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Abstract

Could the paradigm of the quantum physics instrument a metaphysical reconstruction of the natural world? What connections exist between actuality, potentiality and the contradictory complementarity? What are the uncertainty relations and how do they meet the Hegelian Concept or the Aristotelian *energeia*? How does the metaphysics retrieve the negativity of becoming and what is the hermeneutic contrariety of the quantum mechanics?

**Keywords:** metaphysics, quantum physics, wave, particle, intellect, reason, Aristotle, Kant, Hegel, Heisenberg, duality, Absolute Spirit, Nature, complementarity, actualization, potentiality, negativity, identity, causality, subjectivity, becoming, Self.

Does the reason extract its legitimacy from a scientific extension which predicates its elements, or does it display its conditions of possibility through an *a priori* metaphysics? Therefore, the expression of a classical metaphysics would be excluded because the intellect cannot access the reason if it is situated in an extrinsic space in regard to sensibility, or, on the contrary, the possibility of the Spirit to transcend the mundanity through a paradigm which avoids an intellect that objectively treats any empirical representation in conformity with the model of science, could be configured in the classical, previous limits.

The classical scientific paradigm, based upon the idea that an empirical and objective universe undergoes rigorous deterministic laws, is seriously affected by the Newtonian mechanics whose equations will be further interpreted as functional descriptions of the movement of material particles in time and space. In the same time, the spatio-temporal coordinates present essential transformations concerning the Kantian Copernican Revolution, the object being translated in the terms of the individual metaphysical subjectivity. Also, the quantum mechanics overcomes the traditional physical vision of the spatio-temporal representation through some abstract, modern coordinates,

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while the wave-particle duality, situated in the multidimensional quantum space constitutes the hard core of this theory. Consequently, the conjunction of this reality indicates new internal transcendent characteristics, through which the metaphysics and the quantum phenomenon maintain similarities and contradictions. Under these circumstances, the present discourse analyses the synallagmatic connections and the asymptotic relationships developed by the metaphysics and quantum physics, in a time when the paradigm of the quantum mechanics requests a reconstruction of the ontological and epistemological foundations of the world, from the perspective of the metaphysical horizon.

Firstly, projected from a Hegelian view upon the Aristotelian hermeneutics of noēsis noēseōs, energeia expresses the exponent of the subjectivity, coordinated through the relationship between actuality and potentiality. This approach is executed in multiple hypostases (essence and Concept, teleology and existential process immanent in subject, Self and Absolute Spirit), instrumenting the metaphysical reconstruction. The substantial division that Hegel operates upon the metaphysics (the sensible ousia or the Substance itself as a substratum for change, the finite nous or the Intellect as a constitutive principle of an a priori externality, the divine nous as an absolute activity of the Thought itself and its complete manifestation upon Nature and Spirit) identifies the substance of his own concept and actualization, requesting the plenary identity of subject and object to whom the universal itself aspires.

Excluding an univocal determination of the intellect, Kant examines the two terms of this alternative to characterize the intellect as a faculty of the necessity. However, an intellect that eliminates the sensibility is simultaneously necessary and impossible. On the one hand, it is necessary if the intellect generates abusive metaphysics, purely formal expressions unable to develop a certain knowledge, which are, of course, condemned by Kant; additionally, an autonomous and necessary intellect is a condition for a metaphysics of morals, independent of the sensibility and its interests. On the other hand, the process involves an autonomous intellect whose impossibility is justified by the vision which created it, because it is permanently limited to the sensibility beyond which its substance would be lost, configuring a peculiar space where the metaphysics of nature becomes the solely viable metaphysics. Hence, it involves an intellect as a faculty of the necessity, and nevertheless, a necessity that answers to the problem of suspension of any assumption, to the impossibility of the persistence of antagonistic and alternative statements; in other terms, it introduces a necessity of the scientific emergence and experience, a necessity whose sensibility represents, consequently, a material veracity.

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3 A short formula of the well-known Aristotelian assertion, used both by Hegel and commentators concerning the discourse on the divinity, where God is a thought thinking itself (Aristotle, *Metaphysics*, Λ 9, 1074b 34-35).
Anyway, a reply to a denied interrogation cannot be justified in the virtue of the question itself, because the presumed reply is rejected through the act of abolition of the problem; and, if the interrogation is abolished, the answer is impossible and futile too. In a distinct hermeneutics, this reflects an illustration of *Meno*’s paradox⁴, which is inevitable if the difference between interrogation and answer is reduced to an undifferentiated unity of reason that constituted, for the ancient Greeks, the statement or the judgement. The knowledge of the researched object excludes then an axiology of the scientific approach and, in opposition, its ignorance or its objective occurrence eliminates the possibility of existence, because if something theoretically exists, requiring to be researched, then it will evade the research itself. The object should be given in the absence of an *a priori* knowledge, acquiring in this way the status of an object without being. If so, what should the connection between this paradox and the contradictory function that Kant attributes to the intellect consist of?

If the empirical object, the one that should be known, is similar to the object conferred to the sensibility, the intellect becomes unnecessary for the constitution of the object itself, which is already given. On the contrary, if the object divides itself and requests a status of duality, then the objectivation generated by the intellect cannot coincide anymore with the object of the sensibility. The intellect is, consequently, unnecessary for the process of knowledge of the object, or even impossible: it is futile, because it autonomously extracts itself in regard to the sensibility that already contains the object, and it is impossible, because it presents itself as an inexorable entity connected to the sensibility that is always transcended (by the intellect) in the process of configuring a certain object. However, constraint by the paradox of the propositional knowledge, Kant simultaneously sustained both thesis: the object is given and it is not given; the intellect is autonomous and it is not autonomous. The inutility is canceled inside the possibility, and the impossibility underlines the utility: the thought of the object is useful, because the object itself is not given, but it is different in regard to the result, while the potentiality of this hypothesis is valid because it researches an object identical to the given one. The consequence of this necessity of conceiving the synthesis of the intellect and sensibility, possible and simultaneously useful, generates the metaphysics of the Kantian *Critique⁵*, the polarization of the concepts and intuitions defining for Kant the knowledge itself, while the paradox adjacent to this synthesis exclusively interfere in the moment when the relationship with the object is directly thought: we assist to the emergence of the duality of an autonomous intellect, directly connected to the sensible object, and to the

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involvement of an intellect that excludes any possible relationship with the object outside the sensibility.

In other terms, in the first instance, the Transcendental Deduction of the Categories implies specific consequences, tangent to the object. In the Critique A, the given object differs from the cognoscible object, being simultaneously identical: avoiding the paradox, Kant introduces the contradiction of the *noumenon* – an object that is simultaneously similar and different in regard to the given one, although it can be in this manner; it is necessary and impossible, in the same proportion. In the Critique B, the discourse researches a singular object, while the difference, though necessary for the construction of the unity of the synthesis, is this time rejected; the analysis accepts then a dissociation of the *noumenon*, a dual *noumenon*, the negative and the positive, available for each faculty and for its correlatives. Concerning this second instance, the Deduction approaches few consequences tangent to the subject. In A, the given object and the cognoscible object both have a distinct character, even if this relationship is nevertheless impossible; consequently, the discourse introduces the pure consciousness that realises the reflexive synthesis, the unity of the two apparent contraries. In this manner, though, the consciousness becomes self-consciousness and consciousness of the object, eliminating the difference through the reflexivity and constituting the distinction and the synthesis in a single entity; therefore, the resultant is the identity itself, because the paradigm exclusively presents a singular consciousness. The self-consciousness is, in A, synthetic in its relation to the object or, being reflected in such a synthesis, the analysis confronts the risk that the identity-difference of the object, already transformed into a difference-identity at the level of the subject, will induce the appearance of an objective, synthetic character to the pure subject or to the Spirit itself. In B, the process is retrograde, though the result and the consequences are identical. The scission of the subject and object involves the incognoscible character of the pure subject, this distinction being a direct product of *Meno*’s paradox, because the difference between subject and object reproduces the one of the subject itself that knows without knowing, having the *a priori* possibility of learning (in other words, the possibility of making an object), in the absence of an *a posteriori* that completes the objectivation by rendering its utility. In fact, the pure reason divides itself upon the dualism of the intellect and sensibility, a modern valence of the paradox of synthesis that identifies its expression in the Hegelian dialectics.

Under these conditions, the identity is exclusively possible as a hypostasis of the negation or a distinct character, the Thought and the Concept being negatively apprehended in a gradual and evolutive comprehension of the subjectivity; for Hegel, the Logic is animated by a dialectic movement where the Concept presents an inherent negativity and dialectics which reciprocally assume themselves. The contradiction transgresses the objective, finite space
and the negativity confers an essential and positive function to its determinations, because it signifies the vector of the self-consciousness of the Absolute Spirit or its accomplishment of the essential self-knowledge, a becoming conjugated through the identity and non-identity, the abstract identity being a non-identity because it denies the entire becoming.

Accordingly, the equation excludes a finality, though it allows an entelecheia in the context where the essence represents a becoming tangent to the externality, an actualization of a teleological potentiality. In specific terms, the Aristotelian essence refers to the final causality and functionality of the Concept: the substance does not constitutes a reflexive abstract, on the contrary, the concrete universe contains in itself the principle of its self-actualization. Therefore, energeia presents itself in the expression of a reconciliatory entity of the essence and sensibility, under the circumstances of a negativity of its own substance, Self-movement and totality.

Next, the Hegelian interpretation of the Concept as an energeia shows the process of the self-actualization of the Thought within the finite reality. In this manner, energeia signifies, in the Hegelian hermeneutics, the actualization of a potency immanent in a subject situated in evolution or movement, an activity whose intrinsic reference executes its function in multiple manifestations: from the grounding of the essence itself to the Concept, from the teleological process to the natural translation of the existence, from the human being’s essence to the ways of knowledge and act within the most internal dimension, which is the absolute Thought that identifies its object of thought in its own substance. The notion transposes its correspondence in the Aristotelian noêsis noêseôs, the antecedent of the Absolute Spirit and the element used, in fact, in connection with the Encyclopedia itself. In the vision that Hegel attributes to the Aristotelian interpretation and in the context where the matter is similar to the force, the soul becomes the center of a permanently active “energy”, even if this one is not entirely actualized, for instance in the case of the inferior perceptions. The soul does not fundamentally differs from the body; the continuity of the reality is offered by the manner in which all substances and values that exhibit entelecheia represent in fact active forces, when these ones are accompanied by perception or representation, becoming souls. Since the connection between soul and body, matter and consciousness is unalienable, the transition is realised through the unconsciousness, as an inactive and virtual fundament of the

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reflection of monads upon themselves. The soul is the active force or the nucleus of the dynamic relationships, the *entelecheia* of the soul being then conceived as a perfection and self-sufficiency. Stranger to the passivity, the intellect is, therefore, always *actio*.

Consequently, Hegel hermeneutically transforms and appropriates *energeia* to define the Spirit. Essentially, the Spirit represents the actuality, the Self or the subject containing in itself its own movement and *telos*, whose expression detaches in the actualization of its own potentialities, in the self-identity and in the assumption of contents always distinct and innovative. During his lectures on Aristotle, Hegel affirms that “*energeia* is more concretely subjectivity.” Hegel focuses on the notion of *energeia* in the process of reconstruction of the *Metaphysics*, introducing three types of substances: the sensible *ousia* (the Substance) as a substratum of the change, the finite *nous* (the Intellect) as a formative principle of an *a priori* externality and the divine *nous* as an absolute activity of the Thought itself and its complete manifestation in Nature and Spirit. Therefore, if *ousia* is identical with its concept, this one being the subject of its own actualization, then God is, firstly, through the Thought itself, the complete identity of the subject and object to whom the entire universe aspires; secondly, Hegel situates the idea of its natural subjectivity inside the *physis* (the Nature), in the theory of Form that contains its own potentialities intended for actualization or the movement of achieving its own *telos*. However, if the *Metaphysics* represents for Hegel the quintessence expressed in the avatar of his speculative Idea (God), *De anima* incarnates the unification of the natural subjectivity and Spirit, from the finite form to the Absolute.

For Hegel, in *De anima*, the subject of experience acquires the valences of *hexis*, active potentiality, *Aufhebung* or negation of the externality, arguing that the different forms of life, knowledge or action are unilaterally conceived as moments of the actualization of an unitary process, *entelecheia* or the living Spirit. Hence, *De anima* cultivates: the Soul as a synonym of the activity of life, inseparable from its own manifestations and development, although it is situated in relation to different caracters (in *Logic*’s terms, the Idea); the negativity of Spirit, for whom each finite form becomes matter of a superior form, reflecting the reality; the synallagmatic character of Spirit, manifesting its emergence and

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8 G. W. F. Hegel, *Vorlesungen über die Geschichte der Philosophie*, edited by G. J. P. J. Bolland, Leiden, 1908, p. 154. This statement contradicts the modern idea, reflected through Baumgarten and Kant’s philosophical vocabulary and having a Cartesian inspiration, which affirms that the subjectivity constitutes the *cogito* by excellence, being opposed to the objectivity and overcoming it.


ascending, in this way, through Nature, to the ultimate Truth; the sensation as an identity of perceiving subject and perceived object, or as an intrinsic activity of the receptiveness, next to the actualization of senses in the context where the Spirit builds its receptivity in determined directions; the paradigm where the Self is represented as a potentiality or *hexis* that preserves and sublimates the assumptions of the memory, justifying the continuity of the experiences; the intellect that classifies the inferior forms of knowledge, ascending to the self-knowledge; finally, the unity of will and reason.

Hegel thinks that Aristotle induces to the nature, change, becoming itself an internal intelligibility; the substance as a passive substratum does not have to be opposed to the movement, nor the form or the essence to the becoming, overcoming in this manner the Platonism from the perspective of the concept of the immanence of Form, where Hegel identifies the principles of the “pure subjectivity”, which “Plato lacks”\(^\text{12}\). For Hegel, the immanent form constitutes an *archê* or the indefinable cause, unexplained in the absence of the abstraction or isolation, that does not interfere in the subject who undergoes a certain change, additionally or independently of his essence. On the contrary, the cause is contained by the process of its own actualization, because the essence of Being does not exist independently of itself, but it is conceived as a finality – Hegel calls it a Concept – that attributes to the Being the necessary movement for acquiring its own finality or *telos*. In Hegelian terms, the Being becomes concrete, through the Concept, *energeia* representing, in the end, what Hegel denotes through the subjectivity, the Concept as a cause of its own being and movement or an actualization of the Form. The Concept concretely exists within reality and, nevertheless, it is exclusively present as a hidden potentiality, because its existence constitutes the object of the actual thought; the universal represents the essence of the natural being and physical laws, creating the objectivity of the existence, and, in such a case, it cannot be identified in the natural space. The context will introduce the moment of the Idea, a product of the absolute activity of the Thought. In an arbitrary manner, Hegel identifies the existence of the universal or the one of the universal and objective intelligibility with the Aristotelian passive *nous*, then, respecting the order of the opposition of the objective determinations of the Thought, with the self-consciousness, while the Concept is replaced with an absolute Self or active *nous*. The object, as an expression of the conceptual synthesis, is produced within the Self through the unity of Thought, resulting, consequently, the identity of the Self with itself and the identity of the subject with the object. For Hegel, Aristotle is retrieved through the paradigm of *Vereinigungsphilosophie* (Philosophy of unification), in opposition with the Philosophy of Reflection or

the scission of the modernity: the sensible is not anymore opposed to the reason, nature and Spirit, but it rather spread itself in its immediate substance (Grundlage), the distinct character of the Idea in whose extension the Spirit appears only for coming to itself through a process of actualization being simultaneously attributed to the divinity too – in other words, the gradual imminence of the Idea in regard to its own self. The finality of the Spirit is not external, on the contrary, it is internal, as a last resort; in Aristotelian terms, the activity of Spirit is complete (teleia) even if it incarnates a certain production or creation, because this generation represents for Hegel, as the theory or practice, a self-production of the Spirit within the reality. In the dialectics of the Nicomachean Ethics\textsuperscript{13}, the energeia of the Spirit represents its own eudaimonia: “The eternal idea that is in and for itself actualizes, produces and enjoys itself as an Absolute Spirit”\textsuperscript{14}. In this Bessichselbstsein or being-in-itself, Hegel realises a homogenous identification with the Aristotelian théoria, praxis and poiêsis.

Also, Hegel singularly instruments the paradigm thesis – antithesis – synthesis in the context in itself\textsuperscript{15} – for itself\textsuperscript{16} – in itself-for itself\textsuperscript{17}, translating it in the terms of a mechanical production whose finality is absent, the structure being opposed to the model. For Hegel, the problem has not a verbal articulation: something is denied, but not through the verbal entity, but in a concrete manner (we deny some possibilities), so the becoming defines itself and through itself, any logical participation being excluded. The logic is animated by a dialectical movement, while the Concept has an inherent negativity and dialectics which assume themselves. The negation is not, this time, a predicative and discursive negation, but a general and universal principle, valid for any relationship. The identity is exclusively possible as a hypothesis of the negation or distinct character, while the Thought and the Concept can be now apprehended as a negation, rational process and evolution, but only if these ones are represented as subjectivity. The subjectivity becomes in this way an individual relationship, a relation of the Self with itself, being sustained through the different character of the negativity. Hence, the contradiction overcomes any finite object and it does not represent anymore the appanage of the Kantian antinomies. However, the Hegelian negativity has an essential and positive function, because it signifies the vector of the self-consciousness of the Absolute Spirit and its self-accomplishment; so, the


\textsuperscript{15} The universal and abstract beginning, that does not have a specific content.

\textsuperscript{16} The content seen as an exist out itself (an apparent connection between what appears to be and the original point of departure).

\textsuperscript{17} Every exit out of itself defines the Spirit, representing individual moments of its becoming during the process of accomplishing its Self-consciousness.
negativity is not eliminated, but it acquires a positive valence because it incarnates a specific becoming, conjugated through the proportions of the identity and non-identity, the abstract identity being a non-identity because it denies the entire becoming. The concrete identity represents the identity of the identity and non-identity, of everything that gradually becomes, being denied and overcome for attaining a sublimated reintegration. The becoming of the Spirit is coextensive in regard to the unity of reality (the concrete), and not a pure rational, external and a priori manner because, if the Spirit apparently needs Another for becoming itself, this Another is Another as Itself, and not as Other (which is external, additional and hermeneutic through its own intelligibility). Consequently, the scheme remains open, excluding a finality, but not an *entelecheia*: we represent some intrinsic realities contained by a more comprehensive reality, the Absolute Spirit. The Hegelian approach shows, therefore, how the Absolute Spirit can be integrated: the metaphor of the circle simultaneously constitutes a premise and a conclusion, an *in itself* (the actualization) that has, anyway, the assumed becoming, an *for itself* (the potentialities) and an *in itself-for itself*, the Absolute or something similar to the Abstract Universal or even the Abstract Universal itself (that accumulates and determines itself).

In these conditions, the Hegelian dialectics retrieves and reintroduces the Aristotelian metaphysics. Inside the reality (the organic matter constitutes the expression of the highest possible reality), the finality has a positive function: the becoming is teleological and it ceases to be the paradigm of a Brownian movement. Hegel retrieves the potentiality and the actuality of the Aristotelian philosophy; the essence represents a becoming, an actualization of a virtuality that teleologically accomplishes its end. Nevertheless, the becoming is not isolated from the exterior, but it is situated in a direct relation with the externality. In an Aristotelian paradigm, the Matter is necessary to the Form, and despite this, the first is situated outside the latter, and that is Hegel’s reproach. On the contrary, during his relationship with the externality, the individual actualizes only some potentialities of his own self, without being, in the same time, asymptotically isolated from the exterior (he does not manifest an isolated self-accomplishment). The critique also regards the Kantian universe, where the intellect can determine something in itself, but it can never determine the *self* of something. For Hegel, every determination of the intellect appeals to a vicious negativity, referring to the fact that the thing is not, which

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18 *In itself-for itself* represents a consciousness that retrieves every moment or action created for itself, a metaphysical entity made by the abstract beginning and the multiplicities of the gradual determinations occurred through the evolution of Spirit. The *in itself* is included and retrieved in *for itself*. The substance of the original Absolute realises itself as a subject too, through the actualization of its own potentiality. The finality does not mean, therefore, an ultimate point, but an element situated in the horizon of *in itself-for itself*. 
induces a certain limit concerning the hemisphere where the knowledge of the things stops its journey; the connection of the entities is external, and the negativity is external too. Conversely, when the individual’s becoming involves his becoming as Another (the Self is this time actualized), the negativity is adequate, which is a *sine qua non* condition for the becoming itself; the negation (the negativity) is in this last case, internal. The idea, the vector of the structure of the original progression and the absolute logical determination develop through a completely actualized subject, being opposed to a reality that, apparently, is something different from what is an Idea. The Idea survives within Nature because the void and formal Absolute retrieves its own finality of the real and empirical process of the self-conscious Spirit, it extracts and follows the internal substance through the instances of Nature and Spirit.

Thenceforth, the Nature and the Spirit define themselves as moments of the actualization of the Idea, seen as an autonomous, self-determination of the Spirit itself, its development being teleologically accomplished when the Spirit appropriates the totality of its constitutive moments. In this sense, the becoming of the Idea in the space of Nature leaves a logical transition, compatible with a deductive dialectics, and it preserves the autonomy that determines the assumption of the Idea within a finite Form, an essential moment for acquiring the self-consciousness.

Secondly, a quantum interpretation of the philosophical hermeneutics, simultaneously logical and natural, involves an assumption on the Hegelian dialectics where the microphysics, as the model of the Kantian pure reason, would require the domain of the pure dynamic and antagonistic contradictions, a space where the transcendence represents a relative and paradoxical manner, because the actualization of a prime term would inhibit and virtualize the manifestation of a second one. This represents the mechanism through which the relative transcendence of the contradiction is built and manifested, without which no exponent of a reconciliatory synthesis can have validity: if the analysis presents itself as a contradictory and dynamic process in regard to synthesis, the dual functions of a quantum system, the wave and the particle, are reciprocally reduced to the quantifier level.  

In a probabilistic paradigm, Bachelard conceives the potentiality of such a metaphysics of the microphysis, quantum space through “the ontological mobility corresponding to the essentially probabilistic foundation of datum”, “a connection where the operator, thought to be identical with itself (…) contributes to the elimination (…) of the irrational character of the probability”\(^{20}\). In other words, the rational and the irrational manifest themselves on the territory of the

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19 The evolution of the energy quantifier in a physical system is analysed by Louis de Broglie in *Théorie de la quantification dans la nouvelle mécanique*, Paris: Hermann, 1932.

same antagonistic dualism of the logical character, cultivated by both classical metaphysics and modern microphysics (quantum physics), and, additionally, generated and determined by the multiplicity of the indeterminacy relations. In fact, this indeterminate conjunction or incomplete quantum measurement (EPR\textsuperscript{21}) caused by the existence of a hidden variable, is built as the Hegelian Spirit, being incomplete until its fully actualization, reintegration and assumption, the variable becoming the metaphor of the evolution and dislocating, in the same time, the theory of the classical temporality: “the quantum postulate (...) states that any observation of the atomic phenomena involves a finite interaction with the observational instrument (...). On one hand, for defining the condition of a physical system according to the general conceptions, any exterior action must be ignored; though, in this case, following the quantum postulate, any possibility of observation is simultaneously excluded; first of all, the concepts of time and space lose their sense immediately. If, on the other hand, for making the observation possible, we admit the eventual interaction with proper observational instruments, which do not belong to the system, then an univocal definition of the condition of the system becomes impossible because the nature of these things, and any problem of causality, in the general sense of this term, is excluded. We should then conceive a radical modification of the relation between the spatio-temporal description and the principle of causality, signifying the ideal possibilities of observation and definition, whose unification is characteristic to the classical theories: according to the essence of quantum theory, their conceivability seen as some complementary aspects must be abandoned in the favour of a mutual and exclusive character.”\textsuperscript{22} So, in the context of a contradictory complementarity, the time and space become \textit{a priori} intuitions of the observer’s (subject) sensibility, according to his own observational instruments. In a quantum dialectics, the equation generates a multiplicity of mundane potentialities and it introduces typical interpretations (for instance, the paradigm of the many-worlds interpretation\textsuperscript{23}, enunciated by Everett), because the space and time are not objective, but they belong to the subject’s consciousness.

\textsuperscript{21} The quantum Einstein-Podolsky-Rosen paradox analyses the dichotomy cultivated by the measurement and description of the microscopic systems (singular elements like photons, electrons and atoms) through the methods of the quantum mechanics. In this paradigm, the unit of measurement of a physical quantity of an individual system must influence the proportion and measurement of another physical quantity of a secondary system, spatially different, or, on the contrary, the description of the reality conferred by an undulatory function is incomplete.


\textsuperscript{23} The quantum interpretation of the multiple worlds asserts the objective reality of the universal undulatory function, denying though the actuality of the collapse of the undulatory function or its reduction. In other words, the theory implies that any historical alternative, past or future, is valid, because each of them represents an actual or, at least, possible and potential universe.
Next, Heisenberg indicates, through his uncertainty relations\textsuperscript{24}, that the rigorous observation of the coordinates localised in space and time presumes an uncertainty of the impulse-energy component, an unpredictable modification of the dynamic behaviour and a scission of the causality of the observed facts; conversely, the increased precision of the energy and quantity of movement or the causality of an atomic process involves the major uncertainty of its spatio-temporal aspect. These two proportions of the classical physical quanta present an incompatible microphysical character, and the attempt of simultaneously applying them to a singular object is opposed to the limit imposed by the acting quantifier (in Aristotelian terms, \textit{energeia}).

Nevertheless, the integrity of the principle of non-contradiction is not abolished, because the two terms of this contradictory complementarity never actualize simultaneously, in an identical spatio-temporal domain. The reciprocal exclusion functions as a vector that avoids the contradiction presumed by such an actual coexistence, and Heisenberg demonstrates that, through the uncertainty relations, the undulatory and the corpuscular representations eliminate a conflictual participation\textsuperscript{25}: when the movement of a particle is already observed, the undulatory representation can be applied to it because the particle possesses a wavelength, though through the existence of a multiplicity of possible, pure virtual positions the particle disappears, because the corpuscular representation is, in this case, incompatible; conversely, in the case of a geometrical figure or coordinated function, the associated wave is eluded, while its movement is restricted to a simple, infinite multiplicity of possible phenomena because, this time, the undulatory representation rejects the quantum reality and the corpuscular representation cannot be applied anymore. Definitely, Heisenberg considers that there is a complementary reality between the quantum concepts of wave and particle, the two elements reciprocally excluding each other though avoiding a contradictory tangent because their applicability is not simultaneously distributed.

Hence, the two elements are not heterogeneous, but their specific function of identification is always opposed to a contradictory duality whose antagonistic term realises the irrational and contrary character of the opponent term. In fact, the wave and particle are only microscopic notions that evolve, through individual paradigms, the conceptual rationality of the physical reality,

\textsuperscript{24} In the quantum physics, the uncertainty principle enunciated by Heisenberg presents the existence of some rigorous inequalities which constraint specific couples of physical proprieties, like the measurement of a present position of a particle, made in the same time with the determination of the future position of the same particle. Consequently, these measurements cannot be simultaneous, and the rigorous measurement of a certain propriety is inversely proportional to the control, determination and knowledge of the other.

\textsuperscript{25} Werner Heisenberg, \textit{Les Principes physique de la théorie des quanta}, Paris : Gauthier-Villars, 1932, ch. II-III.
avoiding a direct contradiction of macrophysics because the movement and the causality cultivated by these ones represent a process of evolution or metaphysical becoming, a process of differentiation of the permanence and identity conferred by the spatiality of a physical being, so an actualization of the own potentialities, without transforming the substantial reality of that specific being: the movement constitutes a determined becoming of extrinsic modifications, and the causality postulates directly proportional relationships developed between cause and effect, despite the modal heterogeneity of the cause and effect. The spatial description shows the laws of the identity of the modal heterogeneity of the figure, while the causality regards the elements corresponding to the movement; therefore, the two theoretical representations display the same duality, having an identical transcendence and contradiction as a **telos**. The contradiction of the microphysics interfere in this point because, in this space, the geometry is contradictorily connected to the dynamic field, through the acting quantifier, in the same way as, during the process of actualization of some immanent potentialities in subject through **energeia**, the resulted negativity undergoes the transcendental process of becoming, being assumed and overcome for obtaining the unity of the contraries. The two concepts are not contradictory in themselves, but the application of their logical identity (maintained through any dynamic and causal transformations) to the quantum experience requires an antagonistic dualism whom the macroscopic process transcends, through the finality. The irrational and the heterogeneous character of the dynamic activity (**energeia**) are opposed, in the microcosmos, to the geometric identity that overcomes the contradiction (the negativity) through the spatio-temporal description, while the circumstantial irrational and heterogeneity are opposed, in macrocosmos, to the dynamic identity (**energeia**) that transcends the contradiction (the negativity) through the logical causality and reason, the finality assisting to the complete actualization of the individual potentialities, in both cases.

As far as they are instrumented from this perspective, the uncertainty relations seem to represent a totally new and contrary theory: if each of the complementary terms is alternatively actualized within the microcosmos but simultaneously accomplished inside the macrocosmos, then this process involves, for both of them, the possibility of an ultimate contradiction, for whom any real experience becomes impossible because the human intellect cannot conceive a movement that excludes a physical object, a dynamic and pure character coexisting with a spatiality having an infinite heterogeneity of movements; however, in the end, even this potential contradiction is somehow avoided through the identity and the causality. In a Hegelian dialectics, the contradiction is solved by the reconciliation between essence and sensibility, in the context of an assumed and transcendental negativity of its own substance, Self-movement and totality in a space where the spatio-temporal relationships
are conjugated through subjectivity. In the same time, in Aristotelian metaphysical terms, the teleologic process overcomes the finite nous (the Intellect) and identifies its essence in the expression of noēsis noēseōs, the antecedent of the Absolute Spirit and the active substance of the Unmoved Mover, the pure existential space by excellence, where the Thought, the Intellect, the Movement and the Intelligibility are identical, eliminating any intrinsic contradiction or potentiality.

Finally, the complementarity that essentially exhibits a contradictory and uncertain duality requires a metaphysical transcendence where the antagonistic elements existing between the observer and the observed object, between the subject and the object or between the thought and the intellect are completely actualized in a hermeneutic unity, eliminating their negativity. Therefore, avoiding the reformulation of some new metaphysical images, imitating the realistic model and rejecting the classical, empirical, metaphysical paradigms, the case of the quantum physics intersects an authentic veracity through a philosophical synthesis of the metaphysical term. 26 This structure can include, in the end, Aristotelian, Kantian and Hegelian metaphysical arguments in a hermeneutic interpretation of the quantum theory: the paradoxes of the quantum mechanics (the contradictory complementarity of the wave and particle 27, the problem of the uncertainty relations 28, the theory of the multi-worlds 29, the problem of the incomplete quantum measurement 30) could identify their ontological and synallagmatic connections in the notion of noēsis noēseōs and in the expressions of the Transcendental Deduction and Absolute Spirit.

REFERENCES


27 The Copenhagen interpretation of the quantum mechanics postulates the dual existence of the matter, as a wave and particle, analysing the condition of each individual physical particle described through the coordinates of its wave function.
28 The uncertainty principle enunciated by Heisenberg.
29 The quantum interpretation of the many-worlds was asserted by Everett.
30 EPR paradox or the Einstein-Podolsky-Rosen paradox analyses the dichotomy cultivated by the measurement and description of the microscopic systems.


