Jonas Frerick

Curriculum Vitae

# Keywords

**Particle Physics, astrophysics, cosmology;** Light and Ultralight Dark Sectors, Dark Photons, Inelastic Dark Matter, Direct Detection, Self Interacting Dark Matter

# Education

2021-2024	PhD, DESY Hamburg, Germany, GPA – 1.0 (magna cum laude)
Thesis	Catching Dark Photons in the Sky: Looking for light vector particles using satellites
Supervisor	Kai Schmidt-Hoberg
Description	I studies different aspects of the Dark Photon model. The emphasis was on solar production of Dark Photons and direct gauged Dark Photon Dark Matter searches.
2019–2021	<b>M.Sc. Physics</b> , <i>RWTH Aachen</i> , Germany, <i>GPA – 1.0</i>
	Focus of Studies: Quantum Field Theory and Gauge Theories
Thesis	Exothermic Dark Matter from Upscattering in the Earth
Supervisor	Felix Kahlhoefer
Description	I built a general framework to calculate the effects of Dark Matter with two almost mass-degenerate states at direct detection experiments. (Led to publication [1].)
2016-2019	B.Sc. Physics, RWTH Aachen, Germany, GPA – 1.3
Thesis	Self-interacting Dark Matter from the Yukawa Potential: From astrophysical data to particle properties
Supervisor	Felix Kahlhoefer
Description	I studied the effect of Dark Matter self-interactions on the shape of Dark Matter halos.
2008–2016	<b>Abitur</b> , Qualification to attend university with focus on Physics and Mathematics, $GPA - 1.0$

**German system**, 1.0 - 4.0, 1.0 is the highest possible score (5.0 corresponds to not passed)

### Publications

- Timon Emken, Jonas Frerick, Saniya Heeba, and Felix Kahlhoefer. Electron recoils from terrestrial upscattering of inelastic dark matter. *Phys. Rev. D*, 105(5):055023, 2022. arXiv:2112.06930, doi:10.1103/PhysRevD.105.055023.
- [2] Jonas Frerick, Felix Kahlhoefer, and Kai Schmidt-Hoberg. A' view of the sunrise: boosting helioscopes with angular information. JCAP, 03:001, 2023. arXiv:2211.00022, doi: 10.1088/1475-7516/2023/03/001.
- [3] Jonas Frerick, Joerg Jaeckel, Felix Kahlhoefer, and Kai Schmidt-Hoberg. Riding the dark matter wave: Novel limits on general dark photons from LISA Pathfinder. *Phys. Lett. B*, 848:138328, 2024. arXiv:2310.06017, doi:10.1016/j.physletb.2023.138328.

## Selected Presentations

#### Conference talks

*iDM@IDM: Electron recoils from terrestrial upscattering of inelastic dark matter*, IDM 2022, Vienna; 19.07.2022

*Light-shining-through The Dark Side of the Moon*, DESY Theory Workshop 2022, Hamburg; 29.09.2022

A' view of the sunrise: Boosting Helioscopes with Angular Information , IAXO Collaboration Meeting, Hamburg; 15.03.2023

#### Lectures

*Quantum Computing V*, DESY Workshop Seminar (winter term 22/23), Hamburg; 07.02.2023

#### Seminars

Looking for Dark Photon Dark Matter with LISA Pathfinder, Fermilab Theory Chalk Talk, Fermilab; 11.10.2023

### Schools & Visits

- 1. Summer School on Particle Physics, ICTP Trieste, 19.06.2023-30.06.2023
- 2. Asymmetry Secondment, Fermilab, 20.08.2023-21.10.2023

### Grants, Fellowships & Awards

2020-2022 Dean's List of the RWTH Aachen University

2016 DPG Abiturpreis (Awarded by the German Physical Society DPG)

- English Fluent
- German Native
- French Basic
- Italian Basic

Basic words and phrases only Basic words and phrases only