

# Timon Emken

## Theoretical Physicist

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### Current position

2019– **Postdoctoral fellow**, Chalmers University of Technology, Göteborg, Sweden

### Academic Education

- 2019 **Ph.D.** (Physics) University of Southern Denmark, Odense, Denmark  
Specialization: Theoretical Astroparticle Physics
- 2013 **M.Sc.** (Physics) Georg August University, Göttingen, Germany  
Specialization: Theoretical Particle Physics
- 2011 **B.Sc.** (Physics) Georg August University, Göttingen, Germany

### Research Experience

- 03/2019– **Postdoc** Department of Physics, Chalmers University of Technology, Göteborg, Sweden  
Group leader: Riccardo Catena
- 02–04/2018 **Visiting researcher** C.N. Yang Institute for Theoretical Physics, Stony Brook, NY, USA  
Host: Rouven Essig
- 2016–2019 **PhD student** Center for Cosmology and Particle Physics Phenomenology (CP<sup>3</sup>-Origins), Odense  
Supervisor: Chris Kouvaris  
Thesis: *Dark Matter in the Earth and the Sun – Simulating underground scatterings for the direct detection of low-mass dark matter*
- 2014/15 **PhD student** Faculty for Physics and Astronomy, Würzburg  
Supervisor: Werner Porod  
Topic: *Astrophysical Constraints on supersymmetric Pati-Salam models*
- 2012/13 **Master student** Institute for Theoretical Physics, Göttingen, Germany  
Supervisor: Laura Covi & Riccardo Catena  
Thesis: *Supergravity & Supernovae – Gravitino Phenomenology in Astrophysics*  
Results were published in [5].
- 2011 **Bachelor student** Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany  
Supervisor: Folkert Müller-Hoissen  
Thesis: *Static, axially symmetric Deformations of the Schwarzschild spacetime*
- 2010 **Research intern** Institute of Materials Physics at the German Aerospace Center, Köln, Germany  
Supervisor: Matthias Sperl

### Scientific Publications

- [1] **Timon Emken** and Chris Kouvaris. How blind are underground and surface detectors to strongly interacting Dark Matter? *Phys. Rev.*, D97(11):115047, 2018. [arXiv:1802.04764].
- [2] **Timon Emken**, Chris Kouvaris, and Niklas Grønlund Nielsen. The Sun as a sub-GeV Dark Matter Accelerator. *Phys. Rev.*, D97(6):063007, 2018. [arXiv:1709.06573].
- [3] **Timon Emken** and Chris Kouvaris. DaMaSCUS: The Impact of Underground Scatterings on Direct Detection of Light Dark Matter. *Journal for Cosmology and Astroparticle Physics*, 1710(10):031, 2017. [arXiv:1706.02249].
- [4] **Timon Emken**, Chris Kouvaris, and Ian M. Shoemaker. Terrestrial effects on dark matter-electron scattering experiments. *Physical Review D*, 96(1):015018, 2017. [arXiv:1702.07750].
- [5] Riccardo Catena, Laura Covi, and **Timon Emken**. Model independent limits on an ultralight gravitino from supernovae. *Phys. Rev. D*, 91:123524, 2015. [arXiv:1410.0314].

(Link to inSPIRE-HEP author profile)

## Teaching Experience

2017	<b>Substitute lecturer</b>	Department for Physics, Chemistry and Pharmacy, Odense, Denmark <i>Advanced Quantum Mechanics</i> <i>Introduction to Astrophysics and Cosmology</i>	(winter term 2017) (winter term 2017)
2016–	<b>Teaching assistant</b>	Department for Physics, Chemistry and Pharmacy, Odense, Denmark <i>Advanced Quantum Mechanics</i> <i>Introduction to Astrophysics and Cosmology</i> <i>Physics A</i> <i>Advanced Quantum Mechanics</i> <i>General Relativity and Cosmology</i>	(winter term 2017) (winter term 2017) (spring term 2017) (winter term 2016) (summer term 2016)
2014	<b>Teaching Assistant</b>	Faculty for Physics and Cosmology, Würzburg, Germany <i>Theoretical Mechanics and Quantum Mechanics</i>	(summer term 2014)
2011–13	<b>Teaching Assistant</b>	Institute for Theoretical Physics, Göttingen, Germany <i>Quantum Mechanics I</i> <i>Analytical Mechanics</i> <i>Mathematics for Physics I</i> <i>Analytical Mechanics</i> <i>Classical Electrodynamics</i>	(summer term 2013) (winter term 2012) (summer term 2012) (winter term 2011) (summer term 2011)

## IT Skills

**Code** C++, HPC, Mathematica, MPI, git, Python, LaTeX  
**OS** macOS, Linux, Windows

## Conference and Seminar Talks

28.02.2019	<b>Simulating Dark Matter in the Earth and the Sun</b>	PhD defence	Odense, Denmark
01.06.2018	<b>How sensitive are direct detection experiments to strongly interacting dark matter?</b>	MASS2018,	Odense, Denmark
24.04.2018	<b>The Impact of Earth Scatterings on Light Dark Matter Detection</b>	C.N. YITP,	Stony Brook, USA
29.08.2017	<b>Terrestrial Effects on Light Dark Matter Detection,</b>	Da $\nu$ Co 2017,	Odense, Denmark
14.07.2016	<b>Simulating Dark Matter Trajectories for Direct Detection Experiments</b>	DTP 2016,	ECT*, Trento, Italy
28.11.2013	<b>Supergravity &amp; Supernovae,</b>	GRK1147 seminar,	Würzburg, Germany
06.11.2013	<b>Gravitino Phenomenology with Supernovae,</b>	Cosmology seminar,	Göttingen, Germany
17.09.2013	<b>Gravitino Phenomenology with Supernovae,</b>	Theory seminar,	Würzburg, Germany
08.07.2013	<b>Gravitino Phenomenology in Astrophysics,</b>	IMPRS Workshop,	MPI for Physics, München, Germany

## Outreach

2017	<b>Contributing author</b>	Quantum rascals web portal <i>Kvantebanditter</i>
2017	<b>Features in the media</b>	Interviews and popular scientific articles about my research, e.g. in New Scientist.
2017	<b>Outreach article</b>	" <i>Detecting Dark Matter and Seeing the Invisible</i> " for student newspaper <i>Hjerneblod</i> .

## Workshops

2017	<b>Workshop</b>	<i>Code Refinery,</i>	NeIC, Aarhus, Denmark
2017	<b>Winter School</b>	<i>9th Odense Winter School on Theoretical Physics,</i>	CP <sup>3</sup> -Origins, Odense, Denmark
2016	<b>Summer School</b>	<i>Doctoral Training Program,</i>	ECT*, Trento, Italy
2014	<b>Workshop</b>	<i>DESY theory workshop,</i>	DESY, Hamburg, Germany
2014	<b>Workshop</b>	<i>Terascale C++ School,</i>	DESY, Hamburg, Germany
2013	<b>Summer School</b>	<i>Summer School on Particle Physics,</i>	International Center for Theoretical Physics, Trieste, Italy
2013	<b>Spring School</b>	<i>Computer Algebra in Particle Physics,</i>	DESY, Zeuthen, Italy

## Language Skills

**German** native speaker    **English** fluent  
**Danish** proficient        **Japanese** basic

## Various

2018– **Referee** Physical Review D (PRD), Journal for Cosmology and Astroparticle Physics (JCAP)