



Causal Powers and Structural Realism

workshop
2/10/2015

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Anna Marmodoro (U. Oxford)
David Yates (FLUL)
Gil C. Santos (CFCUL)
João L. Cordovil (CFCUL)
João Pinheiro (CFCUL)
Michael Esfeld (U. Lausanne)

Anfiteatro da Fundação da Faculdade de Ciências
9.30 am to 18.30 pm

Organized by:
Research Group on Philosophy of Natural Sciences
RL "Emergence and Relational Metaphysics"
<http://cfcul.fc.ul.pt/GI/FCN/LI/EMR/>

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CFCUL
Centre for Philosophy of Science
of the University of Lisbon
<http://cfcul.fc.ul.pt>

Causal Powers and Structural Realism

10:45

Opening Session by Olga Pombo.

Director of The Center for Philosophy of Sciences,
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11:00 – 11:30

«Power, Emergence and Ontology»

Anna Marmodoro

The paper argues that substances, though emergent, are fundamental in the ontology; and that each special science carves its own set of substances in nature.

11:30 – 12:00

«Dispositional Monism and the Problem of Relational Individuation»

David Yates

According to dispositional monism, basic physical properties are fully individuated by their places in a causal structure consisting solely of basic physical properties and the relations in which they stand. The nomic relations between those properties, as described by the laws of (completed) physics, exhaust the natures of the properties they relate. Although this theory has familiar epistemic and metaphysical advantages over categoricalist theories of properties, it gives rise to the problem of relational individuation—how can a relational structure be both constituted by, yet ontologically prior to, its relata? In this paper I offer a solution to this problem based on the idea that the causal structure that individuates basic physical properties also involves non-basic qualitative properties, which are realized by basic physics but not individuated by their places in the structure. I focus on the role of geometric properties in classical electrodynamics. The shapes of charged bodies are (i) causally relevant, (ii) realized by their basic physical properties, (iii) epistemically transparent, (iv) not individuated by their causal roles, which they have in virtue of prior non-structural essences. The resulting ontology does not inherit the disadvantages of categoricalism, and preserves the core dispositional monist idea that all basic physical properties are “pure powers”. The theory requires no addition to the basic dispositional monist ontology, and instead uses its resources to build realized properties that are not themselves powers, but which can help to individuate those that are. The solution offered depends on the principle that the property of being relationally individuated is not closed under realization. I consider whether a similar principle—that being relationally individuated is not closed under composition—might offer an independent solution to the corresponding problem of relational individuation in ontic structural realism.

12:00 – 12:30

«Powers and Relations: Challenging the Intrinsicity Thesis»

Gil C. Santos

Causal Powers Theory constitutes a systematic attempt to overcome Neo-Humean metaphysics, regarding both the ontological nature of properties and the nature of causation. Natural properties are seen as causally active and relational as their nature is conceived in the light of their ways of acting and interacting with other powers. Consequently, causation is seen as a relational process between correlative powers and their conjoint manifestations.

Nevertheless, the overcoming of Neo-Humean metaphysics faces some problems, and I will argue that one of the main issues is the insufficient development and deepening of CPT's relational approach. I will criticize the widespread intrinsicity thesis, by distinguishing between instantiation and existence-conditions of powers, and by rethinking in a new monadistic way the relationship between properties or powers and relations.

13:00 – 15:00

Lunch Break

15:00 – 15:30

«Does OSR need to be fundamentalist?»

João L. Cordovil

In Steven French's words (French 2010), Ontic Structural Realism (OSR) is motivated by “two sets of problems that “standard” realism is seen to face. The first has to do with apparent ontological shifts associated with theory change that can be observed throughout the history of science. The second is associated with the implications — again ontological — of modern physics”.

OSR addresses these two sets of problems or motivations, first by arguing that modern physics implies the downfall, or is at least incompatible with, the traditional metaphysical view that at the fundamental level of reality there are individual entities with intrinsic identities – objects - that move inside a spatio-temporal framework.

On the contrary, OSR is often presented as the ontological view that what there is at the fundamental level physical reality is not individual objects but structures of relations – radical OSR -, or structures of relations and relata without intrinsic properties, on the OSR's moderate version.

Therefore, despite its differences with traditional objects metaphysics, OSR seems also to be committed with the ontological image that there is a fundamental level of physical reality whose entities have ontological priority (Schaffer 2003, McKenzie 2013).

But does OSR really need to be fundamentalist? Is fundamentalism coherent with the above quoted OSR initial motivation? Couldn't we have structures or objects and structures all the way down? And does it really matter?

15:30 – 16:00

«Integrative Pluralism and Ontic Relational Unity of Science»

João Pinheiro

Integrative Pluralism is a variety of epistemological pluralism or «epistemological disunity of science» put forward by Sandra Mitchell (2003). According to this stance, it is possible to preserve the causal autonomy of the so called «special sciences» commonly associated with ontological emergence of

properties while at the same time sustaining the intuition that we live in «One World». In this talk we intend to suggest a way to support this monistic intuition while preserving the emergent character of the causal properties that are object of the «special sciences», and consequently justify Integrative Pluralism. For that purpose we will proceed in two steps. First, we will start by exposing an argument in favour of ontological unity («priority monism», to be more exact) elaborated upon by Jonathan Schaffer (2010) which he dubs as the argument from the internal relatedness of all things. The argument in question depends upon the existence of an internal relation that is pervasive enough to connect all things and Schaffer himself suggests that causal connectedness, as depicted by «causal essentialism», is a viable candidate for playing such role. Second, we will assess the possibility of using a theory of causal powers as justification for the requirement of intra- and inter-«level» integration of scientific model-theories in light of recent work on relational metaphysics developed by Gil Santos (2015a & 2015b) that emphasises the extrinsic character of (at least some) dispositions.

To sum up, we will be giving the first steps towards a relational ontology that could justify both the (ontological) Unity of Science and Integrative Pluralism.

16:00 – 16:30

Coffee Break

16:30 – 17:00

«Structures with or without powers?»

Angelo Cei

Recently, there has been a growing attention to the modal implications of adopting a structural realist attitude towards physics. Independently from the form of ontic structural realism adopted, there has been a certain consensus on the point that a realist conception of structure seems to be committed to interpret structures as being in a way or in an other sites of modal features. Structures, the thesis goes, need to be causal and implementing some form of natural necessity in order to allow for supporting the claim that they are de re items rather than purely mathematical ones and genuinely make sense of natural processes they are supposed to feature. I review part of this literature and try and show that alternative categorical pictures are, at least, equally plausible vis a vis the relevant physics.

17:00 – 17:30

«Spatial and dynamical structure»

Michael Esfeld

On the basis of a moderate ontic structural realism that admits - thin - objects, I draw the following distinction between spatial and dynamical structure in this paper: the spatial relations individuate the objects. They make them absolutely discernible in the actual world and at least weakly discernible in all possible worlds. Dynamical structure, as expressed in terms of the dynamical parameters that physical theories introduce, determines the change in the spatial relations. Dynamical structure, in contrast to spatial structure, thereby is modal and a causal power (if anything in physics is a causal power). I illustrate this proposal by briefly drawing on classical as well as quantum mechanics.

20:00

Dinner at Chapitô's