A Dualistic Hypothesis

Johan Gamper
Karl P U, Stockholm, Sweden
johan.gamper@karlpu.org
karlpu.org
https://orcid.org/0000-0002-2162-4918

Abstract
On the basis of the finding that the principle of causal closure permits causal connections between universes (Gamper 2017) Gamper has suggested a new line of research, scientific ontology (manuscript), which addresses the modal properties of a universe that can be joined with another universe via an interface. In this study a preliminary issues is penetrated. To solve a threatening inconsistency between two central definitions in Gamper (2017) I propose a hypothesis that aligns them. The hypothesis, it is found, also offers a new interpretation of the quantum physics wave function.

1. Scientific ontology

Scientific ontology (Gamper, manuscript) is described as an '*intermediate* layer of theory *between* basic assumptions and science, […] an *ontological* layer.' Specifically it 'involves the construction of consistent theoretical frameworks that integrate the possibility of interfaces between universes.' The need for this ontological layer of theory comes from the finding of Gamper (2017) that 'by altering the definition of the causal closure of the physical, the causal closure of the physical does not *necessarily* imply that the world is causally monistic' (Gamper, manuscript). Gamper (2017) proved this modal property by implementing *interfaces* between universes. Interfaces are thus *possible*, but are they realistic?

To answer this question, Gamper (manuscript) has proposed a two-step process where the *second* step is scientific research. The first step, scientific ontology, is to fill the gap between the principles or basic assumptions and science with a consistent theoretical framework that accommodates the modal properties of an ontology that matches the basic assumptions.

However, some urgent issues should be addressed before scientific ontology produces more elaborate theories. It is beyond the scope of this article to attempt to list them, but one issue relates to the definition of a 'universe' that is used in Gamper (2017). It is unclear whether this definition permits an actual interface.

1.1 Is an interface a universe?

If an interface really is a universe, any interface, in effect, would be empty (which is a weaker claim than 'there could not be any interfaces'). Gamper (2017) describes a definition of 'a universe' that is difficult to accommodate with his definition of causal closure: 'a universe is a domain of things of a certain ontological status, e.g., *physical things* or *mental things*' (p. 631). However, in the same passage, he states that '[a]n interface between universes can be seen as a domain that violates the suggested account of causal closure, suggesting a view in which universes are causally closed whereas interfaces are not'. Thus, Gamper claims that an interface is not a universe, but a universe is 'a domain of things of a certain ontological status'. Therefore, what is an interface? Whatever an interface is, it should contain *something*. Nevertheless, if an interface contains anything, is this interface that contains at least one thing of 'a certain ontological status', therefore, a universe?

There are, in fact, only two options for an interface to not be a universe. If the interface does not contain things of *one ontological* type, one option is that it contains nothing at all and is empty. According to this view, an interface is consistent with causal closure, but there are no actual interfaces. The modal weight of the modified basic assumption now becomes clearer. According to the old definition, interfaces were impossible, and an interface was inconsistent with causal closure. In this view, there is no possible world where there is an interface between universes if causal closure is true. According to the modified view, however, an interface is consistent with causal closure. In this view, there is a possible world that contains an interface where causal closure is true. There are no such *actual* worlds, however, if any interface is empty.

If there was no actual interface although an interface is possible, the corresponding *sciences* (namely, the science that is based on the standard set of assumptions and the science that is based on the non-standard set of

assumptions) would be identical. However, the ontologies would differ because the modal properties for interfaces and universes per se differ between the two sets of basic assumptions (the standard set of basic assumptions with the old definition of causal closure and the standard set of basic assumptions with the modified definition).

If the interface does not contain things of one ontological type, the other option is that it contains things of *more* than one ontological type. We can now return to the heading of this paragraph: 'Is an interface a universe?' If an interface is a universe, either there is no interface (because an interface is not a universe) or causal closure is not true. If we consider causal closure to be true, again, there is either no interface or an interface is not a universe. Therefore, to make the modified definition of causal closure *scientifically* interesting, an interface must be shown to possibly contain things of *more* than one ontological type.

An argument can now be claimed that saves causal monism[1]. This paper aims to defeat this 'causal monism saving argument'.

The causal monism saving argument is *either an interface is empty or it contains something of at least two ontological types, and both cases entail that there are no interfaces.*

This argument is valid if any interface is empty. If any interface is empty, the second disjunct, '*it contains something of at least two ontological types*', is superfluous. Therefore, to counter the argument, it is necessary and sufficient to show that it is possible that an interface can contain something of at least two ontological types.

2. The dualistic hypothesis

Given that 'a universe is a domain of things of a certain ontological status' and that an interface is not a universe, the interface either is empty or contains more than one ontological type. One difficulty is that, on the one hand, we know nothing regarding what these ontological types *are*, and on the other hand, we are on a conceptual level where we *cannot* know anything about them. Accordingly, we are dealing with the modal properties of interfaces and universes *per se*, which is a problem because we must ascribe ontological properties to things that we do not know.

An example of this dilemma is described in Kim (2011, p. 34), where he lists 'the major tenets of Cartesian substance dualism'. Descartes attempts to identify what body and mind essentially are and their differences. For our purposes, it suffices to consider one ontological type because if the other type differs in any way, we have 'at least two' ontological types. Descartes says about the body that 'the essence of a body is to have spatial extensions (a bulk) and to be located in space'. If we use Descartes' first conjunct in our predicament, we obtain 'an interface [in this case, between body and mind] contains that which has spatial extension and [simultaneously] that which does not have spatial extension' ('*x* is *y*, and *x* is not *y*', so to speak). Thus, if we entertain the basic assumption of non-contradiction, there is no interface.

This consideration seems, for now, unavoidable. If we state any property of a certain ontological type and simultaneously claim that an interface contains something that has this ontological property *and* an ontological property that is *not* this property, we will always end up with an inconsistency.

However, if we use Descartes' *second* conjunct, we can with adjustments make some progress. Descartes' second conjunct as applied to our 'predicament' reads 'an interface contains that which is located in space and [simultaneously] that which is not located in space'. Therefore, we return to the inconsistency. If we make a small adjustment of the suggested ontological property of Descartes, we obtain 'an interface contains that which is located somewhere and that which [simultaneously] is located somewhere else'.

To better serve our purposes, we can adjust this proposition accordingly as 'an interface contains that which is located in a particular universe and that which [simultaneously] is located in another universe'. With only one more revision, we have arrived at the dualistic hypothesis.

[1] 'A casually monistic universe cannot cause anything outside itself and cannot have any 'event' inside itself that is caused by an 'event' outside of itself.' (Gamper, manuscript)

The dualistic hypothesis
If there is an interface between two universes, then either it consists of two entangled areas where one area is located in one universe and the other area is located in another universe or it consists of more than one pair of entangled areas.

This line of adjustments builds on there being a difference between the two properties of 'extension' and 'being located in space', i.e., a difference in the *type* of property. Otherwise, this line would dissolve into the inconsistencies that are found regarding 'extension'. The difference, however, may require the first adjustment from 'is located in space' to 'is located somewhere'. Concerning these types, 'extension' could be considered an intrinsic property, whereas 'is located somewhere' could be considered an extrinsic property.

Regarding the dualistic hypothesis, what we have seen up to this point is that an interface cannot be located in either one universe or another universe. In this hypothesis, however, the interface is located both in one universe *and* in another universe. However, because a universe in the present context *is* 'a domain of things of a certain ontological status', if an interface is *located* in two universes, it *consists* of things of more than one ontological type. The hypothesis thus implies that the contents in themselves *are* more than one type of ontologically separate things. The contents are in entangled areas and therefore belong to two universes where they do not belong to a universe but to an interface. The dualistic hypothesis is thus consistent with the proposition that the contents of an interface consist of more than one type of ontologically separate things, but it appears that an interface in itself is not located elsewhere than in a universe.

In the next section, I tentatively suggest an approach concerning the application of the dualistic hypothesis to the layer of science (physics). The dualistic hypothesis belongs to the second layer, namely, the ontological layer. An ontology that contains the dualistic hypothesis permits scientific attempts to use it. However, an ontology that does not accept this hypothesis (with no other means to block the causal monism-saving argument) would in effect be very similar to an ontology that underlies contemporary science because in this ontology, any interface would be empty. The next section therefore really concern speculations that are based on a non-standard set of basic assumptions with the addition of the dualistic hypothesis.

3. The dualistic hypothesis applied

An entanglement in line with the dualistic hypothesis can be considered in physics. Such application, however, is far from within the realm of contemporary physics, but this should be anticipated because we can now contemplate solutions to the challenges with a non-standard set of basic assumptions.

The wave function in quantum physics relates to elementary particles. The mathematics behind the wave function contains both real numbers and imaginary numbers. Concerning the dualistic hypothesis view, this composition could indicate that the particles are entangled, i.e., they are located both in the physical world and in a non-physical world. If we attempt a small adjustment similar to before, we could suggest that the particles are entangled and that they are located both in the physical universe and in a *pre*-physical universe.

This view resembles an interpretation of the quantum physics wave function. In this interpretation, a quantum physics elementary particle *locationally consists of two entangled areas where the one area is in the one universe and the other area is in the other universe, or it consists of more than one pair of entangled areas.*

References

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