GROUND IN PHILOSOPHY OF SCIENCE

University of Geneva, 13-14 September 2016

PROGRAMME

13 September 2, Rue Jean-Daniel Colladon (salle Simon Veil)

10:00–11:15 KEYNOTE. Marc Lange (UNC, Chapel Hill): *Grounding, scientific explanation, and reducible physical properties*

11:15–11:45 *coffee break*

11:45–12:30 David Kovacs (Bilkent University): *Metaphysical explanation, unification, and understanding*

12:30–14:00 *lunch break*

14:00–14:45 David Schroeren (Princeton University): *Scientific explanation, grounding, and hyperintensional ontology*

14:45–15:30 Haktan Akcin (Lingnan University): *Naturalized metaphysics, modal structuralism, and grounding*

15:30–16:15 Fabio Ceravolo (University of Leeds): *Superinternal grounding vs relativistic composition*

16:15–16:45 *coffee break*

16:45–17:30 Philipp Blum (University of Lucerne):*Structuralism and relational individuation*

17:30–18:15 Beate Krickel (Ruhr-University Bochum): *What is mechanistic constitution?*

20:00 *conference dinner*

14 September 2, Rue Jean-Daniel Colladon (salle Simon Veil)

10:00–10:45 Christian Wüthrich (University of Geneva): *Grounding time*

10:45–11:15 *coffee break*

11:15–12:00 Nina Emery (Brown University): *Laws and their instances*

12:00–12:45 Toby Friend (UCL): *Can we ground laws but keep them explanatory?*

12:45–14:00 *lunch break*

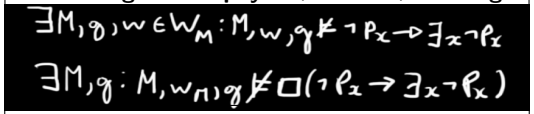
14:00–14:45 Vanessa Triviño & María Cerezo (University of Murcia): *Dispositions and grounding*

14:45–15:30 Mauricio Suárez (Complutense University of Madrid): *The grounds of objective chances*

15:30–16:00 *coffee break*

16:00–17:15 KEYNOTE. Michela Massimi (University of Edinburgh): *Grounds and nomological necessity. Kantian reflections*

Grounding – Metaphysics, Science, and Logic



https://groundingproject.wordpress.com

ABSTRACTS

Haktan Akcin (Lingnan University): "Naturalized metaphysics, modal structuralism, and grounding" I try to clarify the structuralist claim that the world has an objective modal structure with reference to the recent grounding discussions. Against criticisms that the ontological priority relations in OSR are vague, I highlight the scale-relative ontology suggested by Ladyman & Ross. Since structure is the real pattern in a scale-relative ontology, structure itself turns out to be the essence understood as the ontological prior. The analogy with grounding argument here might be established via Fines suggestion that modality is grounded in essence. In a similar vein, we could argue that structure precedes modality in OSR. Along the way, I defend the necessitarian understanding of grounding, since otherwise our link to the ontological dependence relations, as pointed out by the opponents of OSR, would be lost. I finish by drawing an analogy between OSR and grounding with respect to causation. Grounding is usually understood as the metaphysical priority relation distinct from causation, and this approach is very much in accordance with Ladyman & Ross' exclusion of causation from fundamental ontology due to the fact that causal powers do not play a central role in fundamental physics.

Philipp Blum (University of Lucerne): "Structuralism and relational individuation" Recent and not-so-recent brands of structuralism have been motivated by the need to relationally individuate physical entities. The precise form of the argument from relational individuation to being 'nothing over and above' nodes in a structure has not been spelt out. I discuss critically several forms of such an argument, contrast them with parallel cases in the philosophy of mathematics and conclude that the prospects for a distinctly physical form of physicalism do not look good.

Fabio Ceravolo (University of Leeds): "Superinternal grounding vs relativistic composition" Fans of grounding have been attracted by its promise to eschew eliminativism on medium-sized dry goods – understood as bearers of ordinary sortals: 'is a table', 'is a chair', etc. But the details are as yet unrevealed. In order to mark a way forward, I propose the following naturalistic methodology. One takes a physical theory that clearly poses an eliminativistic challenge. Following, one looks at which relation among the resources posed by the theory is responsible for raising the challenge. Finally, the relation is supplemented with the grounding-like features sufficient to solve the challenge. The supplementation, however, should not violate empirical adequacy and should not presuppose any further fundamental ideological structure, on pain of scoring lower on a virtue-theoretic count than the theory's eliminativistic interpretation. While the method nicely sets grounding in a naturalistically evaluable context, I will suggest (admittedly provisionally) that in some special relativistic cases the only grounding variety suitable for supplementing a physical package is not one that scores on a par on the minimality of fundamental ideology.

Nina Emery (Brown University): "Laws and their instances" What is the relation between a scientific law and its instances? This question has received little discussion in the literature, but neither does it have an obvious answer. On the one hand, many will want the relation between a law and its instances to be explanatory. On the other hand, few will think the relation between a law and its instances is causal. In this talk, I explore the view that laws ground their instances. I compare this view to several competing accounts including those given by Woodward (2005) and Skow (2016). And I discuss several consequences that follow from it, including consequences for Loewers (2012) proposal for how make sense of

the explanatory power of Humean laws by claiming that laws scientifically explain the Humean mosaic while the mosaic metaphysically explains the laws.

Toby Friend (UCL): "Can we ground laws but keep them explanatory?" A problem posed to the Humean approach to laws of nature is to show how it is possible for laws to explain first-order on-goings whilst also being grounded in them. Despite objections to the mode of argument for this concern with Humeanism, I think we ought to accept the conclusion that laws under Humeanism don't have a certain *metaphysical* sort of explanatory power. However, I want to suggest that Humeanism remains plausible despite this since there are arguments which amount to the analogous conclusions for all the prominent alternative accounts to laws. In particular, I will argue that nomic necessitation and dispositional essentialist accounts suffer from grounding laws in the very things laws are mooted to metaphysically explain. Showing this will require some careful analysis of what metaphysical explanation and essence do and do not amount to. It's not all bad news for laws, however, and I will draw attention to some non-metaphysical forms of explanation which serve to justify laws' role in science.

David Kovacs (Bilkent University): "Metaphysical explanation, unification, and understanding" A number of philosophers today are interested in metaphysical explanation. Many of them think that these explanations are backed by the grounding relation, which serves as the glue that ties metaphysical explananda to their explanantia. In the background of this view is a picture according to which explanations require the presence of determination relations, for example causation, grounding, and perhaps other relations as well, such as micro-basing or composition. Call this general picture the *determinative model*. In this paper, I offer a novel alternative to the determinative model, which I call Metaphysical Unificationism. This view is inspired by Philipp Kitchers similar account of scientific explanation, and contends that explanatoriness is a holistic feature of those theories that derive a larger number of explananda form a meager set of explanantia. I will argue that Metaphysical Unificationism has several advantages. First, it reestablishes a link between explanation and understanding that has been ignored by determinative models of metaphysical explanation. Second, it avoids worries that pose a more serious problem to unificationist views of *scientific* explanation. Third, it can give us something that determinative views are by design unsuited for: a completely general theory of explanation.

Beate Krickel (Ruhr-University Bochum): "What is mechanistic constitution?" Craver's *mutual manipulability account of constitutive relevance* is the most popular approach to mechanistic constitution. Constitutive relevance obtains, according to Craver, only if the putative mechanistic component and the phenomenon are mutually manipulable by means of Woodwardian interventions. Recently, different authors have argued that the mutual manipulability account is problematic (Leuridan 2012; Gebharter and Baumgartner 2015; Romero 2015; Harinen 2014): first, interventionism is not applicable to constitutive relevance relations because there cannot be ideal interventions into constitutive relationships. Second, a modification of the notion of an ideal intervention, as suggested by Woodward, that is supposed to solve the first problem, renders constitutive relevance causal. I will develop an account of constitutive relevance that solves these problems while maintaining the merits of Craver's mutual manipulability account. My solution rests on a metaphysical analysis of the nature of mechanistic phenomena: phenomena are objects that participate in processes or states (*entity involving occurrents*, or *EIOs*; Kaiser and Krickel 2016). Mutual manipulability can be analyzed in terms of causal relations

between the mechanism's components and *temporal parts* of the constituted phenomenon. Still, constitutive relevance is not a causal relation since it holds between the mechanism's components and the phenomenon *as a whole* and there cannot be causal relations between an event and its parts.

Marc Lange (UNC, Chapel Hill): "Grounding, scientific explanation, and reducible physical properties" Explanation is a potential point of contact between philosophy of science and investigations of grounding. My talk will explore some of that potential. Although grounding is supposed to underwrite a kind of explanation alongside scientific explanation, "grounding explanations" are rather different from scientific explanations. I wonder whether grounds, when they explain, do so by virtue of being grounds. It may be that grounding is not an explanatory relation per se. I will then turn to the relation between grounding and scientific explanation. Some non-fundamental properties are merely arbitrary conglomerates of more fundamental properties, whereas other non-fundamental properties are natural enough to figure in scientific explanations. Because all of these properties are non-fundamental, some difference between the grounds of these two sorts of non-fundamental properties might be expected to account for their difference in explanatory role. I will look at some examples (such as center of mass, reduced mass, and Reynolds number). Ultimately, I will argue that perhaps surprisingly, no difference in the grounds of these non-fundamental properties is responsible for their difference in explanatory power.

Michela Massimi (University of Edinburgh): "Grounds and nomological necessity. Kantian reflections" In this paper, I look at the role that the notion of "ground" played in the history of philosophy. In particular, I investigate Kant's mature view on the laws of nature and their necessity. I distinguish three kinds of grounds in Kant and I focus my attention on his notion of "real grounds" qua causal grounds underpinning laws of nature. Despite influential projectivist readings of Kant on laws, I argue that Kant subscribed to a metaphysically more robust image of nature. The notion of ground played a central role in it by delivering the nomological necessity of the laws of nature. These historical reflections bear on wider contemporary discussions in the metaphysics of science about dispositions, their causal basis, and relevance.

David Schroeren (Princeton University): "Scientific explanation, grounding, and hyperintensional ontology" Scientific theories are often thought to play various *modal* roles. For example, theories are used to make pronouncements as to what is *possible* and *necessary*, according to those theories. This modal role of theories may be taken to suggest that theories should be regarded as having an *intensional ontology*, i.e. an ontology which consists of entities that are individuated up to necessary equivalence. The purpose of this paper is to argue that theories ought to be regarded as having an ontology which is not merely intensional, but rather *hyperintensional*; i.e. an ontology which consists of entities that are individuated more finely than by necessary equivalence. I proceed by examining the *explanatory* role of theories; and in particular, by arguing (1) that paradigm cases of scientific explanation should be construed as hyperintensional, and (2) that scientific theories are often involved in grounding explanations. I illustrate the consequences of this view by considering classical mechanics: although Hamiltonian and Lagrangian mechanics are mathematically intertranslatable by way of the Legendre transformation, I argue that they disagree on their hyperintensional ontology. Thus, taking seriously the explanatory role of theories allows us to distinguish, on principled grounds, between mathematically equivalent physical theories.

Mauricio Suárez (Complutense University of Madrid): "The grounds of objective chances" We say that a particular coin has some propensity to land heads; that a radium atom has a certain propensity to decay within the hour; that a particular individual has a propensity to smoke, and that smoking has a propensity to cause lung cancer. In all these expressions, a is the propensity property of the object or chance set up, and b is its manifestation property. How do a and b relate, i.e. how do the propensity and manifestation properties relate? I explore three models, or accounts for the relation between propensities and their probabilistic or chance manifestations: indicative conditionals; conditional probabilities; and what I call grounded indexed probabilities. I argue that the first one confronts important semantic objections; the second one is refuted by Humphreys' paradox; and the third one is along the right track.

Vanessa Triviño and María Cerezo (University of Murcia): "Dispositions and grounding" The relation of grounding between A and B is generally described as a metaphysical relation of noncausal dependence that can be expressed by locutions such as "in virtue of", "depends on" or "is determined by". Despite of this characterization of grounding, there exists a wide debate with respect to whether grounding is a real metaphysical relation or not. The general aim of this paper is to contribute to this debate by exploring whether grounding relations can be recognized in a metaphysics of dispositions/powers. In particular, we will try to examine four relations that might be recognized in a realist metaphysics of dispositions/powers, namely: (A) the relation between a disposition and its categorical (or material) basis (B) the relation between a manifestation and its disposition (C) the relation between a new disposition that is the consequence of two or more other powers jointly manifesting and the manifestation of these latter powers and (D) the relation between a cause and the disposition whose manifestation gives rise to a causation process). We intend to analyse whether each of these relations meet the standard features attributed to a grounding relation or not.

Christian Wüthrich (University of Geneva): "Grounding time" Time seems to be the kind of aspect of our reality that ought to be primitive and hence fundamental in the metaphysical furniture of our world. However, as physicists have searched for a theory combining quantum physics with general relativity and replace them as fundamental physical theory, it has become increasingly clear that the ontology of such a fundamental theory will not contain anything resembling a (space-)time. Space and time, it appears, are absent at the fundamental level – they are grounded in something else – and only 'emerge' as effective phenomena at a coarse-grained scale. If that is so, any such candidate theory must establish the emergence of spacetime and its dynamical content from the fundamental structure atemporally, i.e., without conceiving of this emergence as a dynamical process in time. The goal of this paper is to articulate what this means and to consider one approach to formulating such a theory, viz. loop quantum gravity, and to study how temporality may emerge atemporally in its cosmological models. This paper is part of a larger joint project with Nick Huggett addressing this issue in different approaches to quantum gravity.

ORGANIZATION

Ground in Philosophy of Science is organized by Lorenzo Casini (University of Geneva) and Marcel Weber (University of Geneva), with the generous support of the Swiss National Science Foundation (grant no. CRSII 1_147685/1). It is an international conference in the SNF project Grounding - Metaphysics, Science, and Logic, and a satellite event of the second annual conference of the Society for the Metaphysics of Science, University of Geneva, September 15-17, 2016.

ATTENDANCE

Attendance is free of charge. If you wish to attend the conference or join us for dinner, please email lorenzo.casini@unige.ch.

CONTACT

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