: Optically controlled droplet transport platform*

Jul 2015 – May 2019

Calicut, India

First Class with Distinction (GPA: 8.37/10)

## Work Experience

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### Wissenschaftliche Hilfskraft

TTK Institute RWTH Aachen, Karlsruhe Institute of Technology

May 2021 – Jul 2021, May 2022 – Jul 2022

Germany

- $\text{\LaTeX}$  typesetting of lecture notes for the courses offered by Prof. Felix Kahlhöfer in WiSe 20/21, SoSe 21 and SoSe 22.

### Wissenschaftliche Hilfskraft

RWTH International Academy

Sep 2021 – Oct 2021, Sep 2022 – Oct 2022

Aachen, Germany

- Tutoring for the bridging course in Statistical Physics (*Theoretische Physik IV*) as part of Masters College in Physics for international students at RWTH Aachen.

### Summer Project Fellow

Indian Institute of Astrophysics

Jun 2018 – Jul 2018

Bangalore, India

- Successfully completed a summer project on “*U band photometric studies of high-declination fields of interest to UV astronomy*” using data from Himalayan Chandra Telescope, *Hanle*.

## Projects

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### Sterile neutrino dark matter production mechanisms in presence of NSIs

Dec 2020 - Dec 2021

- Master thesis under the supervision of [Prof. Dr. Achim Stahl](#) and [Dr. Werner Rodejohann](#).
- Studied the effect of scalar, axial-vector and pseudoscalar non-standard neutrino self-interactions on the Dodelson-Widrow mechanism with Majorana neutrinos and demonstrated that experimentally allowed neutrino NSSIs can lead to sizable shifts in allowed parameter space.

### Optically controlled droplet transport platform

Jul 2018 – Jun 2019

- Bachelor thesis under the guidance of Dr. Subramanyan Namboodiri Varanakkottu
- Design and implementation of a novel lab-on-chip “optically controlled digital microfluidic device” for on-demand droplet transport and exploring its applications in biochemical analysis.

## Achievements and Scholarships

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### JN Tata Endowment in Physics

2019-2021

- Awarded by Tata trusts for the higher education of Indians abroad in Humanities, Natural Science, and Technology.

### STIBET Studienabschluss-Stipendium

2021

- Scholarship for degree completion as part of scholarship and advising program for international students and doctoral candidates (STIBET), funded by German Academic Exchange Service (DAAD).

## Programming Skills

**Familiar with:** PYTHON, MATHEMATICA,  $\text{\LaTeX}$ ,  
TENSORFLOW, KERAS

## Certifications

**TOEFL iBT :** C2 (114/120) **German :** A2  
**GRE General :** 324/340

## Publications & Poster presentations

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- Benso, Cristina, Werner Rodejohann, Manibrata Sen, and Aaroodd Ujjayini Ramachandran. “Sterile neutrino dark matter production in presence of nonstandard neutrino self-interactions: An EFT approach,” *Phys. Rev. D* **105** (5), 055016 (2022), [arXiv:2112.00758](https://arxiv.org/abs/2112.00758) [hep-ph].
- Benso C., Ujjayini Ramachandran A. *Impact of neutrino effective NSSI on sterile neutrino dark matter production in the early universe*. Poster presented at: Neutrino 2022; June 2022; Virtual Seoul.  
[DOI:10.5281/zenodo.6805243](https://doi.org/10.5281/zenodo.6805243)