

AGPhil 3: Philosophy of Cosmology III

Zeit: Dienstag 11:00–12:45

Raum: HS 10

Hauptvortrag

AGPhil 3.1 Di 11:00 HS 10

What do we actually learn from simulated universes? —
•STÉPHANIE RUPHY — Université de Lyon, France

Computer simulations are everywhere in science today, playing a central epistemic role, especially in the studies of physical objects or processes for which data are very sparse or inexistent. But what can we actually learn about real-world systems from their simulated counterparts? Focusing on cosmological simulations, I will offer a requalification of the type of knowledge produced by simulation enterprises, emphasizing its modal character: simulations do produce useful knowledge about our world, but by telling us what could be or could have been the case, rather than by telling us what is or was actually the case. I will also discuss in this talk to what extent the building of increasingly detailed simulations of real-world phenomena shapes the very aims of science.

AGPhil 3.2 Di 11:45 HS 10

Some Issues and Non-Issues in Concordance Cosmology —
•MARC HOLMAN — University of Western Ontario

The so-called “flatness problem” is widely taken to be a major outstanding problem of modern cosmology and as such forms one of the prime motivations behind inflationary models. Upon distinguishing three different versions of this putative problem, I show that the observational fact that the large-scale Universe is so nearly flat is ultimately no more puzzling than similar “anthropic coincidences”, such as the specific (orders of magnitude of the) values of the gravitational and electromagnetic coupling constants. In particular, there is no fine-tuning problem in connection to flatness of the kind usually argued for. Furthermore, the arguments regarding flatness and particle hori-

zons typically found in cosmological discourses in fact address a mere single issue underlying the standard FLRW cosmologies, namely the *extreme* improbability of these models with respect to any “reasonable measure” on the “space of all spacetimes”. In other words, there is arguably a serious cosmological fine-tuning problem, but it pertains to *generic* FLRW geometries. By their very nature, dynamical mechanisms such as inflation are inapt for addressing this latter problem.

AGPhil 3.3 Di 12:15 HS 10

Interventionism Meets Cosmology — •PHIL DOWE¹ and DAYAL WICKRAMASINGHE² for the Dowe and Wickramasinghe-Collaboration — ¹School of Philosophy, Australian National University, Canberra, Australia — ²Mathematical Sciences Institute, Australian National University, Canberra, Australia

Interventionism as an account of causal explanation and causal inference (Woodward 2003, Pearl 2000) is widely held to have been successful when applied to the special sciences. But it is also widely held that Interventionism doesn’t apply on the cosmological scale because, among other reasons, at that scale no sense can be made of the idea of an intervention. We show that there is ample reason to think cosmology utilises causal inferences and furnishes causal explanations, and that attempts to extend the idea of an intervention at the cosmic scale are in some ways better placed to capture cosmic causal explanation than the main rival, Lewis’ closest world semantics. To argue for this we consider the inflationary explanation of the expansion rates of the universe and the current acceleration, and the inflationary solution of Guth (1981) to the smoothness problem (horizon problem). In addition we illustrate how causal reasoning might clarify alleged epistemic limitations induced by cosmological horizons (particle and event horizons).