THE FIELD OF 'BETWEEN' – A CONCEPT OF TRUTH FOR INTERDISCIPLINARY COSMOLOGY

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ABSTRACT. *The term "**Field of 'Between'**" arose from a phenomenon of quantum physics, demonstrated by means of the so-called "double slit experiment" (a facility used by Niels Bohr). During the continuous emission of light quanta the beam is sometimes observed in the form of light particles, sometimes it appears as a wave phenomenon. Thus the emitted quantum is protocoled either as a particle (discrete) or as a wave (continuum). The result depends on the physical interaction between the shooting beam and the light-sensitive material of the detector. In pure physics it is nothing but an interaction of physical materials. In view of natural philosophy it can be reflected as follows: The result arises in the "**Field of 'Between'**", in the **topos** of an **inter-action** between real physical materials. Based on this minimal **inter-action** in a micro-world, the present article shows that this "**Field of 'Between'**" can be defined as a fundamental principle underlying any relation, confrontation or emergence of any beings within the cosmos. The "**Field of 'Between'**" in the meso-world can also be applied to the **inter-action** and **intra-relation** between different thinking methods – as an irrefutable principle to achieve a developable result in an interdisciplinary dialogue. The principle of the "**Field of 'Between'**" has a further dimension in macro-cosmic space, i.e. in the regulative relation of the gravitation field of the earth-moon-system, which includes the centrifugal force of the rotating earth. The goal of this article is to establish an interdisciplinary 'cosmology' of philosophy and natural science in view of the epistemology of natural philosophy.*

KEY WORDS: *interaction in physics, inter-action in natural philosophy, principle of cosmology, micro-world, meso-world, macro-cosmic space, interdisciplinary dialogue, intra-relation, interdisciplinary epistemology*

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Introduction

Contrary to the established genre of the Mathematical Philosophy the *interdisciplinary research of physics and philosophy* is not well known. Of course there are writings of physicians for popular public to introduce selected parts of physics for the public of mass media. Introduction to highly advanced theories is purely for physical public in which the reflections of *philosophy* do not have any place.[1] On the other hand there are number of reports written by specialists of *scientific theory* in which scientists present their oppositions to the previous philosophy tradition of continental Europe.[2] Against these areas there are renowned theories of Natural Philosophers since the 19th century oriented to interpret the advancing results of Natural Science fragmentary, tend to put it into the frame work of the previous thinking methods of natural philosophers.[3] What is lacking is an *inter*disciplinary reflection of the philosophy for the contemporary science in which a philosopher is able to grasp the *principles* of physical thinking, reflecting the physical theory in relation to the fundamental philosophical conception of the subject "What is Truth". To goal this purpose for the interdisciplinarity the philosophers should know the parts of physical theme fundamentally. *Vice versa*, physicians should also collect the knowledge what is he purpose of philosophical reflections and what is the goal of the philosophy at all. Philosophy of Science is not the same of explanations of theories of physics or another natural science, but it goals a fundamental reflection *what is a truth* as a common base of the different thinking disciplines. The '*Field of Between*', a scientific and cosmological conception of mine works as a principle that I introduced into the interdisciplinary fields of Physics and Philosophy in 2006. In the following chapters I present the essential parts of this principle in a compact form.[4]

1. The Significance of the Term in the Micro-World: Being – Substance – Physical Reality

In a well known physical experiment, a light quantum is emitted towards the target of a light sensor. If the quantum hits the target, a visible point emerges on the flat material as the result of the physical *interaction between the flying light quantum and the light sensor*.[5] The localization of the light quantum is completely unknown

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[1] For example: Einstein, *Grundzüge der Relativitätstheorie,* Braunschweig 1990. Heisenberg, *Physikalische Prinzipien der Quantentheorie,* Stuttgart 1991. Heisenberg, Bohr (Ed.), *Die Kopenhagener Deutung der Quantentheoire,* Stuttgart 1963. Schrödinger, *Über den Indeterminismus in der Physik,* Leipzig 1932. Treiman, *The Odd of Quantum,* Princeton 1999. See the quoted works in this report. Some works of Heisenberg are extraordinary examples of successful exceptions: *Quantentheorie und Philosophie,* Stuttgart 1994. *Physik und Philosophie,* Stuttgart 1990.

[2] Riedl: *Evolution und Selbstbezug der Erkenntnis*, München 1990, *Die evolutionäre Erkenntnistheorie,* Berlin 1987. Popper: *Objektive Erkenntnis* (*Objective Knowledge,* Oxford University 1972), Hamburg 1973, *The Logic of Scientific Discovery*, London 1959.

[3] Cf. Natural Philosophy of the 19th Century.

[4] Articles of this theme are found in my publications: See the Reference at the end of this report.

[5] Pietschmann, *Quantenmechanik verstehen*, Berlin, Heidelberg 2003, p. 26.

before it is measured. The same is valid at the end of the measuring. An exact prognosis of the way of the flying quantum and its localization is not possible. The protocol of the flight of the quantum changes from case to case. It depends on what kind of physical facility is used for the experiment and on the method how the quantum is measured.[1] Even if some renowned physicians have contended recently that the condition of the moving quantum can be predicted to a *limited extent* in the probability theory[2], the nature of the quantum is still now in the principle: The quantum being is depended on accidental moments, its protocols are case by case changeable. The nature of quanta is "*created*" by the experiments. The consistence of Heisenberg's *uncertainty principle* is evident.[3]

What was argued most in quantum physics was the point if and how far a quantum can be understood as a "**physical real being**", the so-called "***physical reality***" ('*Das Physikalisch Reale*') presented by Einstein in his argumentation in the EPR Paradox against Heisenberg.[4] In the way of thinking based on Substantial Metaphysics (Aristotelism, Leibniz's Monadology) it may be argued, that the score of a flying quantum is *just an* '*accident*' (*accidentia*) in reality, a pure *physical effect* in which an emitted quantum vanishes immediately.[5] One scientific theory is that the "quantum protocol is no other than an '*artificial phenomenon*' produced by experimental physical facilities." [6]

Here I should like to present another proposition:

A quantum is the minimal physical substance to construct the material of the *micro*-world, *mezzo-worlds* and of *macro-cosmic space*. But its essential unity can be *never* be explained by *substantial metaphysics* according to Aristotle or Leibniz.[7] Specialists of Aristotelism might say: "A quantum is *only* a particle – a broken part of an atom. A physical protocol of a quantum results in an '*accident*' in reality, but a quantum *per se* is not a substantial being. The main position of substantial metaphysics since Aristotle does not lose its meaning in any way."[8]

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[1] Pietschmann, ibidem 2003, p. 63. Cf. Pietschman, "Versuch zur Entwicklung des Denkansatyes der Quantenphysik", in: *intellectus universalis*, ed. by H. Hashi, W. Gabriel, Wien 2005.

[2] Zeilinger: *Einsteins Schleier. Die neue Welt der Quantenphysik*, München 2005. *Einsteins Spuk*, München 2005.

[3] Heisenberg, *Physikalische Prinzipien der Quantentheorie*, Stutgart 1990, Kap. I.2, p. 16. Pietschmann, *Quantenmechanik verstehen*, 2003, p. 26.

[4] Einstein-Podolsky-Rosen-Paradox, American Physical Society 1935. See the chapter 2 of this report.

[5] H.-D.Klein, "Inwiefern ist das teleologische Konzept der modernen Physik immanent?", in: *Die Natur in den Begriff übersetzen*, ed. by Posch and Marmasse, Frankfurt a.M. 2003. Cf. Atistotle, Metaphysics, Book Δ 1025a, Book Z 1032a-b.

[6] F. Wallner, *Structure and Relativity*, Frankfurt a.M. 2005, p. 67.

[7] In accord of this fact analytic philosophers say that the classic metaphysics and ontology like that of Leibniz is not valid in the contemporary philosophy: Chris Swoyer, "The Autonomy of Relations", in: *Facta Philosophica*,vol. 6 No. 1, Bern 2004.

[8] For the conception of the substantia / ousia see Aristotle, *Metaphysics*, Books Z, H, Θ.

I will say: "This position is right. The uncertain nature of quanta doesn't interfere with Aristotelian metaphysics. The theories of Aristotle, Leibniz etc. about *substance* have *no relations* to the aspects of the physical reality of *particles in the micro-world* system. The nature of a quantum has been *independent* from the *principles of substance theories* since the beginning of metaphysics. In other words, the nature of a quantum is *not* recognizable from the position of substance metaphysics." There are similar cognitions in the philosophy of continental Europe. Starting from this point my own position is as follows: "***If it is so, the contemporary theory of being has a possibility to change its essential part dynamically***. I say that the nature of a quantum is '**emptiness of substance, free from substantiality**'." It emerges and vanishes immediately. The visible point of the scored quantum is the track of the vanishing being. I say: "This track emerges in the **Field of Between**, the field **between the flying quantum and a receiving material**".[1]

2. The Physical Real Being – Einstein's Argumentation in the EPR Paradox

The arguing point of quantum physics from its beginning has been if and how far a quantum is understandable as a *physical real being.* This definition (*das physikalisch Reale*) was coined by Einstein. He brought arguments to the *Uncertainty Principle* against Heisenberg repeatedly. In short, Einstein postulated that the base of "*physical reality*" (*das physikalisch Reale*) lacks in quantum physics, so that fundamental research in quantum physics is incomplete. In the opinion of Einstein the "physical reality /physical real being" should have three main conditions[2]:

a) Definitive localization in space-time: Physical reality is a definite unity in (traditional) physics; a physical material can be measured in repeated experiments. It must be observed and protocoled by the repeated measuring method which is bound to yield consistent results.

b) Stability of the measured object by execution of an experiment: By measuring, the condition of the physical object should not be disturbed by the experimental physical facility. This point is totally lacking in quantum physics.

c) Systematic relations of the measured object to physical circumstances: The measured object is a physical system bound to its physical reality. Built up in its own space-time in physics it should have consequent relations to the physical beings around it. It must consistently show a definitive physical system. This point also lacks in quantum physics.

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[1] See the notes 5–8 of this report.

[2] Einstein, Podolsky, Rosen, "Can quantum-mechanical description of physical reality be considered complete?", in: *Physical Review* 47, American Physical Society 1935. M. Born-A. Einstein, *Biefwechsel*, München 2005, p. 272ff. Cf. Hashi: „Quantenphysik und ihre Anregungen zur neuen Seinsdynamik", chap. III.3., in: *Wiener Jahrbuch für Philosophie* vol. 38 / 2006, ed. by H.-D. Klein, Wien 2007. "Naturphilosophie und Naturwissenschaft. Denkansätze bei Hegel und bei Popper", 2.4.b), in: *Naturphilosophie und Naturwissenschaft*, Polish Academy of Sciences, ed. By M. Herman, A. Nadolny, H. Hashi, Vienna 2006/07.

Therefore Einstein concluded in his EPR Paradox: "All these conditions of '*physical reality*' are lacking in quantum physics. The basic theories and research methods of quantum physics should be considered fundamentally." Einstein held this position in the scientific theoretical alliance with K. Popper.[1]

The point debated most by natural scientists and philosophers was, if and how far a quantum can be interpreted by previous concepts of '*being*' in '*physical reality*' at all. A quantum stays in physical *space-time* for an extremely short duration and *vanishes immediately.* A light quantum is bound to its own quantum count. It has a spin in a direction and it can be observed and protocoled. But its duration is extremely short, for example, it appears with its own *space-time* for 10^{-23} seconds and vanishes immediately. A light quantum can split into two further quanta (*double quantum* / *Doppelteilchen*) after the emission.[2] The quantum nature is accidental. The quantum nature differs in the protocols, depending on what kind of facilities were used in the experiments.

3. Debates in Unproductive Way

This point has caused many confusing debates. *Consciously* or *unconsciously*, scientists and philosophers consider that a *being* is bound to its *substance*; it exists on its fundamental substantiality; according to traditional physics it is a material bound to a physical body. Natural scientists, influenced by Einstein, were conscious of the concept of the "*Being of Physical Reality*".[3] Philosophers (like Popper) tended to think that a quantum is bound not only to natural scientific fact, but also to its '*ontological substance*'.[4] A particle of an atom is bound to its '*systematic unity*' which is *indivisible*, like that of a *monad* by Leibniz or *ousia / substantia* by Aristotle.[5] Physicians proved that this character *lacks* in particle physics in the *micro-world*. From this result the debates of physicians and philosophers developed in the direction that the 'previous theories of *substance metaphysics* of Aristotle, the *monadology* of Leibniz etc. might lose its relevance at all. Then the previous natural base of *substance*, *monade* or the *physical reality* / *real being of physics* was negated in the new physics totally.'

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[1] Popper: *Objektive Erkenntnis*, Hamburg 1973, VIII.3., p. 330. *Objective Knowledge*, Oxford University 1972, p. 302. *The Logic of Scientific Discovery*, London 1959, appendix xii, correspondence with Einstein.

[2] Pietschmann, *Quantenmechanik verstehen*, 2003, pp. 103. Machida S., (ed.) *Quantum Theory in Contemporary Physics*? (今さら量子力学?), Tokyo 1990, pp. 26.

[3] Einstein, EPR-Paradox. Cf. the letter of Einstein for Popper dated of 11. 9. 1935, in: Popper, *The Logic of Scientific Discovery*, 1959, appendix xii, pp. 457. The position of Einstein against Heisenberg is found also in "Die Quantenmechanik und ein Feldgespräch mit Einstein", in: *Quantentheorie und Philosophie*, Stuttgart 1994.

[4] Cf. the 'Third World Theory' by Popper, in: *Objektive Erkenntnis*, 1973, *Objective Knowledge* 1972. F. Wallner, "The Split of Austrian Philosophy. Wittgenstein and Popper", in: *Konstruktion der Realität*, Wien 1992.

[5] Aristotle, *Metaphysics*, Books Z, H, Θ. Leibniz, *Monadologie*, Stuttgart 1990.

In my opinion, there is a failure of conclusion in interdisciplinary reflection. Unconsciously these thinkers *presuppose* that a quantum as a particle of an atom builds up a minimal part of the physical being of the whole universe. In a *purely physical view* this is right. From the *philosophical* point of view we have to complement a critical reflection as below:

According to physical materiality a quantum builds up an elementary part of all being. But, if we collect atoms in a physical laboratory, we can build up, for example, two hydrogen atoms and an ozone atom, but we cannot produce '*water*' that we perceive in nature. We can break down physical reality in an analytical and objectivist way to the most elementary part, a '*particle*' of *micro-world*. We can construct a physical world in the *projection* of our *consciousness*, as a *scheme of the world* in the view of natural science. But, the constructed *projection of the world* and the *real world* are *not* same; they are different. One of them cannot identify with the other. From the combination of the physical parts there cannot emerge a live being. Our self consciousness cannot be produced in a natural science laboratory.[1] If we claim that we can explain and construct everything by natural science theories, our position turns into a theory focusing *all being excessively* on *natural science*, a *physical absolutism*, the so-called 'physicalism'.[2]

4. Lacking Aspects are Philosophical Comparatistics

From that point a long series of debates follow an unproductive way. Especially when the debates center on methodology, the results of them are not interdisciplinary dialogues, but crude and incorrect conclusions made by natural scientists and by natural philosophers, because the *different systems* of *thinking* in philosophy and physics are ***never reflected*** *in a* ***comparative way***. In short, physics dominate the subjects of [***quid facti***], the areas of concrete real factums, real materials and its causality in every detail to construct the physical world in deductive way. Compared with physics, philosophy dominates the areas of [***quid juris***]: What is the handlebar in philosophy is the *examination of the ways, forms and contents of thinking of every kind, the methods of thinking* at all. This pair of terms, ***quid facti*** and ***quid juris***.[3]

The subjects of physics are factums, objects of real being that can be measured. The subjects of philosophy are, in contrast to physics, various ways of thinking *produced in our consciousness*. This is for philosophy the ***Intrasystem,*** for physics and natural sciences the ***Extrasystem***. Things that can be operated by the **physical**

[1] The method of cloning animals is successful in a theoretical scheme, but in reality there are difficulties in every detail. In cloning, the female cell which merges with the male cell cannot be split easily. Cf. Okada Y., *Organism, Brain and Life*, Tokyo 1999.
[2] H.-D. Klein, *Geschichtsphilosophie*, Wien 2004, chap. I.1.
[3] The significance of these terms is quoted by Kant, *Kritik der reinen Vernunft*, "Deduktion der reinen Verstandesbegriffe", B 116, A 84.

quid facti are **for physics** the ***Intrasystem* unity**, for philosophy the ***Extrasystem*.**[1] Unproductive debates between different philosophical and scientific disciplines started from the point that philosophers and scientists *mixed up* and *standardized* their own '*intrasystem* and *extrasystem unities*' *without recognition* of *the different methods* of their thinking disciplines. ***What was lacking*** was the **comparative reflection** of the different scientific disciplines marked with the key words of the [*intrasystem* and *extrasystem* unities].

The unique merit of philosophy is the possibility to examine and prove thinking methods of any kind. As the result of the discourse we could clear up the principles of the various ways of thinking which are valid universally.

On the other hand, ***the unique merit of physics*** is *another one*: It is able to handle concrete material things successively, continuously and in a deductive verifiable way. Physics presents its way of thinking through physical schemes (formula, matrix, tensor calculation, coordinate systems of Riemann geometry etc.) by which it finds also the disprovable parts of physical reality that will become further issues to explore in nature.

5. Complementary Relation of the 'Intrasystem' and 'Extrasystem'

I am of the opinion that the *un*exchangeable merits of both thinking methods (physics and philosophy) should be appreciated and reflected, to lead to a *fruitful* ***complementary interchange*** between the both *disciplines*; *discipline of the philosophy* and that *of natural science*. The background of this thinking is the position of **Yukawa** (YUKAWA Hideki, 1907–1981), Professor at the University of Kyoto, who was awarded the Nobel Prize of particle physics for the discovery of the meson 1949. He was of the opinion that the activity of the human spirit (Geist) can be researched also in view of Natural Sciences, by which the way of the '***human scientist***' thinking **cannot lose** its **original value** in any way. In his opinion **Human Science** and **Nature Science** cannot be separated or isolated. ***Both*** scientific disciplines serve the cognition of the human being. Either of them is related to the other, if we consider different kinds of knowledge from the ***view of the cognition of the human being***.

Excursus

YUKAWA presented this position in his various writings from the view of his interdisciplinary thought. One of his typical positions is found in the essay "*chigyoraku*"[2], with the quotation of the Taoist classic 莊子 *Zhuangzi*, the dialogue

[1] These technical terms can be applied also in the cognition theory and comparative philosophy: Hashi, "Das Feld des *Zwischen* – Zur *system-externen* Logik der Quantenphysik", in: *Interdisziplinäre Philosophie der Gegenwart*, Frankfurt a.M. 2009.

[2] Yukawa, "chigyoraku" (知魚楽, "To know the pleasure of the fish in a river – A Taoist message in the dialogue with a Positivist") in: *The surprising Spirit* (驚く心), ed. by Tsurumi S., Tokyo 1990, pp. 405.

of the Taoist *Zhuangzi* to his rival 惠子 *Huizi* (Hui Shi 惠施) by the walking at the river.[1] Against the Taoist Zhuangzi (莊子) showed Huizi (惠子) a positivistic and materialistic view. In the comparison of the Taoist and positivist position Yukawa developed his own thesis, that this kind of concurrence is found also in the contemporary time by philosophers and by natural scientists. Yukawa accented, "though I represent the position of physics and natural science, I am deep impressed by the Taoist view of Zhuangzi. Then regarding the development of sciences carefully there is very few scientist since the period of Demokritos or Huizi (惠子) – who kept *exclusive one of the both poles* in the way "*either A or non-A*": That is, "I think and believe *either* the philosophical position concerning the universal truth of unity *or* the natural scientist position recognizing only provable things in the positivist way of thinking. Contributions of natural scientific advantage emerged always from the insight of scientists who were *not* satisfied with *merely positivistic* way of thinking. To find and establish a new thesis or principle the true scientists had positioned *between* the extreme poles: Regarding the new systematic construction of an unknown part of nature they developed their insights and imaginations (like Philosophers or Taoist). On the other hand they cleared up the positivistic provable parts in a maximal intention in the scientific deduction. I, as a particle physicist, want to find the systematic principle of a particle which is not recognizable as a 'particle, substantial and independent one'. The nature of a particle is only recognizable if we observe it in a relation with another particle: We can observe one particle not in a constant and consistent preparation, but only in an extreme short time-space, when another particle is near the observed one and when the first particle leaves from the second one. The theory of particle physics is built up in this field of relation, in which I as the scientist move always between the both poles; one of them is the insight to grasp the new cognition, and the other one is to prove the hypothesis in the scientific methods." As he presented this position in his international symposium for physicist in Kyoto, this analogy seemed to stimulate many participants.

Yukawa reflected his thought in his further writings: A result the professional level for interdisciplinary philosophy is found in the dialogue with KOBAYASHI Hideo (1902 – 1983), one of the most intellectual critics in 20th Century in Japan titled "The Progression of Human Being" (人間の進歩について).[2]

Yukawa's thesis for the problematic how to establish the interdisciplinary relations, communications and contributions from the natural science to the anthropological philosophy is executed in his scientific report "Science and Human Nature" (科学と人間性), marked up by the four aspects, Human Being as the

[1] Zhuangzi 莊子, chapter 17 (秋水, the water of autumn), Abs. 16. Ed. by Ogawa T., Tokyo 1978, pp. 398.

[2] The Progression of Human Being". (人間の進歩について), in: Kobayashi H., Complete Edition, appendix vol. 1, Tokyo 1983, p. 130–158.

Thinking Being, Human Being as the *Observing Being*, Human Being as the *Acting Being* and "Science and the Well-Being for Mankind". [1]

This position of Yukawa postulates *neither mixing nor thoughtless equalization* of natural philosophy and natural science. ***Neither isolation nor equalization*** is called for a "**complementarity**". I think that this idea of the [**complementarity**] can lead to the method of interdisciplinary thinking which is important for comparing [***intrasystem***] and [***extrasystem***] unities.[2]

6. The Field of 'Between' as the Concept of Scientific Theory

I am of the opinion that we can reconstruct our [***intrasystem***] thinking ***from the stimulation*** of [***extrasystem***] thinking. Generally, one can see *his own unity* in the **other's reflection** of himself **objectively**. My interdisciplinary scientific concept is the *Field of '**Between***', stimulated by the fundamental knowledge of Buddhist philosophy (*pratitya samutpāda*), which is in no way connected with esoteric concepts or mystification of any kind. Problems of reincarnation or irrationality are *never* in my concept.[3]

The essence of the ***Field of 'Between'*** is in short:[4] a being [A] becomes [*A*] only if it enters into a relation with another being [*non-A*]. The meeting of [*A*] and [*non-A*] constructs a field of an "***emerging relation depending on each other***". The relation from [*A* to *non-A*], [*non-A* to *A*] can be *maintained*, it can *develop*, *be dissolved* and *vanish*. The fundamental concept is the [relation of *A* and *non-A*]. I will comment that this '***Field of Relations Depending on Each Other***' shows always a '***space* of *Between***' [***A* and *non-A***]. The emerging of a relation, its duration, development and vanishing in Buddhist philosophy is not discussed in the way of Aristotle's *substantial metaphysics*. An expert in Aristotle's substance metaphysics might say that "the causality of occurring, staying and vanishing of a relation between *A* and

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[1] *Human Being and Natural Science* (人間と科学), ed. by Yukawa, Tokyo 1956, p. 2–46.

[2] See the note 24. The starting point of the analytic way of thinking was found by Aristotle's Organon, Metaphysics and Physics intensively. He criticized the way of Plato's thinking of the *idea* (ιδέα) of the *one* / *hen* (ἕν) and accented his thesis: "To say that something is not or it is not existing, is faul. But to say that something is and a non existing one does not correspond the truth, is truthful.", Metaphysics, 1011b - 1012a). Plato presented just the last position which was omitted by Aristotle. See "Parmenides"-Dialogue 152a – 166c. Cf. the Aristotle's sharp criticism against Plato, in: *Metaphysics*, Book M. In the comparison with Aristotle I will say that Plato's insight suggests a possibility to the fruitful reflections for the comparative philosophy of East and West.

[3] The projection of the "samsāra" as a "reincarnation" in substantial transfiguration from one personality to another being is believed mostly in the faith of Tibetian of Buddhism: Contrary to the popular knowledge since the last decades in Europe this way of imagination has *less common ground* of the Mahayana Buddhism as religion and philosophy in East Asian cultures. The similar type of the "reincarnation" of Tibetian Budhism is found primary in the faith of Hinduism. See the literatures of Buddhology: Nakamura Hajime, Classics of Mahayana Buddhism in 7 volumes, (大乗仏典) Tokyo 2002- 2005. Takasaki J., *Buddology and Indology*, Tokyo 1993.

[4] This basic principle of being is pratitītya samutpāda. See the Pāli Canon. In the Mahayana Buddhism it was extended into the metaphysic/ontological and anthropological principle. See Nakamura, ibidem, Takasaki, Hayashima, ibidem.

non-A is in the *dynamis*, in the potential possibility of every thing and being. *A* and *non-A*, everyone is an *ousia*, a substance. Everyone is present within his or her own being, so there is not any space between *A* and *non-A*. *A* and *non-A* are a 'substantial unity'." – Just for this point I present my position and my comments:

If someone connects every word of 'being', 'existing', 'emerging' and 'developing' etc. with a *substantial, constantly being moment*, he would never grasp the essential meaning of the '*Field of Between*'. The 'Field of Between', viewed purely physically, is a *field* of space-time that enables a ***physical interaction*.** Viewed purely physically, by the double-slit experiment, a physical interaction emerges **between** the shooting light quantum and the receptor. Viewed philosophically, meta-physically and ontologically, the '**Field of Between**' is the [**space-time**], where the things [***A* and *non-A***] enter ***into a relation***.

We may apply this [***A* and *non-A***] in the physical reality for the ontology: There are two beings coming to *actualize a relation* **between** [***A***] and the other [***non-A***]; we may say in ontology and in anthropological philosophy, [**A**] and [***B***]. In this field, a non-verbal communication can emerge between the contents of their consciousness (including parts of unconsciousness), their thinking and their feeling. In the horizon of Buddhist philosophy it is possible to think that both beings or persons, [*A*] and [*B*], don't have a fixed "substantial unity": Of course we can say: "Viewed physiologically, each of them has his own combinations of his DNA, one's own genetic series *un*exchangeable with the other one; each one is an organic 'closed system'"[1]. But in Buddhist philosophy, the burning point is not the *biological* "*a priori*"[2], but really the "*a posteriori*" in the anthropological field of what happens, what emerges in human relations. The main focus is on the empirical factums, if and how far every person / being is able to develop his natural potential (DNA-combinations, atomic construction) to the reality of what he can and what he does. Both persons / beings, [*A*] and [*B*] ([*A* and *non-A*]), accompany their previous experiences (consciously and unconsciously) into the '*Field of Between*'. This end result of the empirical unities of every person and every being cannot be predicted absolutely and also cannot be defined by a "substantiality" of any kind. I shall remark here that my philosophy (stimulated by Buddhist philosophy) is *not* in the horizon of a pure *theoria*. My philosophy works with the main focus on **real experience in the middle of the field of life.**[3] I say that things experienced by a person in a relation or

[1] Okada Y., *Organism, Brain & Actual Beings* (生命、脳、いのち), Tokyo 1999.)

[2] *Not* in the Kantian meaning! Cf. the Original, *Critic of Pure Reason*, "Introduction", B 1 – B 30, A 1 – A 16.

[3] A background of this position is the philosophy of Kyoto School represented by NISHIDA Kitarō (1870 - 1945) in his *Complete Works*, Tokyo 1965, 1979, 2001, Selected Works, Kyoto 1998, 2002. Nishida's system of philosophy includes also the philosophy of science in which human experience in a real world is marked up as a fundamental dimension to build up the theories and the system of his philosophy. In this position the logic is not limited as the formalization to construct a thought, but it expresses the form and principles of real being: Cf. the lecture of NOE K., in: Nishida,

meeting are ***more than*** the things defined by his DNA-combination, subject to physiological and biological facts. The *psychological* situation of a person on a certain day, his emotions, e.g. his nervousness, or his character traits, e.g. his arrogance, etc. are phenomena that cannot be defined as a "substance" in philosophical meaning. These things are in Aristotle's philosophy ***not*** the '***substance***' but something which is *'**accidental**'*. Those particles emerge spontaneously in the **field of communication between** [***A***] and [***non-A***]. They **remain for a short time** and **vanish** at the end of the communication.[1] The '*Field of Between*' is the [**time-space of an interaction**] in which different beings, [*A* and *non-A*], [*B* and *non-B*], enter into relations, engage in verbal and non-verbal interactions during which both of them construct a [**time-space of '*depending relation*' of each other**]. Interaction, reflecting oneself against the existence of the partner, melting and isolating can happen in this '*Field of Between*'. Viewed purely from physics, this '*Field of Between*' is the space-time of the **full *execution of physical interactions*** and their result that can be developed into the next space-time.

In the horizon of interdisciplinary philosophy I would like to define this with the previous terminology, namely the [**intrasystem**] and [**extrasystem**] unities: The ***interaction*** of the ***natural philosophy* and *natural science*** corresponds to the [**repeated reflections, interchanging positions**] in the [**Field of Between**], *between* the unities of [**intrasystem**] and [**extrasystem**].

7. The 'Field of Between' as a Cosmological Principle

In the previous chapters, the 'Field of Between' was presented as an ontological concept in the ***micro-world*** and the ***mezzo-world***. I am of the opinion that this concept is able to take part in a field of ***macro-cosmic space***:

For example, we can consider the ***dynamics of the ocean,*** its ***low tide*** and ***high tide*** (flood)[2]

The water level of an ocean rises if it is in the gravitational field of the moon, exactly, in the additional relation of the [**centrifugal force of the rotation of the earth-moon system**] (around their center of gravity) and the [**gravitation of the moon**], resulting in the high tide. That is, both the nearest regions and the furthermost regions to the moon on the earth have a high tide. On the *intermediate regions between those two regions mentioned before* of the earth, the gravitation of the moon and the centrifugal force of the revolution almost cancel each other: The result is *low*

Selected Works vol. 2, Works of Natural Philosophy and Philosophy of Natural Science, Kyoto 1998, pp. 462.

[1] emerging-staying-vanishing. In Sanskrit: *utpada, stihi, nirodha.* Chines. 生住滅. Nakamura, Classics of Mahayana Buddhism (大乗仏典), vol. 5, Huayan-Sutra, Lankavatra-Sutra (kegon-kyō, ryōga-kyō, 華厳経、楞伽経), Tokyo 2005, pp. 189.

[2] Duden, *Physik*, Mannheim 2001. A thesis from the view of *natural philosophy* to this phenomenon is executed by Hans-Dieter Klein in a deduction of his system theory: "Systemtheorie und Monadologie", in: *Systemtheorie*, ed. by K. Gloy, Bonn 1998, *System der Philosophie*, ed. by H.-D. Klein, Frankfurt a.M. 2003.

tide, while the water of the ocean of the whole earth is pulled up in the high tide regions, during which the water of the ocean on the whole earth remains in the same quantity. Natural science calculates the proportional relations of the [**gravitation of the moon**] and the [**centrifugal force**] due to the rotation of the earth-moon system around their center of gravity, the proportion of the quantity of the high tide to that of the low tide. Viewed from my natural philosophy, the phenomenon of this dynamic process emerges in the [**Field of 'Between'**], in the [**time-space**] ***between*** the [**gravitation of the moon**] and the [**centrifugal force of the earth-moon system rotation**] around their center of gravity.

> And where is the place of *man* as thinking and acting person?
> I say, that man has his [**time-space**] in the [**Field of *Between***],
> the [**time-space *between* the moon and the earth**].

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