

AGPhil 1: Ontological Aspects in Physics

Zeit: Montag 14:00–16:00

Raum: SR 113

AGPhil 1.1 Mo 14:00 SR 113

Compositionality in Particle Physics: Lessons from the Weak Interaction — ●SORIN BANGU — Univ. of Bergen, Dept. of Philosophy, 12 Sydneplass, 5007 Bergen Norway

One of the most general (and successful) ideas of modern science, especially prevalent in physics, is that chunks of matter are made of, or composed of, other (smaller) chunks of matter. As stated, this principle - call it the compositionality principle - has an ontological character: if one asks what the larger chunks of matter are, the answer is that they are, nothing more and nothing less, some sort of collection, or mereological sum, of their constituent parts (where among these components one might also want to include, as elements in their own right, the relations that hold them together.)

This paper inquires about the status of the compositionality idea in the context of the early (1930s) attempts to understand weak interaction. The proposal I articulate here is that the compositionality thesis turned out to be a rather complicated business: some instances of the claim are meant literally, and others are not. What I will do is isolate two representative cases, one in which I will argue that the model of interaction is a literal instantiation of the compositionality claim, and one in which it cannot be.

AGPhil 1.2 Mo 14:30 SR 113

Decoherence: How much does it help? — ●MEINARD KUHLMANN — Universität Bielefeld

Decoherence entered the scene as a solution to the measurement problem in quantum mechanics. However, it has become increasingly clear in the last decade that decoherence as such solves few if any aspects of the measurement problem. If so, the question arises in which respect decoherence does help. I will supply a differentiated answer.

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Natural Laws as Dispositions — ●FLORIAN FISCHER — Königstr.3, 53113 Bonn

Dispositional theories of laws of nature are problematic, besides their popularity. Reviewing the history of dispositions, I start with the simple conditional analysis. C.B. Martin pointed out that the conditions for gaining or losing a disposition can be the same as the stimulus. Another closely related but significantly different group of counterexamples are Johnstons masks and Birds antidotes. The object keeps its disposition in these cases, but nevertheless the manifestation is some-

how blocked or weakened.

There are a number of proposals how to save dispositions. I will present the accounts of Choi and Gunderson, Manley and Wasserman and finally Fara. In the end all of them are not convincing. My diagnosis is that all this accounts have something in common and that exactly this is the basic problem. They, somehow or other, narrow the scope of the disposition to exclude the counterexample cases, which is unacceptable.

A look at the scientific practise can be of great help to examine a well-discussed case in the philosophical literature. To deal with the problems of the missing manifestation, I propose a new kind of manifestation. I conclude by comparing my view to recent accounts. I can make sense of abstraction and even answer the monotonicity charge. In the end, I would like to have removed one obstacle for a dispositional theory of laws of nature.

AGPhil 1.4 Mo 15:30 SR 113

Euler on the correspondence between light waves and the surfaces of bodies: "All surfaces of bodies are similar to tensioned strings" — ●DIETER SUI SKY — Institut für Physik, Humboldt-Universität zu Berlin

Following Huygens and making use of the similarity between the perception of sound by hearing and of colours by seeing, Euler completed the wave theory of light by the analysis of the surfaces of bodies. In contrast to Newton's corpuscular theory, Euler had to develop additionally a model of the *surfaces of bodies*. Euler claimed that surfaces are similar to *tensioned strings* whose vibrational motion is excited by the light waves. An early version, included in the manuscript *Theses Philosophicae* (1749-52), was only recently published, the later version was already published in the *Letters to a German Princess*.

Euler's theory of perception and vision will be compared with Berkeley's *New Theory*. Analyzing seeing and touching, Berkeley claimed: "It is therefore a direct consequence that there is no idea common to both senses." Euler constructed the missing link by means of the wave theory of light.

The conclusion is that Euler's theory of light is of considerable epistemological importance because it includes a critical approach to Newton's and Berkeley's theories. Furthermore, Euler's basic hypotheses had been later confirmed by Planck's assumption of elementary oscillators in the theory of heat radiation and Einstein's treatment of emission and absorption of light.