

## AGPhil 9: Philosophy of Cosmology VIII

Zeit: Donnerstag 11:00–13:00

Raum: HS 10

AGPhil 9.1 Do 11:00 HS 10

**#eco-techno-cosmo-logic develops an aesthetic-scientific experimental system based on the ongoing research at the Laboratori Nazionali del Gran Sasso** — ●AMELIE LÖSSL<sup>1</sup>, JOL THOMSON<sup>3</sup>, DIOGO DA CRUZ<sup>1</sup>, ANGELA NEUMAIR<sup>1</sup>, and ELIZABETH MONDRAGÓN<sup>2</sup> — <sup>1</sup>Akademie der Bildenden Künste, München, Deutschland — <sup>2</sup>Technische Universität München, München, Deutschland — <sup>3</sup>University of Westminster, London, Great Britain

The SFB42 is a research group built out of artists from the Munich Academy of Fine Arts and physicists of the TUM. Together they travelled to the LNGS, the largest underground research center in the world, where they collected important data for the project #eco techno cosmo logic, which was initiated and developed by artist and researcher Jol Thomson. Based on the results of a subsequent workshop they were able to create some trans-objects by teaming up and working in interdisciplinary pairs. These objects are partial and material manifestations of this collaborative working process, where an intermingling of aesthetic and scientific methods and representations takes place. In our talk we will present and discuss the produced trans-objects. They are inspired by the concept of diffraction used by the feminist thinkers Donna Haraway and Karen Barad. Diffraction is a performative alternative to the analogy of our epistemologies as reflective, referring to a concept of physical optics, where it describes the interference pattern of diffracting light rays; which, in turn, enables knowledge production outside conventional patterns.

AGPhil 9.2 Do 11:30 HS 10

**Probability Theory as a Physical Theory Gives Insight in Big Topics. Questions to Mathematicians.** — ●LOUIS VERWOORT — University of Tyumen

There is something puzzling about probability theory: does it describe individual events (or systems), or rather ensembles of similar systems? At any rate, probabilities are always measured on ensembles. In this sense probability theory, as a physical theory, is unique: other physical theories describe individual measurements and individual systems. Here it is argued that probability theory can be seen as a general theory of causality (or determinism), so dealing with the underlying causal connections between systems. This simple be it radical interpretation suggests new avenues of research for fundamental issues in physics and mathematics. For example, it suggests 1) a generalization of the Central Limit Theorem; and 2) a different approach to address the unification of quantum mechanics and relativity theory. Through-

out the article precise questions to mathematicians are formulated to advance this research.

AGPhil 9.3 Do 12:00 HS 10

**Extragalactic Realism** — ●GAUVAIN LECONTE — IHPST, Paris, France

Ian Hacking's experimental argument for scientific realism about entities was designed to be applied only to laboratory sciences. Hacking thus defends, in a 1989 paper entitled "Extragalactic reality", an antirealist conception of astrophysics. I argue that this antirealism about astrophysics relies on a misconception of the methodology of present day astronomy and on an anthropocentric distinction between experimentation and observation.

First, I present Hacking's argument for antirealism about black holes and gravitational lenses and show that its shortcomings come from its anthropocentric character. I show that if we use a non-anthropocentric concept of experimentation such as James Woodward's interventionist account of "natural experiments", then modern astronomy should be considered as an experimental science.

Then, I revisit the cases of gravitational lenses and black holes put forward by Hacking as arguments in favour of his antirealism about astrophysics. I maintain that recent developments such as the use of gravitational lenses to measure Hubble's parameter or the detection of gravitational waves prove that astronomers do perform interventions on astrophysical entities using gravitational lenses and black holes. Therefore, the proponents of the experimental argument for scientific realism should consider these extragalactic objects not as mere hypothetical or auxiliaries but real entities.

AGPhil 9.4 Do 12:30 HS 10

**Constants of Nature - The Royal Road to Fundamental Physics** — ●ALEXANDER UNZICKER — Pestalozzi-Gymnasium München

Despite the deep mysteries surrounding their origin, there is little theoretical research about constants of nature. Rather, there appears to be considerable confusion about their role and importance.

The talk tries to clarify the concept in a straightforward manner and highlights the role of constants in history: scientific breakthroughs have usually been accompanied by an elimination of constants. It is argued that any complete theory of reality must do without any constants of nature - though in a different manner than most contemporary attempts.