

Nacht van Descartes 2014: Van kern tot kosmos / From nucleus to cosmos Emeritaat Dennis Dieks

Datum

Maandag 13 oktober 2014

Middagprogramma

14:00 – 17:00, Senaatszaal van het Academiegebouw, Domplein 29 Utrecht, voertaal Engels.
Het middagprogramma staat in het teken van het emeritaat van Dennis Dieks.

Aansluitend avondprogramma

20:00 – 22:30, Aula van het Academiegebouw, Domplein 29 Utrecht, voertaal Nederlands

Toegang

Gratis en zonder inschrijving

De Nacht van Descartes wordt jaarlijks georganiseerd door het Descartes Centre for the History and Philosophy of the Sciences and Humanities en Studium Generale en bestaat uit een middag- en een avondprogramma. Beide onderdelen zijn onafhankelijk van elkaar te volgen en voor iedere geïnteresseerde vrij toegankelijk.

AFTERNOON PROGRAMME

Symposium on the occasion of the retirement of Dennis Dieks

14:00 – 17:00, Senaatszaal Academiegebouw, Domplein 29 Utrecht, language: English



On the occasion of the retirement of Dennis Dieks a symposium will be held on October 13, 2014, dedicated to philosophy and foundations of science. Four of Dennis' co-authors, Henk de Regt (VU University Amsterdam), Pieter Vermaas (Delft University of Technology), Marijn Versteegh (University of Vienna) and Olimpia Lombardi (University of Buenos Aires), and Dennis himself will speak about developments and new prospects.

13.00: Coffee and tea

13.30: Bert Theunissen (Utrecht University): *Welcome*

13.35: Henk de Regt (VU University Amsterdam): *Understanding the Physical World*

Physics provides us with understanding of the world, but what exactly does it mean to have physical understanding? This is a deep philosophical question that cannot be answered without knowledge of the practice and history of physics. Combining expertise in physics with philosophical acuity, Dennis Dieks is the ideal scholar to answer this question. I had the privilege of collaborating with him in a research project on this topic, and together we developed a philosophical theory of scientific understanding that is currently widely discussed in the literature. In my talk I will review our contextual theory of understanding, describe the way in which I have elaborated it in subsequent work, and show how the theory solves a specific problem that confronts traditional views on scientific understanding.

14.05: Pieter Vermaas (Delft University of Technology): *Good Modal Interpretations of Quantum Mechanics: from Utrecht to Delft*

Dennis Dieks is a founding father of the family of modal interpretations of quantum mechanics, and the research he initiated at his Institute for History and Foundations of Mathematics and the Natural Sciences has established these interpretations as well-developed and internationally acknowledged

candidates to understand quantum mechanics. The results of this research answered to a considerable extent what modal interpretations could offer as interpretations of quantum mechanics, yet their evaluation raised in turn the meta question of what an interpretation has to offer for being a good, tenable or useful interpretation of quantum mechanics. I will revisit this research on modal interpretations and explore this meta question, drawing from my experience as a PhD student at the Utrecht Institute who went to work in Delft.

14.35: Break

14.50: Marijn Versteegh (University of Vienna): *Are identical quantum particles particles?*

A central element of modern physics is the notion of identical particles: all electrons for example have exactly the same intrinsic properties. In this presentation I will address the question whether identical particles, as they are described within standard quantum theory, can in general be appropriately called particles at all. Is an electron in some way a distinct object, distinct from all other electrons, so that we can really speak of the existence of many electrons, or is there just one undivided whole, one quantum field? Saunders argued that the individuality of each fermion is guaranteed by the antisymmetry of the many-fermion quantum state. In the two-electron case one can for example say that one electron has opposite spin to the other electron, from which one can conclude that there are indeed two distinct electrons. However, Dieks and I argue that, within the standard interpretation of quantum mechanics, such irreflexive relations do not make any difference with regard to the individuality of the identical particles [1]. A system of identical quantum particles can best be regarded as an undivided whole.

[1] D. Dieks, M.A.M. Versteegh, Found. Phys. 38, 923 (2008).

15.20: Olimpia Lombardi (University of Buenos Aires): *What is quantum information?*

The elucidation of the concept of quantum information combines the difficulties inherent in understanding the meaning of the word 'information' with the well-known foundational puzzles derived from quantum mechanics itself. This situation contrasts with the huge development of the research field named 'quantum information'. In the present work I will address the question 'What is quantum information?' from a conceptual viewpoint. For this purpose, first Schumacher's formalism will be introduced by contrast with Shannon's theory, and the definition of quantum information in terms of a quantum source will be discussed. Then, the definition of information in terms of coding theorems will be analyzed. These tasks lead us to focus on the relationship between Shannon entropy and von Neumann entropy, and to discuss the differences between the concepts of bit and qubit. Finally, on the basis of the previous discussions, I will analyze the different interpretations of the concept of information, in the search of a characterization adequate both to Shannon's and to Schumacher's formalisms.

15.50: Break

16.05: Dennis Dieks (Utrecht University): *Philosophy and Foundations of Physics: Where do we stand?*

16.50: Closing remarks

AVONDPROGRAMMA

Van Kern tot Kosmos, Recente kantelpunten in de natuurkunde en hun betekenis

20:00 – 22:30, Aula van het Academiegebouw, Domplein 29 Utrecht, voertaal: Nederlands

Natuurkundige ontdekkingen - van het uitdijende heelal tot het bestaan van de allerkleinste deeltjes - veranderen ons wereldbeeld. Toen de astronoom Copernicus in 1543 berekende dat de aarde om de zon

draait in plaats van andersom, bracht hij het gevestigde gezag aan het wankelen. Einsteins relativiteitstheorie zette ons begrip van de wereld opnieuw op losse schroeven. Volgens natuurkundigen staan we nu weer op een kantelpunt. Wat staat ons te wachten? Zijn we dicht bij een theorie van alles, die belangrijke ideeën in de natuurkunde met elkaar verbindt? En als het universum een blauwdruk heeft en we die begrijpen, welke gevolgen heeft dat dan voor ons denken?

Nobelprijswinnaar Gerard 't Hooft (UU), Erik Verlinde (UvA), Dennis Dieks, wetenschapshistoricus Jeroen van Dongen (UvA/UU) en wetenschapsfilosoof F.A. Muller (EUR/UU) brengen de nieuwste ontwikkelingen in de natuurkunde in kaart en gaan hierover in gesprek met elkaar en het publiek.

