Conformal invariance and microscopic sensitivity in cosmic inflation

Aalst, T.A.F. van der

List of publications

[151] *The everpresent η-problem: knowledge of all hidden sectors required*
Sjoerd Hardeman, Johannes Oberreuter, Gonzalo Palma, Koenraad Schalm and Ted van der Aalst
JHEP **1104**:009, 2011, arXiv:1012.5966 [Chapter 4]

[152] *Decoupling limits in multi-sector supergravities*
Ana Achúcarro, Sjoerd Hardeman, Johannes Oberreuter, Koenraad Schalm and Ted van der Aalst
Submitted to JCAP, arXiv:1108.2278 [Chapter 4]

[226] *A worldsheet perspective on string inflation*
Koenraad Schalm and Ted van der Aalst
Submitted to Phys. Rev. D., arXiv:1008.5024 [Chapter 5]

[253] *Consistency condition for inflation from (broken) conformal symmetry*
Koenraad Schalm, Gary Shiu and Ted van der Aalst
Submitted to JCAP, arXiv:1211.2157 [Chapter 6]

Curriculum vitae

My name is Ted Adrianus Franciscus van der Aalst. I am born in Eindhoven, the Netherlands, on the 31st of January, 1984. After having completed pre-university education at the Pleincollege Van Maerlant in Eindhoven, I enlisted for the Bachelor's programmes in Physics & Astronomy and in Mathematics at Utrecht University in 2002. In 2005, I graduated cum laude as Bachelor of Science in both programmes with a minor in the History & Philosophy of Science, and continued with the Master's programmes Theoretical Physics and Mathematical Sciences at the same university. This resulted in a cum laude graduation as Master of Science in both programmes in 2008 with a thesis titled *A geometric interpretation of the c-map* under supervision of dr. S. Vandoren and dr. J. Stienstra. My study results were rewarded with a Shell stipend, awarded to the nine best MSc students in Theoretical Physics in the Netherlands. During my study I have been a teaching assistant for several Bachelor and Master courses, among other things "vector calculus" and "advanced quantum mechanics". I have acted as the evaluation manager of the Master's programme in Theoretical Physics and been a student member of the Graduate studies committee and Education advisory committee.

In 2008 I started my PhD research at the Instituut-Lorentz for Theoretical Physics at Leiden University under supervision of prof. dr. A. Achúcarro and dr. K. Schalm. I spent two months as a visiting researcher at the string theory group of the University of Wisconsin in Madison, by invitation of prof. dr. G. Shiu. Teaching activities included answering questions from high school students regarding their "profielwerkstuk" and acting as the teaching assistant for "physics of elementary particles" and "theory of general relativity". During my PhD, I have attended several schools, conferences and workshops in Driebergen, Amsterdam, Paris, Trieste and Princeton and I have presented my work in seminars and talks in Groningen, Veldhoven, Trieste, Chicago, Madison and Ithaca.

Dankwoord

Dit proefschrift is het resultaat van vier jaar onderzoekswerk, waarin ik heb mogen samenwerken met en ben geholpen en bijgestaan door een grote groep familie, vrienden en collega's. Hoewel het proefschrift slechts één naam draagt, is het uiteindelijke resultaat mede tot stand gekomen dankzij hen. Mijn dank gaat als eerste uit naar mijn co-promotor Koenraad Schalm, wiens enthousiasme, positieve instelling, optimisme en passie voor het vakgebied een onuitputtelijke bron voor inspiratie vormt. Zijn, altijd opbouwende, kritieken en gedreven aanmoedigingen hebben mij een beter onderzoeker en professional gemaakt. Ik heb veel waardering voor het feit dat de menselijke maat hierbij nooit uit het oog verloren is geraakt. I feel very privileged to have Ana Achúcarro acting as my promotor. I have benefited greatly from her attention to detail and her sharp thinking and questioning, which set an impressive example of a pure scientist. Her vibrant presence is contagious and her truly caring nature is heart-warming.

Binnen de academische wereld is het niet ongebruikelijk om collega's als in een familie aan te duiden. Ik wil Sjoerd bedanken voor zijn optreden als mijn academische grote broer. Hij heeft mij bekend gemaakt met het instituut, het vakgebied en de wereld, met zijn kennis en brede interesse. Mijn vragen werden altijd beantwoord met zijn liefde voor natuurkunde en het plezier om erover te praten. Zijn invloed is terug te vinden in het hele proefschrift en ik had het gereedkomen dan ook graag met hem gevierd. Zijn initialen staan met eer gegrift in de kosmische microgolf achtergrondstraling. Hij wordt gemist.

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A truly inspiring period was the fall of last year, in which I visited the University

of Wisconsin in Madison. I want to thank Gary Shiu for inviting me and being such an incredible host. His great understanding of physics and the physics community has been a major help in understanding how our research fits in the bigger picture.

My visit also allowed me to intensify discussions about my research with other string cosmologists. I would like to thank the University of Wisconsin, the University of Chicago, New York University, Princeton University, the University of Pennsylvania, Syracuse University and Cornell University for their hospitality and I am especially grateful to Daan & Esther and Riccardo & Paloma for welcoming me as their guest. For interesting discussions and interactions I would like to thank A. Hashimoto, S. Sethi, D. Kutasov, M. Kleban, G. D'Amico, R. Flauger, E. Pajer, J. Khoury, K. Hinterbichler, A. Joyce, C. Armendariz-Picon, L. McAllister, P. McGuirk, P. Creminelli, D. Baumann and S. Patil. I would also like to thank the members of the reading committee and opposition committee for their close look on my work.

My colleagues of the Instituut-Lorentz, the Dutch cosmology group and the DRSTP form a very active and informal network of people with similar thoughts, ideas and interests. It has been an honor to have been part of such a great community with wonderful and intelligent people, who form a pleasant group to work with on a daily basis. My fellow PhD students and postdocs, from the institute, the DRSTP and from Madison, have made the last four years a wonderful experience. Een speciale dank gaat daarbij uit naar Fran, Marianne en Trudy voor de structuur en warmte op het instituut.

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