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Quantum Dialectics

DEAN ANTHONY BRINK

Abstract: This brief examination of treatments of nothingness-oriented dialectics in Kyoto School philosophers Nishida Kitarō and Tanabe Hajime engages questions of space from Hegel to quantum mechanics. It begins to situate their work in light of Emmanuel Levinas's writings on empty space and as overlooked contributions to the philosophy of science.

Key words: Kyoto School, quantum physics, space

This exploration of space and dialectics in world-renown Kyoto School philosophers Nishida Kitarō (1870–1945) and Tanabe Hajime (1885–1962) intends to shed light on approaches to space and matter that speak to new materialism's concerns by engaging the implications of quantum theory in relation to space and matter. When Diana Coole and Samantha Frost entertain "choreographies of becoming that . . . find cosmic forces assembling and disintegrating . . . objects . . . within relational fields, bodies composing their natural environment in ways that are corporeally meaningful for them" (2010: 10), they frame *some scales* in the formation of these *objects*. But, what if we recognize one of the implications of quantum physics, namely that it corroborates our knowledge of the creation of matter as we know it through various processes of star formation and cycles of destruction that constantly recombine subatomic particles *on a universal scale*. Thus, the possibility of sub-atomic particles (entangled or not) being found *anywhere* exists side by side with the realization that observable bonds in atoms reflect complex quantum processes requiring various amounts of energy (including suns and supernovae) to have become manifest in their respective configurations, but as atoms not essential so much as an illusory surface of what is not necessarily there as the particles can be anywhere, ascertained only probabilistically. Then, no longer are vital instincts resembling human will or patterning manifest in a reification of vitalist projections onto

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matter. For quarks blinking in and out of space or for stars forming in the farthest reach of time that our telescopes can now reach, scale and relation of parts are both problematic. *How* particle-waves blink in/out is thought to be bound up in the earliest parting of the cosmos (big bangs) and subsequent star formations and supernovae; matter everywhere *is* bound up with—entangled with—matter potentially anywhere (including galaxies faraway).[1] Thus the very focus on human/nonhuman distinction in new materialism is at some scales and relations in itself a red herring. The matter of disentangling objects at the subatomic levels may be difficult, prone to probabilities, not absolutes, as entanglement and non-locality of the wave-particles of matter are the norm. The role of the recognition of awareness of frames of structurality (poststructuralism) and how agencies weigh in on their formation is not necessarily in opposition to issues of framing materiality, and is not only posthuman but post-assemblage or post-autopoietic in the sense of bodies always being sub-atomically beyond themselves, post-objective, post-spatiotemporal, but locally pregnant with probabilities regarding states of matter-energy (particle-waves) at given relativistic sites.

No less than six historical manifestations of space pertain to an age of ontologies altered by quantum theory. These types include: (1) Kantian space prescribed as a transcendental category and produced in the very process of perception by way of intuition (*chokkan* or "direct-seeing" in Japanese); (2) abstract Euclidean geometric space idealized (fallaciously, after relativity theory as well as quantum theory) as a model for actual space; (3) Hegel's description of space in *Philosophy of Nature* and *The Science of Logic*—notably the idea that without the subtractive power of time, space would remain undifferentiated (an idea reified in Nishida); (4) Minkowski and Einstein's addition of the dimension of time to 3D space, through relativity theory recognized as irregular spacetime warped by forces known to classical physics such as gravity (within quantum mechanics relegated to a minor detail); (5) Nishida Kitarō's place (*basho* 場所) as a point of differentiated space within an indeterminate void (*kū* 空)[2] out of which being emerges limited to the present and based on an interactive matrix of *particulars* (including animate and inanimate things); (6) quantum systems of one or more particle/waves as non-local proto-spatial-temporal manifestations subject to tracking as phenomena associated with complementarity, or other framing models, ranging from many-worlds/decoherence theories to particle-oriented matrix mechanics, pilot-wave or hidden variable theories, etcetera. The implications for how we interact spatio-temporally now should somehow situate a quantum appreciation of posthuman relationality on a subatomic scale. Therefore I will focus on Hegel (3), Nishida (5), and quantum non-locality (6).

As dialectics come in many forms, I will limit myself to Nishida's recasting of Hegelian dialectics of substance from its binary I-other or subject-object relation into a dialectics of distributed determination within a locus or field assuming

nothingness (rather than being) as the contingent ground for existence. Nishida's "logic of place" and subsequent developments of it provide alternative approaches to space vis-à-vis dialectics in the age of quantum mechanics. Though Nishida himself touched upon it in his latter thought (Tremblay 2018), Tanabe, who wrote extensively on topics in the natural sciences, built on Nishida's dialectics to sketch a dialectical ontology incorporating quantum mechanics, which suggests a dialectics out of undifferentiated space, outlining the challenges of quantum theory and its probabilistic post-spatio-temporal orientation in a heretofore unrecognized engagement with these issues in (world) philosophy.

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Quantum physics does not itself offer the last word on how we exist dialectically, but it does complicate and undermine how we conceive space. We have a means of conceptualizing how we are no longer "lost in space" but rather have always been, in Wittgenstein's sense, "held captive to a picture" of space and Cartesian coordinates with the human vantage holding sway. Kristian Camilleri argues that "the concept of the electron's location in space ceases to have applicability in quantum mechanics. In this way, the very notion of an 'object' in space and time is recognized to be an idealization with limited applicability, but one which, for Heisenberg, ultimately remains indispensable for the possibility of human knowledge" (Camilleri 2009: 151). Heisenberg recasts Kantian *a priori* transcendental concepts from a metaphysical structure into a "practical one" (Heisenberg 1958: 82; cited in Camilleri 2009: 148). *Space* thus becomes a practical concept with a "limited range of applicability" rather than an absolute given. For Niels Bohr, space must be recognized as destabilized, subject to radical reduction, since "the representation of a state of a system can never imply the accurate determination of both members of a pair of conjugate variables q and p. . . . [T]here will always be a reciprocal relation" (Bohr 1950: 52). The position and momentum of an electron can only be known "by referring to the mutually exclusive conditions for the unambiguous use of space-time coordination, on the one hand, and dynamical conservation laws, on the other" (Bohr 1950: 52). Bohr emphasizes how this is the source of complementarity in quantum physics, but implies that quantum relationalities still require the scientific culture that has provided us with a manifest world based on classical physics. This process of renegotiation limits our "freedom of constructing and handling the measuring apparatus, which in turn means the freedom to choose between the different complementary types of phenomena we wish to study." This, he implies, blocks our access to a clearer "quantum-mechanical mode of description," one that might situate itself in terms beyond the limited purview of classical physics. The basic scheme and formulae used in testing quantum events are "mathematically

consistent" (Bohr 1950: 53) while yet to be described in a language more native to quantum physics.[3]

Ever since the work of physicist John Bell in quantum theory in the 1960s, the emphasis on the destabilization of events in continuous spacetime has been losing ground to propositions that the subject-object distinction *itself* has inhibited understanding of quantum observations. Bell argues for local be-ables (or maybe-ables), written "beables," to account for the limited capacity to engage local events without having to reestablish a master narrative of spacetime relations in the wake of the "New Quantum Theory." Empirical data has led to the relegation of spacetime to that of an incomplete and unreliable concept. What remains *be*-able is local engagement. "Beables" are in the wake of quantum theory among the more plausible modest ontological postulates in light of where physics has placed us today. As Newtonian science helped Kant, Hegel, and even Nishida see the world in relation to force, quantum mechanics suggests models not bound to metaphors of force, which notably proliferated in the age of colonialism (which our thinking has yet to be extricated from). Beables, as hybrid quantum-material places, suggest the need for new models of the dialectic of being and nothing that place the onus on substance to establish itself after the fact of nothing (void)—a reversal of a long-held assumption of being in Western philosophy. Thus we live in an age of a dialectics of void space. As Bell argues, a "'system' under study" may simply be defined, rather, "as a limited space-time region" (Bell 1987: 40–42, 174).

Maintaining that "local *be*ables" offer possible ontologies produced at sites of attention, Bell thus refuses to police the subject-object distinction or to contain it in new procedures. This orientation toward remnants of space as the product of studies in physics avoids (critics would say ignores) being sidetracked by many related issues in quantum theory. Nishida's own site-specific dialectic, which provided a frame for direct engagement with quantum physics by his successor, Tanabe, may offer a means of situating a dialectics of void, non-coordinate space in a sense commensurate with Bell's interpretation of quantum theory. Next, Nishida's philosophy and Tanabe's writings on quantum mechanics will form the basis for an exploration of dialectics and space after quantum theory.

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Tanabe suggests that Nishida's dialectics of nothingness, one of the key concepts inspiring Kyoto School philosophy, was supported by the new quantum theory. Nishida's idea of "absolute nothingness" (*zettai mu*) becomes the basis for situating seemingly *any* dialectical opposition as a fundamental contradiction that structures ontologies differentially. Nishida writes: "When the absolute opposites form a self-identity as 'one in many' and the 'many in one,' an infinite amount of particulars are determined mutually vis-à-vis each other" (trans. Kopf 2004:

81–82; NKz7: 41). Gereon Kopf sees non-dualistic, non-essentializing difference as "the driving source behind [Nishida's] seemingly infinite dialectic" (Kopf 2004: 80). It is this development that forms a supplement to our understanding of complementarity and the problem of describing space, since Nishida "maintains that the multiplicity of phenomena cannot be reduced to a oneness, be it a self-identical being à la Spinoza's substance or a self-identical place à la the *basho*" (Kopf 2004: 82). Nishida also offers a use of "discontinuity" (*hirenzoku*) or "continuity of discontinuity" (*hirenzoku no renzoku*) "to undermine a causal-mechanistic approach that denied the possibility of free will and creativity, and to accentuate the dimension of the world of engagement" (Kopf 2004: 92). Following this logic, decohering emplacement in space (given our understanding of quantum complementarity) might obtain a model for situating freedom to the degree it carries the theoretical potential to undermine predicted causes and expected results—so crucial to biopolitical control today, where predictability governs capital markets.

My use of *empty* or *void space* builds primarily on Kyoto School methods of focusing on radical negativity to produce a processual, productive dialectic not subject to synthetic being, but situated in terms of contradictions. As James Heisig argues, precisely *because* of the focus on nothingness as an empty set problematizing anything that enters an ontological field of potentiality and epistemological void, it undermines essentialist identity of matter and objects. For Nishida, "[t]o call reality itself *absolute nothingness*" is to say that "it is subject to the dialectic of being and not-being, that the identity of each thing is bound to an absolute contradictoriness" (Heisig 2001: 63; emphasis in original).

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Hegel writes in the *Science of Logic* that "[e]xistence proceeds from becoming. It is the simple oneness of being and nothing. . . . It is at first in the one-sided determination of *being*; the other determination which it contains, *nothing*, will likewise come up in it, in contrast to the first" (Hegel 2010: 83; emphasis in original). Without arguing *why* being is determined first, he simply reflects a longstanding consensus in Western philosophy since Plato that being, not nothingness, must be the foundation of any ontology. It is this suppressed nothingness that forms Nishida's basic point of departure in redefining Hegel's dialectical thinking. His use of nothingness, however, was inspired by the use of emptiness in Indian and East Asian Buddhist thought. While *emptiness* per se is rarely discussed in Nishida, it is a feature of his foundational philosophical method present in his use of "nothingness," which is inspired by and often considered a formal philosophical articulation of the Mahayana Buddhist concept of *emptiness* (空). "Emptiness" is a key concept here, pointing to an ideal *openness* to recognizing that the world

is not literally materially empty; rather it is apprehended with the possibility of *seeing through* the material obstructions that form conflicts and force-relations in the world. As such, he turned to redefining a systematic dialectics akin to Hegel but inflected by the Buddhist concept of emptiness. Although treatments of Nishida in Western languages often highlight the Buddhist legacy in religious terms, it is important to underscore that Nishida wrote philosophy of the most abstract and logically ordered variety. Thus "empty space" becomes a metaphor for the obligation to account for spaces (scales, scopes, object-situations, and relations) without resorting to modernist paradigms of instrumental reason in conjuring extensive ontologies.

Lucy Schultz builds upon James Heisig's interpretation of absolute nothingness in Nishida, arguing:

> Nishida sought to articulate a rational standpoint that could account for itself without being contingent upon conditions determining it from the outside. Only absolute nothingness can satisfy this criterion. And yet . . . [i]t has no existence in-itself distinct from the myriad manifestations of the historical world. The place of nothingness is no place other than the medium of concrete reality. (Schultz 2012: 324)

The impulse for Nishida's work was in part based on an attempt to supplant a metaphysics of being in Western philosophy with one of nothingness found in Buddhism and avoiding nihilism. Schultz focuses on how Nishida's affinities with Hegel reflect a common orientation toward the concrete in variations of a "dialectical ontology in which being itself is shaped by the dynamic interplay of the self and world" (Schultz 2012: 319). Nishida's dialectics thus withdraws from Hegel's historical idealism by reworking various dialectical oppositions as a *present* that refers to nothingness as its base premise rather than being, which would reproduce Hegel's dialectic of sublated *progress*. Nishida maintains a focus on structuring contradictions that form the present out of an undifferentiated void, which is nevertheless still substantive—albeit tentatively balanced and changing—as a dialectical present subject to self-contradictory productive forces that preserve a role for free will in the framing of the frame.

While Hegel repeatedly refers to space and time as being of the same cloth, what concerns us, with respect to the task of understanding space after quantum theory and how matter is present, is Hegel's own use of *place* to situate space and time at a specific place, which is so essential to Nishida. Hegel argues in a way that seems to sheer away from any sense of Kantian *a priori* transcendental categorical scaffolding:

> Space in itself is the contradiction of indifferent juxtaposition and of continuity devoid of difference; it is the pure negativity of itself, and the **initial** *transition into time*. Time is similar, for as its opposed moments, held together

> in unity, immediately sublate themselves, it constitutes an immediate *collapse* into undifferentiation, into the undifferentiated extrinsicality of *space*. **Consequently, the negative determination here, which is the exclusive point, is no longer merely implicit in its conformity to the Notion, but is posited, and is in itself concrete on account of the total negativity of time. This concrete point is place.** (Hegel 1970: 229, §260; emphasis in original)

This passage is crucial to our understanding of Nishida's use of place (*basho*) as a major concept in the development of his later thought as well as reinterpretations of Hegel with implications for new materialism. The key elements of Nishida's place are here: the focus on space as a repression of time's other places, with concrete focus on *place* enabling an escape from abstraction and a point of access to being and nothingness. Nishida would clarify the "contradiction of indifferent juxtaposition and of continuity devoid of difference" as a *working model* for his system, replacing the movement toward substance with a movement toward nothingness *in order to highlight contradictions as unity through interaction, rather than the hierarchical overcoming through sublation* (and progress of the human spirit of overcoming). As he writes in one of his last essays on the logic of the place, invoking Leibniz and Kant within his own system:

> I am an expressive monad of the world. I transform the world into my own subjectivity. The world that, in its objectivity, opposes me is transformed and grasped symbolically in the forms of my own subjectivity. But this transactional logic of contradictory identity signifies as well that it is the world that is expressing itself in me. The world creates its own space-time character by taking each monadic act of consciousness as a unique position in the calculus of its own existential transformation. (Nishida 1987: 52; NKz11: 377)

This consciousness is realized through its space-time character not based on essence but rather in the present itself in relation to others, but self-determined, and limited by the foundational assumption of nothing (rather than being) as well as the role of conscious choice of frame: "As humans, through the contradictory self-identical character of time and space, we transcend the determined, causal world of the here and now as self-determinations of the absolute present itself" (Nishida 1987: 92; NKz11: 427; trans. mod.).

In his essay "Place" (*Basho*) Nishida situates space thus: "When one considers space, time, and force all as means of thinking, the objective place [*kyakkanteki basho*] in which the experiencer is situated would seem to be akin to a field of transcendental consciousness" (NKz4: 241). Nishida is careful to insert qualifiers to underscore how his "logic of place" is a critical metaphorical apparatus in its own right for overcoming the dualisms which limit Western philosophy heretofore to binary oppositional dialectics (Hegel) or *a priori* transcendental categories (Kant) while accounting for free will and mechanisms of determination that are

not reducible to raw forces. Nishida shares an interest with our new materialist focus on discerning means of conceptualizing knowledge without privileging anthropocentric cultural perspectives that may include the production of certain types of space themselves. He argues, alluding to Kant, that just as we cannot posit something resembling a thing we cannot posit something resembling force because in both examples they "are objectified by discerning subjects" (NKz4: 244). Nishida situates such contradictions surrounding situating both force and thought at a site (*basho*) in relation to nothingness according to the idea that: "When a place is truly nothing, such contradictions vanish, and we again see individual independent existences as if things in space" (NKz4: 245). As Krummel argues in his discussion of this essay, "*basho*" (place), being named after Plato's *chōra* (place or locus), comes to function as a dynamic matrix of forces within various dialectical oppositions. Nishida "transposes the Platonic ideas into epistemological categories that form sense-matter, and chōra becomes the place qua field of consciousness . . . for that interrelationship of form and matter" (Krummel 2015: 200). Here *nothing* operates as a bottomless receding framework accommodating a spaceless spatiality for potentiality and thought. As such it seems a neutral placeholder for determinations (judgment) and a locus for volitional action inter-related, restrained, and defined by others (human and nonhuman).

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Nishida himself presents a limited engagement with quantum theory and yet may be understood as largely conforming to classical physics (based on force, mass, inertia); however, Tanabe does engage questions of dialectics and the new quantum theory by extending Nishida's approach to a disciplinary dialectics.[4] Tanabe recognized how determinism, simple causality so fundamental to classical physics, lost its ground with quantum physics. Even though many physicists would assert Schrödinger's formula to be a good estimator of a particle-wave's state and potential for movement, the formidable uncertainty principle (the Copenhagen interpretation) undid the basic laws of causal relation in spacetime, now reduced to relations of probability that engender infinite possibilities (THz14: 462).

Recognizing that quantum physics had supplanted relativity theory as the driving innovation in the field of physics, Tanabe wrote, "[i]n both its form and content, the objectivity of physics has a dialectical structure" based on its development, and immediately in the next chapter argues that these *new physics* themselves are in a dialectical relationship with classical (Newtonian) physics (THz14: 464). Thus "nature in physics is as a whole universally subject to a dialectical structure" (THz14: 465). Tanabe sees the impulse to recuperate classical physics as displaying an unwillingness to embrace the dialectical challenge that quantum theory itself poses, which should be recognized as a new direction in physics. Thus he

argues that "the revolutionary significance has yet to be adequately accounted for" (THz14: 459).[5] He also realized the either/or option of quantum versus relativity theories was a red herring, writing that relativity theory only rethinks the relation of geometric (Euclidian) space and classical (Newtonian) physics, but does not extend its investigation to "the structure of physical existence itself" (THz14: 459). Tanabe realized that the shift from classical to quantum physics could be traced in the shift from treatment of mass, space, and inertia to questions of measures of frequency and wavelength.[6]

Many approaches to quantum physics have arisen since the foundational debates focused on Einstein and Bohr, yet scant attention has been paid to Tanabe's work. In "Between Philosophy and Science" Tanabe cleverly maps "micro-probabilistic theory [of quantum mechanics] as the basis for a dialectical ontology [*sonzairon*], which must be understood as something realized through experimental facts" (THz5: 323). This dialectic is his response to reading Dirac and others on the undecidability of wave/particle delineation of matter and its implications for the basic understanding of how existence presents itself as well as spatial coordination on the level of predicting energy levels of positively/negatively charged electrons in relation to voidholes, how photons exhibit superpositioning, and related issues (THz5: 322). Probability presents the only viable means for resolving these ambiguities borne of the loss of classical and relativistic models of space after quantum mechanics. While mediation based on both *theory* and *actuality* may form a dynamic unity, in Tanabe's essay "The Development of Operationalism in Quantum Theory" (*Ryōshiron ni okeru sōsashugi no hatten*), he writes, "there is no one existence that would mediate the two beyond it. Rather, we should call what mediates them absolute nothing [*zettai mu*], a principle of interchanging negative unity" (THz5: 439–40). Thus Tanabe falls back on a central concept of a post-Hegelian nothingness (along the lines of Nishida) as a premise for an access point in a present in order to ground his interpretation of quantum physics. By way of quantum theory's capacity to "make physics and philosophy self-aware of mutually exclusive complementarity [*sōhaiteki sōhoteki*]" (THz5: 441) it allows us to see the precarious and by no means dominant (albeit necessary) role of nondualistic mediation of partial, probabilistic spaces predicated on nothing rather than being. However, further elaboration of Tanabe's own thought in relation to Nishida's in light of modern physics would entail a much longer study.

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This focus on local space as dialectics in a void as well as relational empirical interaction helps one understand the significance of Kyoto School applications of empty space in relation to understanding space and objects in quantum theory. However tenuous a relation to human presence, Tanabe's engagement with the

forefront of developments in new quantum physics leads him to dissolve the very premises for postulating spaces; he implicitly links it with Nishida's philosophy, which in this respect inspired his own thought. The postcolonial dimension of their application of nothingness in lieu of being can helpfully be situated in relation to issues of space in Emmanuel Levinas's works exploring "empty space" as distinct from a void, used in a different sense. By reversing the usual preference for light over darkness, Levinas recasts the fullness of a space illuminated by the rational objectification of an Enlightened society as *removing* the mediator *in relation to others* from the world and, instead, proffering merely an autonomous system that provides a negation of inter-being interaction and being. Light and the categories of Enlightenment writ absolute form alienating homogenous spaces and "empty space [becomes] the condition for" relationality, with local spaces ensuring "the condition for the *lateral* signification of things within the same" (Levinas 1969: 191). Moreover, like Nishida and Tanabe, Levinas too would recognize the importance of *intuition* to mediate relations between things, people, and nonhumans. The full hubris of embracing the Enlightenment removes the immediacy of relations by "driving out the shadows; it empties space" (Levinas 1969: 189), or, as Nishida or Tanabe might say, the Enlightenment denies a radical dialectics of space. One now finds at best beables within a spaceless spatiality (abstract configuration spaces).

Nishida's work, along with Tanabe's, can be understood today as extending our understanding of space in precisely Levinas's sense. One cannot ignore the postcolonial implications of this attempt and strategy. What can be discerned is that Nishida in effect engages in a counter-hegemonic postcolonial gesture of differentiation by introducing *nothingness* (*mu*) into what was and remains being-oriented "Western" philosophy (Arisaka 1997). Nishida should be recognized as the non-Western philosopher par excellence who transformed Western philosophy into world philosophy to the benefit of all. He deployed emptiness as nothingness in order to diffuse space as a site of mastery and in ways that may begin to reconfigure pseudocolonial relations with an other.

What one can trace in terms of a quantum dialectics is a movement toward recognition of the *local* in both the foundational physics of our time (quantum physics, which Tanabe explores *as a dialectic*) and an emplacement, in Nishida's sense, of an object-situated humanity interacting as mediators *among* things and *as* things in a field of things. Such an appreciation of possible states of space and matter would seem helpful in framing new materialist concerns, but is only a preliminary step.

National Chiao Tung University

Notes

1. See, for instance, Allori 2017: 180; Buniy and Hsu 2012.
2. Throughout the essay nothing(ness) *mu* 無 and void *kū* 空are used almost interchangeably; however, void or *kū* is the more common Chinese translation of the Sanskrit word for emptiness, Śūnyatā, while *mu* is more often used by Nishida, reflecting his assertion of an Asian ontological ground of absolute nothing (*zettaimu* 絶対無) in lieu of being (*yū* 有) assumed in Western philosophy.
3. As will be shown below, this situation forms one aspect of a quantum dialectics discussed by Tanabe in the 1930s.
4. While Agnieszka Kozyra (2018) shows how Nishida was inspired by Bridgman, Nishida's grasp of quantum mechanics did not reach the level of Tanabe (though Kozyra suggests the opposite to be true). Recent work by Jacynthe Tremblay (2018) points to how Nishida used quantum mechanics—especially Bohr's complementarity—in his late work to justify his modeling of the contradictory self-identity. Also see, in German, Groh 2015.
5. Indeed, the relation of classical and quantum physics has yet to sort out Wilfrid Sellars's distinction between "*scientific image* (the image of the world that our best scientific theories are giving us)" and "the *manifest image* (the image of the world that we ordinarily experience)" (Allori 2013: 59; emphasis in original).
6. Moreover, Tanabe's approach to dialectics in light of the new physics' interest in an *ontological* foundation that is not merely objective or descriptive, since "there is absolutely no basis for establishing a dialectics out of either existence or recognition" if building on "an image passively described" (THz14: 466). It is "only by way of nature and recognition working together that dialectical unity begins to form" (ibid.).

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