



Universiteit  
Leiden  
The Netherlands

## Aspects of cosmic acceleration

Vardanyan, V.

### Citation

Vardanyan, V. (2019, September 18). *Aspects of cosmic acceleration. Casimir PhD Series*. Retrieved from <https://hdl.handle.net/1887/78122>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/78122>

**Note:** To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/78122> holds various files of this Leiden University dissertation.

**Author:** Vardanyan, V.

**Title:** Aspects of cosmic acceleration

**Issue Date:** 2019-09-18

---

## LIST OF PUBLICATIONS

---

- A. Solomon, V. Vardanyan, Y. Akrami  
"Massive mimetic cosmology",  
Phys. Lett. B **794** (2019) 135, arXiv:1902.08533 [Chapter 4].
- O. Contigiani, V. Vardanyan, A. Silvestri  
"The splashback radius in symmetron gravity",  
Phys. Rev. D **99** (2019) 064030, arXiv:1812.05568 [Chapter 5].
- Y. Akrami, R. Kallosh, A. Linde, V. Vardanyan  
"The landscape, the swampland and the era of precision cosmology",  
Fortsch. Phys. **67** (2018) 1800075, arXiv:1808.09440.
- S. Bellucci, A. A. Saharian, D. Simonyan, V. Vardanyan  
"Fermionic currents in topologically nontrivial braneworlds",  
Phys. Rev. D **98** (2018) 085020, arXiv:1808.01577.
- Y. Akrami, Ph. Brax, A.-C. Davis, V. Vardanyan  
"Neutron star merger GW<sub>170817</sub> strongly constrains doubly-coupled  
bigravity",  
Phys. Rev. D **97** (2018) 124010, arXiv:1803.09726 [Chapter 3].
- Y. Akrami, R. Kallosh, A. Linde, V. Vardanyan  
"Dark energy,  $\alpha$ -attractors, and large-scale structure surveys",  
JCAP **1806** (2018) 041, arXiv:1712.09693 [Chapter 2].
- S. Bellucci, A. A. Saharian, V. Vardanyan  
"Fermionic currents in AdS spacetime with compact dimensions",  
Phys. Rev. D **96** (2017) 065025, arXiv:1707.08878.

- V. Vardanyan, Y. Akrami, L. Amendola, A. Silvestri  
"On nonlocally interacting metrics, and a simple proposal for cosmic acceleration",  
JCAP **1803** (2018) 048, arXiv:1702.08908.
- S. Bellucci, A. A. Saharian, V. Vardanyan  
"Hadamard function and the vacuum currents in braneworlds with compact dimensions: Two-branes geometry",  
Phys. Rev. D **93** (2016) 084011, arXiv:1512.06569.
- S. Bellucci, A. A. Saharian, V. Vardanyan  
"Vacuum currents in braneworlds on AdS bulk with compact dimensions",  
JHEP **11** (2015) 092, arXiv:1508.07255.
- V. Vardanyan, L. Amendola  
"How can we tell whether dark energy is composed of multiple fields?",  
Phys. Rev. D **92** (2015) 024009, arXiv:1502.05922.
- E. R. Bezerra de Mello, A. A. Saharian, V. Vardanyan  
"Induced vacuum currents in anti-de Sitter space with toral dimensions",  
Phys. Lett. B **741** (2015) 155, arXiv:1410.2860.
- V. Vardanyan, D. Weedman, L. Sargsyan  
"Seeking the Epoch of Maximum Luminosity for Dusty Quasars",  
The Astrophysical Journal, **790** (2014) 88, arXiv:1406.2002.  
[has been highlighted in Nature: Nature 514, 43-44 (02 October 2014), doi:10.1038/514043a].

---

## CURRICULUM VITAE

---

I was born in November 1992 in Yerevan, Armenia. I am a graduate of Yerevan PhysMath school, where my interest in physics and astrophysics was ignited, primarily, via participation in national- and international-level physics and astronomy Olympiads.

From 2009 to 2013 I studied physics at the Faculty of Physics at Yerevan State University, alongside of which I have done research at the Yerevan Physics Institute and at the Byurakan Astrophysical Observatory.

From 2013 to 2015 I have been a DAAD-funded master student at the Faculty of Physics and Astronomy of the Ruprecht-Karls University in Heidelberg, Germany. I did my MSc research at the Institute of Theoretical Physics of the same university.

From 2015 onwards, I am a De Sitter cosmology PhD student at the Lorentz Institute for Theoretical Physics and at the Sterrewacht Leiden, University of Leiden. During the four years of the PhD research I have assisted in teaching numerous theoretical physics courses at both the MSc and BSc levels. Additionally, I have co-organized the De Sitter Cosmology Journal Club meetings and the Gravitational Wave meetings, both organized jointly by the Lorentz Institute and Leiden Observatory.

After my PhD I will be a postdoctoral researcher at the Kavli Institute for Mathematics and Physics of the Universe in Tokyo, Japan.



---

## ACKNOWLEDGEMENTS

---

- ▷ First and foremost, I would like to express my deepest gratitude towards my supervisors Ana Achúcarro and Alessandra Silvestri. I am indebted to them for their trust and the opportunity to pursue my own research ideas with considerable independence. You have created an amazing cosmological atmosphere at the Lorentz Institute, and I am very proud for being a small part of that.
- ▷ I would like to thank my two mentors at the Leiden Observatory, Henk Hoekstra and Koen Kuijken, for all the advise and support provided throughout these years. I have truly enjoyed all the interactions with your amazing Weak Lensing group. I am indebted to you for (perhaps unknowingly) re-igniting my interest in astrophysics and observational aspects of cosmology.
- ▷ During my research career I have been very fortunate to be attached to a large cloud of amazing collaborators. I am particularly very thankful to Luca Amendola, Yashar Akrami, Stefano Bellucci, E. Bezerra de Mello, Philippe Brax, Anne-Christine Davis, Guadalupe Cañas Herrera, Omar Contigiani, Benjamin Elder, Renata Kallosh, Andrei Linde, Aram Saharian, Hayk Sargsyan, Lusine Sargsyan, David Simonyan, Adam Solomon and Daniel Weedman for all the exciting work that we have done together. Each one of you have strongly contributed in forging my current understanding of physics. I am looking forward to starting new projects with you.
- ▷ PhD years would have been rather dull without all the fellow cosmologists in Leiden. Special thanks go to all the past and present

members of the "Leiden Cosmology Gang". All the Postdocs, fellow PhD candidates and the master students in our group have been an amazing company in and outside the work.

- ▷ During my years in The Netherlands I have never encountered any administrative burden. This is largely due to the professional staff in the administrative sector of the university, to whom I express my gratitude. Particularly, I would like to thank the super-efficient secretaries of the Lorentz Institute.
- ▷ I would like to thank my friends outside the cosmological circle. Particular acknowledgements go to Hrach, Satenik, Tsovinar, Hayk and Lilith. Thank you for all the amazing dinner gatherings accompanied with charming discussions on linguistics, amazing movie events, and your friendship overall. Special thanks are due to Tsovinar for her help with realizing the cover-art idea of this thesis, as well as her help with the translation of the Summary into Dutch.
- ▷ I am very thankful to my wife Nvard for being such an amazing partner in life. Your dedication and support during my PhD years have been truly astounding. On the multiple occasions when I have stayed at the Institute till very late in the evening, you have never expressed a tiny bit of a complaint; this is the right moment to thank you for all of that. This thesis is as much yours, as it is my own. I am also very grateful to the other members of my family, particularly, my sister Anna, brothers Vahagn and Sedrak, mother Hranush and my late father Vanik for all their love.