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Institute of Philosophy

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International workshop

Perspectives on Explanation

May 18-19, 2017

Prague, Czech Republic

Institute of Philosophy, Czech Academy of Sciences
Jilská 1, Prague 1

18th May 2017 (Thursday) Conference room (124a)

09:50 – 10:00 **Martin Zach** (Charles University in Prague)
Introduction

10:00 – 11:15 **Ladislav Kvasz** (Czech Academy of Sciences)
Explanation in science and the explanatory power of language

11:30 – 12:45 **Sorin Bangu** (University of Bergen)
Higher level explanation in physics. The case of the BCS superconductivity model

12:45 – 14:30 *Lunch break*

14:30 – 15:45 **Robert Batterman** (University of Pittsburgh)
Universality, Stability, Autonomy, and Scales

16:00 – 17:15 **Arnon Levy** (Hebrew University of Jerusalem)
A Plea for Pragmatics

19th May 2017 (Friday) Conference room (124a)

10:00 – 11:15 **Alisa Bokulich** (Boston University)
Representing and Explaining: The Eikonic Conception of Scientific Explanation

11:30 – 12:45 **Richard David-Rus** (Romanian Academy)
Scientific understanding through agent-based models

12:45 – 14:30 *Lunch break*

14:30 – 15:45 **Lilia Gurova** (New Bulgarian University)
Explanation, understanding, and inference

16:00 – 17:15 **Marcin Milkowski** (Polish Academy of Sciences)
How do 'paradigms' in cognitive science explain? Lessons from the mechanistic perspective

Book of abstracts

Ladislav Kvasz (Czech Academy of Sciences)
Explanation in science and the explanatory power of language

There are several epistemological questions connected with explanation in science. One doubtlessly interesting sort of such questions deals with the explanation of the failures of previous theories. In the paper I will discuss several such cases, such as the explanation of Newton's failure to derive the correct value of the speed of sound or the explanation of the failure of field theory to describe a stable configuration of charged particles.
Such failures are objective features of the theories involved. In the framework of Newtonian mechanics it is objectively impossible to derive the value of the speed of light; just like in the framework of classical field theory it is objectively impossible to describe a dynamically stable configuration of charged particles. To capture such cases I introduce the analytical and expressive boundaries of the linguistic framework of a theory.

Sorin Bangu (University of Bergen)
Higher level explanation in physics. The case of the BCS superconductivity model

It may be old news that understanding-generating explanations of phenomena in biology, geology, economics, etc. are not, and cannot be, formulated in terms of (particle) physics, i.e., by reference to electrons, quarks, etc. These explanations are thus 'higher-level'. While some argue that chemistry should also be on this list, it is surely controversial whether physics itself is ever (or could be) in such a situation. This talk explores this possibility, that the explanation of superconductive properties of certain metals (as offered by Bardeen, Cooper and Schrieffer in 1957) is an illustration of this kind of explanation.

Robert Batterman (University of Pittsburgh)
Universality, Stability, Autonomy, and Scales

I discuss the concept of universality, specifically of physical phenomena, and even more specifically of the behavior of critical phenomena. In the philosophical literature, I believe, this concept has been widely misunderstood. In particular, a number of recent attempts to formulate what counts as an explanation for the possibility of universal behavior are misguided because they fail to properly understand what the explanandum is. A proper explanation involves recognizing that universality implies a kind of stability of behavior under perturbation. Furthermore, this stability itself requires explanation. I relate the explanation of the stability characteristic of universality to the autonomy of certain models or theories at continuum scales from those and scales of the molecular or atomic.

Arnon Levy (Hebrew University of Jerusalem)
A Plea for Pragmatics

The pragmatic approach to explanation emphasizes the communicative context in which explanations are given and received. A number of versions of this approach were developed in decades past (Achinstein, 1983; Bromberger, 1966; van Fraassen, 1980). But they failed to make a substantial impact on philosophical thinking about explanation, mainly because they failed to solve –

indeed it is unclear they even addressed – the problem of explanatory relevance, seen by many as the sine qua non of an account of scientific explanation.
But the failure to supply criteria for relevance does not mean the pragmatic perspective is useless. In this talk, I will argue that by combining the overall structure of pragmatic approaches – on which explanation is intimately connected with understanding – with relevance criteria drawn from current causal approaches, we can do justice to important issues surrounding explanation, e.g. the importance of explanatory virtues such as modularity and simplicity and the manner in which explanatory power can benefit from idealization. This view is grounded in a substantive, ability-focused, account of understanding, something existing pragmatic approaches lack. If successful, the argument motivates a two-factor theory in which both the content and the context of an explanation determine its overall quality.

Alisa Bokulich (Boston University)
Representing and Explaining: The Eikonic Conception of Scientific Explanation

The widely-accepted ontic conception of explanation, according to which explanations are "full-bodied things in the world," is fundamentally misguided. I argue instead for what I call the *eikonic* conception of scientific explanation, according to which explanations are an epistemic activity involving representations of the phenomena to be explained. What is explained, in the first instance, is not the phenomenon in the world itself, but a particular representation of that phenomenon, which is contextualized within a particular research program and explanatory project. I conclude that this eikonic conception of explanation has the following five virtues: first, it is able to better make sense of scientific practice; second, it allows us to talk normatively about explanations; third, it makes sense of explanatory pluralism; fourth, it helps us better understand the role of mathematics, models, and fictions in scientific explanation; and fifth, it makes room for the full range of constraints (e.g., ontic, epistemic, and communicative) on scientific explanation.

Richard David-Rus (Romanian Academy)
Scientific understanding through agent-based models

The aim of the presentation is to argue that it is a rather more plausible to view understanding from ABM models as a non-explanatory form, following in this sense, some suggestions advanced by Peter Lipton. I will look first at the type of explanation that some authors claimed to be disclosed by these models: Weisberg analysis of IBM in ecology and Grune-Yanoff analysis of Anasazi model. I will argue that their analyses fail to disclose the sort of actual explanation in order to qualify this understanding as an explanatory one. This brings me further to Strevens' Simple View that claims the existence of a correct explanation behind any understanding and his strategy to dismiss the challenges posed by non-explanatory forms of understanding. His strategy remains mainly unarticulated and incurs damaging costs to his view. In the last part I will turn to Khalifa's critique on Lipton's proposals and argue that it is based on an unjustified construal of Lipton's framework. I will show how Khalifa's 'argumentative strategy' fails to establish the superiority of actual understanding over one from possible explanation. I will end by suggesting a way of cashing out the benefits of this form of non-explanatory understanding.

Lilia Gurova (New Bulgarian University)
Explanation, understanding, and inference

I'll discuss the implications for a theory of explanation of a view, which builds on two assumptions: (a) good explanations increase our understanding of explained phenomena, and (b) understanding X is best described in terms of the valid inferences about X, which the agent of understanding can draw from his or her beliefs. The key implication of (a) and (b) is that good explanations allow for drawing extra-inferences about the explained phenomena. I'll argue for the descriptive validity of the latter claim. In addition, I will show how the presented inferentialist view of understanding answers the question 'Why is understanding highly appreciated in science although it is not factive (i.e. it is not necessarily based on true theories)?' The suggested answer is: although understanding is not about truth, it nevertheless plays an important role in the search for truth as far as the valid inferences, which it is manifested in, may lead to true conclusions if we start from true premises, and they may eventually lead to true conclusions even if the premises are false. A comparison with similar and contrastive views on explanation and understanding will be drawn.

Marcin Milkowski (Polish Academy of Sciences)
How do 'paradigms' in cognitive science explain? Lessons from the mechanistic perspective

One remarkable property of psychological and cognitive research is the proliferation of theoretical approaches, usually called 'paradigms' by their practitioners. For example, in cognitive science, the embodied cognition, computationalism, enactivism, or evolutionary psychology are such paradigms. However, it is not clear whether they are supposed to be complete, grand unified theories of cognition, or merely constrain further theorizing. If the latter is true, then one obvious question is how to evaluate their fruitfulness: by looking at how they help explain particular experimental results and theoretical questions, or by looking at their performance as research programs over time. I will restrict my attention on the embodied cognition and argue that the best way to understand it is to assume that it is a research heuristic, whose role is to unify multiple hypotheses about cognitive mechanisms as constituted by sensorimotor processing. It also plays a certain integrative role by presupposing that a set of sensorimotor processes is redeployed in multiple cognitive processes.