

## AGPhil 11: Quantum Mechanics, Philosophy and Information

Time: Friday 10:45–12:45

Location: HSZ/0304

AGPhil 11.1 Fri 10:45 HSZ/0304

**Entangled states explained locally** — •EUGEN MUCHOWSKI — Primelstrasse 10, 85591 Vaterstetten

The existence of entangled states (Bell states) forces us to reconsider our conception of physical reality. This is best done using a model. However, after Bell's theorem a local realistic model describing the quantum correlations should not exist. But Bell's theorem has been refuted by a contextual model. So we are able to concretely discuss terms like contextuality, indistinguishability, inseparability and counterfactual definiteness using a local realistic model. We introduce a model in which the indistinguishability of the entangled photons explains the physical states, but in which the photon pairs do not share the value of a statistical parameter. It is astonishing that a model of entangled quantum systems can be derived solely from the initial conditions and the assumption that the behaviour of quantum particles is determined in advance. No coupling of hidden parameters is required.

AGPhil 11.2 Fri 11:15 HSZ/0304

**When and why did physicists start bashing philosophy?** — •ALEXANDER UNZICKER — Pestalozzi-Gymnasium München

While in the first half of the 20th century physics was an integral part of philosophy, after World War II the latter became more and more an unwelcome appendix. The evolution of this role of philosophy is discussed with some key examples. Obviously, the different research traditions in Europe and America also contributed to this shift in significance.

AGPhil 11.3 Fri 11:45 HSZ/0304

**Impacts, symmetries and decisions** — •BASIL EVANGELIDIS — Eschwege, Germany

There is a great amount of research data accumulating by space exploration on the topics of impacts, symmetries, habitable zone, chemical syntheses, atmosphere, climate and geology. The related facts, sayings and relations need to be evaluated by a theory of decision based on strategies of cooperation. A logic of quantum space science and technology is being, therefore, continuously articulated and innovated though focusing on efficiency, computability, polyvalence, feedback control etc.

AGPhil 11.4 Fri 12:15 HSZ/0304

**Everything is information: paradox or solution?** — •EWOUT HALEWIJN — TU Delft, Netherlands

If we want to solve fundamental conceptual problems such as the "measurement problem", the "absence of absolute space", the multifaceted "problem of time" and "nonlocality", we should not regard matter, space and time as fundamental. Neither should we wait for reconciliation projects in highly mathematical fields such as loop quantum gravity or string theory. If reconciliation of quantum-mechanics and relativity theory succeeds at all, it might not provide conceptual solutions that we are looking for.

We should take the reconciliation challenge head-on without all the mathematics, and ask ourselves: Why are some scientific findings so hard to swallow? Which strong convictions do they clash with? Why are these convictions held by larger audiences at all?

In this talk I defend that the claim "everything is information" could resolve a number of conceptual problems, while not clashing with the convictions held by larger audiences. Except for maybe one paradox: While information seems to be everything, it doesn't appear to exist at all.