

Thursday, 17 September

Room 320 | Mittelstrasse 43 | 3012 Bern

Time	
09.45-10.00	Welcome
10.00-11.00	<i>How Not to Argue for Metaphysical Indeterminacy</i> Jonas Werner Humboldt University of Berlin
11.00-11.15	Coffee Break
11.15-12.15	<i>Nomic Indeterminacy in Physics</i> Vera Matarese University of Perugia
12.15-13.30	Lunch (Buffet)
13.30-14.30	<i>Indeterminate Laws of Nature</i> Robert Michels Goethe University Frankfurt
14.30-15.00	Coffee Break
15.00-16.00	<i>Sources of Causal Indeterminacy</i> Max Kistler University Paris 1 Panthéon-Sorbonne
16.00-16.30	Coffee Break
16.30-17.45	<i>Algorithmic Randomness, Exchangeability, and the Principal Principle</i> Eddy Keming Chen University of California, San Diego
19.00-open end	Dinner (Bistro Hallers)

Friday, 18 September

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Time	
09.30-10.30	<i>Indeterminate Causation: The Case of the Quantum Switch</i> Laurie Letertre LMU Munich
10.30-10:45	Break
10.45-11.45	<i>Metaphysical Indeterminacy Beyond Standard Physics</i> Baptiste Le Bihan University of Geneva
11.45-12.00	Break
12.00-13.00	<i>Spacetime Indeterminacy in Quantum Gravity: Some Reflections</i> Vincent Lam University of Bern
13.15-14.45	Lunch (Restaurant Tulsi)

Thursday, September 17

How Not to Argue for Metaphysical Indeterminacy

Jonas Werner (Humboldt University of Berlin)

10.00-11.00 | Thursday, September 17

There seem to be numerous cases suggesting that core notions of metaphysics give rise to indeterminacy. These cases include the open future, causal indeterminacy, nomic indeterminacy, counterfactual indeterminacy, quantum indeterminacy, and moral indeterminacy. In my talk I argue that while this gives us reason to accept that indeterminacy plays a role in metaphysics, none of these cases give us a compelling reason to hold that the world is substantially indeterminate. My defense of this claim has two parts. First, I propose and defend an account of what it is for the world to be substantially indeterminate. The gist of my proposal is that the world is substantially indeterminate just in case it cannot be completely described, with the notion of a complete description being spelled out in terms of necessity, determinacy, and entailment. Second, I argue that each of the mentioned cases of indeterminacy in metaphysics can be plausibly dealt with in a way that does not involve substantial worldly indeterminacy. The crucial step is to show that only persistent higher-order indeterminacy supports the assumption of substantial worldly indeterminacy and that none of the cases clearly support persistent higher-order indeterminacy. The upshot is that the question whether the world is substantially indeterminate remains open.

Nomic Indeterminacy in Physics

Vera Matarese (University of Perugia)

11.15-12.15 | Thursday, September 17

In a manuscript currently under review, Vera Hoffmann-Kolss, Jonas Werner, and I suggest that quantum mechanics may exhibit nomic indeterminacy and develop a metaphysical framework for it. Our account differs from Eddy Chen's one, which is in terms of vagueness in the laws of nature, since the kind of nomic indeterminacy we propose concerns the nomic status and the alethic content of law-statements. Our paper, however, does not provide any compelling argument for why such indeterminacy should be regarded as a genuine feature of the world, leaving it as an interesting hypothesis for further investigation. In this talk, after reviewing our proposal, I examine whether the philosophical debate on the signal/noise distinction can provide such an argument. In particular, I suggest that an argument for nomic indeterminacy can be constructed from James McAllister's thesis, according to which any pattern that can be extracted from the empirical data constitutes evidence for a corresponding structure in the world. Finally, I assess the strengths and limitations of this proposal and discuss its broad implications for the metaphysics of laws of nature and for scientific realism.

Indeterminate Laws of Nature

Robert Michels (Goethe University Frankfurt)

13.30-14.30 | Thursday, September 17

Chen has recently argued that fundamental laws of nature can be metaphysically vague, his main example being the past hypothesis. The argument involves a number of substantial assumptions about the nature of laws of nature and of vagueness which stand in rather intricate relations. In this paper, I want to discuss some of these assumptions and relations in detail. Two focal points of the discussion will be Chen's assumption that the lack of exactness of the weak past hypothesis coupled with his Minimal Primitivist view of laws suffices to give us a case of a metaphysically vague law, and the question of the feasibility of a potentially stronger variant of the argument involving a notion of metaphysical vagueness which Chen himself puts aside.

Sources of Causal Indeterminacy

Max Kistler (University Paris 1 Panthéon-Sorbonne)

15.00-16.00 | Thursday, September 17

Two sorts of "worldly" (i.e. neither semantic nor epistemic) causal indeterminacy are examined. In situations of probabilistic overdetermination, where two factors C1 and C2 are present each of which raises the probability of some effect E, and where E happens, two sorts of situation have so far been distinguished: either C1 and C2 have merged their contributions to the raise of the probability of E so that both are causally responsible for E, or only one of C1 and C2 is. I suggest that there might exist a third type of situation in which it is indeterminate whether one or both of C1 and C2 cause E. A second sort of causal indeterminacy arises within the framework of interventionism. In that framework causal concepts such as contributing cause or total cause are defined in terms of manipulations and observations. Manipulations can only fix the value of variables, and measurements can only determine the value of variables, to a finite degree of precision. For this reason, the interventionist conception of causation has the consequence that there are situations in which it is indeterminate whether X causes Y. This entails that the metaphysical principle of the "causal closure of the physical" cannot be justified. We will ask whether this sort of indeterminacy is really worldly rather than epistemic.

Algorithmic Randomness, Exchangeability, and the Principal Principle

Eddy Keming Chen (University of California, San Diego)

16.30-17.45 | Thursday, September 17

We introduce a framework uniting algorithmic randomness with exchangeable credences to address foundational questions in philosophy of probability and philosophy of science. To demonstrate its power, we show how one might use the framework to derive the Principal Principle — the norm that rational credence should match known objective chance — without circularity. The derivation brings together de Finetti's exchangeability, Martin-Löf randomness, Lewis's and Skyrms's chance-credence norms, and statistical constraining laws. Laws that constrain histories to algorithmically random sequences naturally pair with exchangeable credences encoding inductive symmetries. Using the de Finetti representation theorem, we show that this pairing directly entails the Principal Principle of this framework. We extend the proof to partial exchangeability and provide finite-history bounds that vanish in the infinite limit. The Principal Principle thus emerges as a mathematical consequence of the alignment between nomological constraints and inductive learning. This reveals how algorithmic randomness and exchangeability can illuminate foundational questions about chance, frequency, and rational belief. (Joint work with Jeffrey Barrett.)

Friday, September 18

Indeterminate Causation: The Case of the Quantum Switch

Laurie Letertre (LMU München; presenting author) & Cristian Mariani (Università della Svizzera Italiana)

09.30-10.30 | Friday, September 18

It is often assumed that, if c causes e , then it is determinate that c causes e . Call this principle Determinacy of Causation (DetC for short). In recent years it has been shown that DetC suffers from various objections within a Humean framework for understanding causation (Sartorio, 2006, Ballarín, 2014, Bernstein, 2016, Swanson, 2017).

Our aim in this paper is to argue that recent discoveries in the foundations of quantum mechanics might give further motivations for rejecting DetC. We focus on a specific arrangement of physical operations known as quantum switch, and show that a mildly realist attitude towards this setup suggests putting DetC into question.

Metaphysical Indeterminacy Beyond Standard Physics

Baptiste Le Bihan (University of Geneva)

10.45-11.45 | Friday, September 18

Cutting-edge physics comes in pieces, and it does not make metaphysical work easy. Nevertheless, several approaches to quantum gravity, the umbrella term for attempts to unify our best empirically confirmed pieces of physics, appear to generate situations that are naturally described using the apparatus of contemporary theories of metaphysical indeterminacy. In this talk, I will examine a number of such cases and assess whether they provide genuine reasons to posit fundamental metaphysical indeterminacy. I will focus in particular on interpretations of quantum superpositions of geometries and on several putative forms of indeterminacy arising in string theory and causal set theory, including indeterminacy concerning the past, temporal passage, and causal relations.

I will conclude by considering a broader lesson suggested by causal approaches to spacetime emergence. If spacetime is not fundamental but emerges from an underlying causal structure, then familiar notions of nomological determinism and indeterminism may themselves be emergent. Moreover, if the distinction between laws and boundary conditions is emergent, then the traditional contrast between indeterministic laws and metaphysically indeterminate states becomes less clear-cut. On such a picture, ordinary nomological indeterminism may be understood as an approximate manifestation of a more fundamental form of indeterminacy in the causal network itself.

Spacetime Indeterminacy in Quantum Gravity: Some Reflections

Vincent Lam (University of Bern)

12.00-13.00 | Friday, September 18

The main research programs in quantum gravity (QG) are commonly interpreted as suggesting that key spacetime features are absent ('disappear') from the QG level, or even that spacetime itself is not fundamental. This perspective from fundamental physics raises a host of intriguing metaphysical issues, in particular about the emergence of spacetime, as well as about the non-spatio-temporal metaphysics of physical entities and laws of nature. However, it has been recently suggested that the framework of metaphysical indeterminacy could provide an alternative to this 'received view' about spacetime in QG. This talk aims to discuss the spacetime indeterminacy proposal, its virtues and challenges in the context of QG, as well as its consequences on the above mentioned metaphysical debates in QG.