

Nils Albin Nilsson

September 18, 2020

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Profile

Highly analytical early-career researcher in physics with teaching experience. My main research interests are phenomenology of new physics in gravity and cosmology, in particular bridging theory and observations, along with early Universe physics and General Relativity.

Education

- **Ph.D. in Physics** Warsaw, Poland
National Centre for Nuclear Research September 14, 2020
 - Title of thesis: *Aspects of Lorentz and CPT Violation in Cosmology*
 - Supervisor: Mariusz P. Dąbrowski
- **MSc. Engineering physics** Lund, Sweden
Lund Institute of Technology June 15, 2015
 - Title of thesis: *Astrophysical Probes of Models of Quantum Gravity*
 - Supervisor: John Ellis

Publications

Refereed Journal Articles

- **N.A. Nilsson**
Preferred-frame Effects, the H_0 tension, and Probes of Hořava-Lifshitz Gravity,
Eur.Phys.J.Plus 135 (2020) 4, 361, I.F 2.612
- **N.A.Nilsson, E.Czuchry**
Hořava-Lifshitz Cosmology in Light of New Data
Phys.Dark Univ. C23 (2019) 100253, I.F 6.509, Citations: 10
- **N.A.Nilsson, M.Dąbrowski**
Energy Scale of Lorentz Violation in Rainbow Gravity
Phys.Dark Univ. 18 (2017) 115-122 , I.F 5.425, Citations: 6
- **M.Fairbairn, N.A.Nilsson, J.Ellis, J.Hinton, R.White**
The CTA Sensitivity to Lorentz-Violating Effects on the Gamma-Ray Horizon
JCAP 1406 (2014) 005, I.F 5.81, Citations: 29

Articles in Preparation

- **K.O'Neil Ault, Q.B.Bailey, N.A. Nilsson,**
Hamiltonian Formulation of the Standard-Model Extension Gravity Sector, [arXiv:2009.00949](#),
submitted to Phys.Rev.D.
- **M.P. Dąbrowski, N.A. Nilsson**
Antisymmetric Tensor Field Configurations in Cosmology

Conference Proceedings

- N.A.Nilsson, K.O'Neil Ault, Q.B.Bailey
A 3+1 Decomposition of the Minimal Standard-Model Extension Gravitational Sector
CPT and Lorentz Symmetry, pp. 198-200 (2020), Citations: 4

Other Publications

- N.A. Nilsson
Incentives, Rewards, and Recognition - What Really Motivates a Researcher?
Essay published for the MDPI essay contest Judging Research - How Should Research and Researchers Be Evaluated and Rewarded?
ISBN 978-3-03928-314-9
- N.A. Nilsson
Commodity or Public Property?
Essay published for the MDPI essay contest The Global Benefits of Open Research
ISBN 978-3-03897-009-5

Awards and Honours

- 2019: Winner of the MDPI English Writing Competition for the essay "*Incentives, Rewards and Recognition - What Really Motivates a Researcher?*", 460 EUR
- 2019: NCBJ Award for Outstanding Achievements for PhD Students, 600 EUR
- 2018: NCBJ Award for Outstanding Achievements for PhD Students, 600 EUR

Grants

- 2018: PI and sole applicant for NCBJ Young Scientist Grant MNiSW 212737/E-78/M/2018, Title: Tensor Lorentz Violation in Cosmology with Antisymmetric Tensor Fields, 3300 EUR

Invited Talks

- “Aspects of Lorentz Violation in Gravity & Cosmology”
Paris Observatory Paris, France
October 17, 2019
- “Successes and Problems of the Λ CDM Model”
Embry-Riddle Aeronautical University Prescott, USA
April 4, 2019
- “Quantum Gravity, Lorentz Violation, and Rainbows”
University of Szczecin Szczecin, Poland
December 9, 2016

Physics Meetings

Oral Contribution

- “Ongoing Efforts to Constrain Lorentz Symmetry Violation in Gravity”
(online) Krakow, Poland
Spring Workshop on Gravity and Cosmology May 26, 2020
- “Antisymmetric Tensors in Friedmann Cosmology”
6th Conference of the Polish Society of Relativity Szczecin, Poland
September 23-26, 2019

- **“A 3+1 Decomposition of the Minimal SME Gravitational Sector”** Bloomington, USA
Eighth Meeting on CPT and Lorentz Symmetry May 12-16, 2019
- **“Hořava-Lifshitz Gravity in Light of New Data”** Vancouver, Canada
Testing Gravity 2019 January 23-26, 2019
- **“Cosmological Evolution in Lorentz Breaking Gravity”** Bloomington, USA
IUCSS Summer School on the Lorentz and CPT violating SME June 15-23, 2018
- **“Toward Quantum Gravity Phenomenology”** Warsaw, Poland
Singularities in General Relativity and their Quantum Fate May 21-25, 2018
- **“Probing Hořava-Lifshitz Cosmology”** Zeuten, Germany
SpringCosmo18 May 19-21, 2018
- **“Searching for Lorentz Invariance Violation in Theories with Modified Dispersion Relations”** Azores, Portugal
3rd Azores School on Observational Cosmology August 27-September 2, 2017
- **Theories with Modified Dispersion Relations** Międzyzdroje, Poland
“SpringCosmofun 17” May 19-21, 2017

Meetings Organised

- **Sixth Conference of the Polish Society of Relativity** Szczecin, Poland
September 23-26, 2019
- **Singularities in General Relativity and their Quantum Fate** Warsaw, Poland
May 21-25, 2018

Research Visits

- **Embry-Riddle Aeronautical University** Prescott, USA
Visiting Professor Quentin G. Bailey January 25-31, 2020
- **Lagrange Institute** Paris, France
Visiting Professor Patrick Peter October 21-25, 2019
- **Embry-Riddle Aeronautical University** Prescott, USA
Visiting Professor Quentin G. Bailey April 3-18, 2019

Departmental Talks

- **“Lorentz Violation and Extra Dimensions with Gravity Probe B”** Warsaw, Poland
National Centre for Nuclear Research PhD Student Seminar November 5, 2018
- **“The Standard Model Extension, Gravitational tests and Cosmology”** Warsaw, Poland
National Centre for Nuclear Research PhD Student Seminar December 18, 2017
- **“Constraining Lorentz Violation in Rainbow Gravity”** Warsaw, Poland
National Centre for Nuclear Research PhD Student Seminar March 14, 2017
- **“Astrophysical Probes of Model of Quantum Gravity”** Warsaw, Poland
National Centre for Nuclear Research PhD Student Seminar October 5, 2016

Teaching Experience

- Teaching Assistant - Electrodynamics (PhD course), Autumn 2019

Review & Outreach Activity

- 2018-present: Reviewer activity. Papers reviewed: 7.
- 2015-2016: Supervised a group of high-school students in the building of a 3D printer.
- 2013: Involved in the outreach program “Her Teach Future” at Lund Institute of Technology, aimed at increasing the number of female students.

Non-Academic Experience

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| • ISIS Duty Technician
Rutherford Appleton Laboratory | Harwell, United Kingdom
2020 - present |
| • Physics Science Technician
Pimlico Academy | London, United Kingdom
2015-2016 |
| • Research Engineer - Radiation Safety
MAX IV Laboratory | Lund, Sweden
2014-2015 |
| • Summer Student
Diamond Light Source | Harwell, United Kingdom
June-September 2013 |
| • Tutor in Mathematics | Helsingborg, Sweden
January-June 2013 |

Language & IT

- Computers/IT
 - Windows, Ubuntu Linux & Debian Linux
 - MS Word & Excel
 - \LaTeX
 - Mathematica: xAct, Markov-Chain Monte Carlo cluster computations
 - Python: numpy, scipy, matplotlib, pandas, seaborn, scikit-learn, image processing
- Languages
 - **Native level:** Swedish, English. **Average:** French. **Beginner:** Polish level A1+