

**The Collapse of Objective Reality:  
Quantum Non-Locality and Buddhist Emptiness**

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## Ontological Extremism, a Middle Way, and the Light of the Mind

What is real? Who am I? In Buddhism the *Abhidharma* of the *Sarvastivada* and *Vaibhashika* Schools, along with Democritus, Aristotle and our Greek materialist efflorescence—Metaphysical Realism/Materialism—cling to the pre-modern realist atomist paradigm wherein appearing spacetime reality consists of indivisible atomic matter particles (atomism) that have an ultimately physical, objectively real, permanent, absolute, even eternal existence. This view is the prevailing ontology of 21st century Scientific Materialism: the ultimate nature of reality is only physical. Epistemic access to the mental/spiritual is reduced to physical brain states.

We shall see that these apparently separate atomistic parts abide interdependently in causal relationship with one another within a more inclusive matrix. These interactions are physical, mental and socio-cultural. The simplest parts require relational, then more holistic descriptions of their participation in ever more inclusive holonic part-wholes, ultimately embraced in a unified whole of which the parts are all participating instantiations. Thus, it follows that the parts cannot be separate from the whole. Conceptually, the Particular precedes the General. Alas, generality is innately infected by an annoying cognitive cloud of subjective vagueness. Hence, first arises and descends the involutory gross physical *parts*; then their ascending evolutionary subtler interdependent *relations* and interactions; then, if you're lucky, emerges spooky numinous nondual (subject/object unity) *awareness (noein)* of this boundless whole, primordial ground which perforce subsumes and embraces this gift of multiplicity.

For recent particle physics and cosmology the totemic idol of atomic baryonic matter, our beloved protons and neutrons, is presumed to be *observer-independent*, arising from "empty space" random quantum fluctuations (quantum foam) of the vacuum ground state—quantum zero point energy field (ZPE)—*total energy density* of space ( $\Omega_{\text{tot}} \approx 1$ ). Astoundingly, positive universal mass/energy, minus negative gravitational energy equals a total universe energy of zero! From this quantum zero emptiness potential emerges, ex nihilo, from nothing, what "inflationary hot Big Bang" theorist Alan Guth calls "the ultimate free lunch", physical spacetime cosmos itself. Such realists—physicists or Buddhists—are *essentialists* who believe that reality exists absolutely, just as it appears. Yes, this Big Science meta-narrative is *observer-independent*. Here the clamorous world of spacetime stuff is a procrustean, separate, stridently objective "real world out there" (RWOT), with or without an observing consciousness to behold it.

Relativistic Quantum Field Theory (QFT, QED), with parallel Buddhist Middle Way view and praxis have radically changed all this. Both are *observer-dependent* and *ontologically relative*; in short, "what is" is real not only by way of our senses, but by our linguistic, deep cultural background materialist "web of belief". On this *non-essentialist* view, phenomena exist not absolutely or independently, "from their own side", but interdependently, via a vast web of causal, interconnected relations relative to we observers, and the reifying *concept-belief* biases that enact our realities. Thus do we enter the brave new world of "ontological relativity".

On the realist, monistic materialist/physicalist view, reality as it appears to our senses is a perfect "mirror of nature" (Rorty), a kind of immaculate perception that represents a non-

participative eternal barrier between inherently unitary human consciousness and a separate Platonic RWOT. Here, we and the world are a duality of essentially separate *things*.

This classical Newtonian scientific paradigm, the observer-independent, theory/model-independent, realist/materialist ontology is opposed by Buddhist Middle Way, as we shall see; and by the Indian Idealism of most of the Hindu *Sanatanadharmā*—the hoary Vedas and *Upanashads*. Just so, it is opposed by Buddhist Idealists, the *Yogachara* or “Mind Only” (*chittamatra*) school of Asanga and Vasubandhu. Here phenomena are adventitious, existing only as mental, relational *processes*, not physical/material *objects* of knowledge. There is no knowing, experiencing subject or self, and no object known. There is only *experience* arising from the “mind seeds” of the *alaya vijnana*, substrate “storehouse consciousness” ground which produces a reified illusion (*vidya maya*) that objects and a “self” or ego-I that perceives them are physically, objectively “real”. This idealist view nicely parallels the proto-idealism of quantum non-locality.

The ontology of Metaphysical Realism (a physical RWOT) is also opposed by Western Objective Idealists—Bradley, Royce, McTaggart. Monistic metaphysical Idealism then, broadly construes material reality as unreal (*avidya maya*), a mental apparition or illusion appearing to a perceiving consciousness. Here too, the ultimate nature of reality is mental, or mind.

Metaphysical Dualism, a third ontology, sees reality as being constituted of two distinct substances—one physical, one mental. Since Descartes, such dualism has fallen on hard times (the interaction problem). Yet, Neodualist Panpsychists (everything is/has consciousness), including “hard problem” founder David Chalmers—have energized Philosophical Dualism.

Shakyamuni Buddha told in his seminal *Heart Sutra*: “Form is empty (*stong pa/shunya*); emptiness (*stong pa nyi/shunyata*) is form...all *dharmas* are emptiness...in emptiness there is no form...no ignorance, no end of ignorance...no path, no wisdom, no enlightenment, no non-enlightenment”. Radical emptiness transcends, yet decorously embraces physical/mental form. What shall we make of such radical empiricism? Is it realism; idealism; skepticism? For Middle Way *Madhyamaka*, it's a bit of all three. Spacetime form ( $E = mc^2$ ) is *relatively* real, but not *ultimately* real. We'll see that form arising from its spacious emptiness ground is empty/absent *intrinsic*, absolute, permanent self-existence. Yet it's “real” enough to embrace causality—cause and effect, karma—and relative-conventional spacetime relation. Healthy skepticism?

Well, ontologically speaking, what *is* real? Buddha asks us to “abide by means of *Prajnaparamita*”, the “perfection of wisdom”, this bright indwelling wisdom *presence* of boundless whole that is emptiness—our already present primordial awareness wisdom—and thereby “fully awaken to unsurpassed, true, complete enlightenment”. And yes, it takes a bit of trans-rational mindfulness practice to understand the prior and present unity of this Middle Way “Two Truths”—relative and ultimate—as utterly empty of self or essence; or as Nagarjuna told, without “a shred of inherent existence”. Thus does this Buddhist “no-self” Two Truths dominant trope reveal the subtle, compelling *logic of the trans-conceptual*, our wisdom in a minor key.

*Therefore, for perspectival, nonlocal realist Middle Way Madhyamaka spacetime phenomena do indeed exist nominally, relatively, conventionally; just not inherently, absolutely or ultimately.* This

great gift of a really real objective reality is the gift of the *Madhyamaka* view, a subtle centrist balance between the ontic extremes that are the non-existence/nihilism of Metaphysical Idealism, and the naive existence/permanence/self of Metaphysical Realism/Materialism.

Kant's robust Transcendental Subjective Idealism—a duality of nominally real, objective "phenomena" with subjective, ineffable, conceptually transcendent "noumena"—parallels *Madhyamaka Prasangika's* Two Truths duality, objective Relative and subjective Ultimate, the pragmatic Middle Way view of Nagarjuna and Chandrakirti. Further, Kant's centrist *Critique of Pure Reason* (1781) portends the Post-modern critique of Modernity's valorization of reason.

Again, on the anti-essentialist view, reality appears not observer-independently, but interdependently (Buddha's "Dependent Arising", *pratitya samutpada*). Spacetime form is ontologically relative and observer-dependent: our appearing realities supervene, or are dependent upon our conceptual, linguistic deep cultural background "web of belief" (Quine 1969).

Is such a middle way unity of these Two Truths—relative *form* and ultimate *emptiness*—contemplatively realizable? Is there a centrist Path that bestrides our competing knowledge paradigms (exemplars), the epistemic extremes of descending, realist, atomist/materialist, objective science (form), and the ascending idealism of subjective spirituality (emptiness)?

*Yes. Between these two philosophical extremes—the local realist/materialist reification of a permanent, absolute, substantial, independently existing physical and mental phenomenal reality "out there", and an idealist nihilist negation of it—abides the mean that is the great Prasangika synthesis, the centrist, Nalanda Buddhist Middle Way Consequence School (HH The Dalai Lama 2009).*

*Madhyamaka Prasangika* is the foundation, on the accord of Longchen Rabjam (2007), and HH The Dalai Lama (2009), of the nondual view and praxis of Vajrayana Buddhist Nyingma School's *Dzogchen*, the Great Completion—that acausal, trans-conceptual "correction" or "completion" of the inherent duality of these Two Truths of Middle Way *Prasangika*, and indeed of the entire great Buddhist Mahayana Causal Vehicle (Klein 2006; Boaz 2015 a).

*Dzogchen* exegesis reveals a centrist *Prasangika* synthesis of the Two Truths, relative/ultimate, with an optimistic, freeing soteriology—a nondual (*advaya*, "not one, not two") view and practice for an expedited human liberation/enlightenment—happiness itself; the happiness that cannot be lost. We cannot *become* happy/enlightened in some future; but we can *be* happy here now. As 2nd century *Dzogchen/Ati Yoga* founder Garab Dorje told, "It is already accomplished from the very beginning", deep within us. *Ultimate Truth Great Completion, our original innate, innermost clear light wisdom awareness—Buddha mind—is always already present! We practice being present to presence of That.* Such is the "epistemology of presence" (Klein 2006).

Recent cosmology's tautological, but non-trivial Anthropic Principle, in contradistinction to the Copernican Principle, restricts possible physical ground states to those that can support life (environmental selection). Our quite unlikely universe with its preposterously fine-tuned physical constants exists that numinous *kosmos*—consciousness itself, primordial source/ground in which this all arises—may evolve to self-reflexively (*rang rig*) know itself. The Strong Cosmological Anthropic Principle of Barrow and Tipler—with the *Dzogchen* view—suggest that a contemplative, noetic (unified subject-object, body/mind/spirit) knowledge of this unbounded *kosmic* whole, home of our merely physical cosmos, is required

for the fruition of human realization of this great process, this "unity of awareness and emptiness".

On the accord of Buddhist Vajrayana epistemology, this perfect understanding is our primordial wisdom Buddha mind (*samatajnana*), the nondual Great Completion that is perfect sphere of *Dzogchen*. Indeed, this is the very *nature of mind*, vast "supreme source" in which, or in whom our relative-conventional realities arise and participate. And on this view, That (*tat*) is who we actually are, our "supreme identity". Heady wine indeed to dualistic concept-mind, ensnared as it is in William Blake's "mind-forged manacles"—our materialist ideological grail quest for absolute *objective* certainty. Do we not limit ourselves most by clinging to, and defense of our closely held web of belief, this veiled dimension of "concealer truths" (*samvriti satya*)? Yet, wonder of wonders, there remains this selfless, splendid sky-like light of mind nature, always present throughout all our cognitive states, objective, subjective and nondual.

### On Knowing What There Is: Buddhist Emptiness

The question of ontology is not whether things exist. Of course things exist! The proper ontic question is, *how* (not why) do things exist? "Everything that exists lacks an intrinsic nature or identity" asserts Alan Wallace (2003) explicating Nagarjuna's great *Mulamadhyamaka karika* with its selfless, centrist *Prasangika* ontology. The appearance of objects arising from basal primordial emptiness ground (the *trikaya* of the base, *dharmakaya*, *dharmadhatu*, *mahabindu*) are causally, interdependently related, that is to say, their reality is dependent upon other related events and processes in a vast, even infinite matrix of such "prior causes and conditions."

For *Prasangika*, because phenomena arise in dependence upon these prior causes and conditions (*pratitya samutpada*), they can have no *essential* existence of their own; yet they exist relatively, conventionally. So things are empty. Empty of what? Empty or absent any *intrinsic* permanent self-identity or self-existence (*svabhava*). Existence of an essential, enduring, permanent self (*atman*) is utterly absent (no-self/*anatman*). Selves, things, all "production" are impermanent (*anitya*). Even emptiness is empty of intrinsic existence—thus the "emptiness of emptiness". It's not a particular; not a universal. There is no ontological ground. The conceptual dichotomy of existence/non-existence is a false dichotomy. "Non-existence" signifies absence of both existence and non-existence. This is the ultimate understanding—nondual "wisdom of emptiness"—liberation from the suffering of conditional existence. How do we do this?

Ultimate Truth—primordial wisdom of emptiness is accomplished only by way of Relative Truth—dualistic practice of the Path to liberation from suffering, "full *bodhi*", awakening of "complete enlightenment". Discursive concepts and beliefs *about* the Path are provisional, yet contain great pragmatic value. These Two Truths are conceived and expressed as a duality, yet in the ultimate sphere of *Dzogchen*, beyond belief, they are a prior and present unity. The nature of the relative is the nature of the ultimate. *Bodhi* is wisdom realizing this truth. In due course, and by grace, the incredulity and confusion of this Path become the Wisdom Deep.

In *Dzogchen* view and praxis the primordial wisdom presence (*vidya*, *rigpa*, *epinoia*) of the ground, our already present Buddha nature (*tathagatagarbha*) abides always at the heart



(*hridyam*) of the human being. Jesus told, "What you seek is already present, yet you do not see it". For Chan master Hui Neng, "Wonder of wonders, all beings are Buddha". Perhaps we are not yet fully awakened Buddhas, but the actual *nature of mind* is our always present Buddha mind (*samatajnana*), "already accomplished from the very beginning" (Garab Dorje). It is *that* to which we awaken from our slumber of ignorance (*avidya*). Why won't we do this?

The ontologizing urge of human discursive mind recursively conceptually imputes, designates, then reifies/objectifies its arising appearances/experiences—gross and subtle—into independent, objectively "real" physical/mental spacetime existent realities of a permanent self/ego-I acting in an emblematic RWOT, all constrained by our atavistic, pre-conscious cultural concept-belief reticulum. Thus arises what Quine (1969) terms our semiotic (syntax, semantics, pragmatics) socio-cultural "web of belief". This concept-belief system is, on the Buddhist view, based in the ignorance (*avidya*, *ajnana*, *marigpa*, *hamartia/sin*) that causes the selfish, adventitious afflictive emotions—fear, anger, greed, pride—that cause suffering. What to do?

## Human Happiness

With a bit of mindfulness practice (*shamatha/vipashyana*)—"the quiescent basis for peace and all higher knowledge"—we train the "wild horse of the mind" to *choose* positive mental/emotional states. We learn to awaken to the original noetic purity of our primordial awareness ground of being as it arises unbidden, then spontaneously displays through our ordinary, "primordially pure" direct perception, prior to conceptual elaboration and judgment. So it is, happiness is fundamentally a skill set. Here, naturally, effortlessly arises our *bodhicitta*, the intention/action to benefit all beings. For Mahayana, such a lifestyle results in liberation from suffering, and is the very cause of human happiness, both relative—the human flourishing of *eudaemonia*, *felicitas*—and the ultimate/spiritual happiness of *mahasuka*, *paramananda*, *beatitudo*.

We live in these two worlds—relative and ultimate—at once! Is not our soteriological happiness imperative the recognition, realization, then compassionate expression of the prior and present unity of these, our two human faces? To conceptually reduce numinous nondual Ultimate Truth to dualistic Relative-Conventional Truth, or not to reduce, that is the urgent question of liberated human awareness, and of scientific reductionism. This is the yoga. Hence verily, from the epistemology you choose, arises the metaphysical ontology you deserve.

## The Two Truths are Dōgen's Being-Time

Dōgen Zenji, Japan's greatest Zen master, spoke of the emerging dimension of relative time and its phenomenal contents—the spacetime dimension of Relative Truth (*samvriti satya*)—as "a being-time moment flashing into existence" from vast spacious expanse of non-logocentric boundlessness (*shunyata*), clear light of our basal primordial ground state. This base is merely nondual ultimate reality-being-itself—the all-embracing dimension of Ultimate Truth (*paramartha satya*). We cognitively ambulate in the unity of these Two Truth dimensions.

Dōgen's *Ugi*, or Being-Time is the nondual *presence* of this unity of being and time. To be is to be impermanent (*anitya*), yet to have a past and a future. To be is to be present now to this *present unity* of Buddhist *Madhyamaka* Two Truths, with its "three times"—past, present, future. Subject/object duality is dropped. Through such awakening we see, not some greater reality ground beyond time, but the great perfection of all arising within it, here and now.

For Dōgen's subtle panpsychic Zen mind—and for Padmasambhava—this eternally present *now* exists for us only *relative* to a past and a future. Being-Time/*Ugi* is a simultaneous array of all three. Thus, we live in a single vanishing instant now. Yet, this precious moment now derives its meaning from the inter-subjective context of a personal, and even collective past and future. This momentous moment now is so significant because all of our past and future are interdependently, causally enfolded within it, while simultaneously unfolding in the timeless continuum of this ever present now. Yes, we live in the moment, but not only in the moment. To live only in the moment now, without awareness of past and future—karma—is to "make our life meaningless". Not to live in this moment now, is "to lose reality itself". Relatively, time/change is objectively real; ultimately, time is subjective and illusory (Boaz 2015 a).

Philosophers of physics and cosmology, if not always physicists and cosmologists, are now discovering a post-eternalist (physics' block universe) Buddhist presentism (only *now* is real) in Dōgen's syncretic view of the unity of objective form/time and subjective emptiness. Self-reflexive "*open presence*" of that unbounded whole, reality itself, is the very *nature of mind*.

Dōgen's great insight is this: prior to the superimposition (*vikshepa*) of dualistic conceptual cognition—the separate self—ordinary direct perception bestows our inherent (*sahaja*), immediate, "primordially pure" clear light mind nature, ultimate ground substrate of relative-conventional experience. In *Dzogchen* "bare attention" of basal "naked awareness", this "space between two thoughts"—an instant prior to subject/object split with its conceptual imputation/reification—abides trans-rational noetic reality itself. This pristine clear light awareness opens into primordial wisdom ground (*gzhi rigpa*)—"open presence" of *that*. Buddha told, all that arises is "perfect as it is", "primordially pure" from the very beginning. Thus our original contemplative injunction: train your mind to be fully present to *that*.

Immediate perception, an instant prior to conception, is pure unadorned immaculate perception. And we all do this with every breath (*prana*)! Wonder of wonders, we are all "primordially awakened" (*bodhi*, *vidya*) to this always "already accomplished" innate and perfect clear light mind; our selfless Buddha mind. The rub? We must recognize, then awaken (*bodhi*) to this perfectly subjective Ultimate Truth. How do we do this? We consult the experts, the masters, and follow their wisdom injunctions, of course. HH The Dalai Lama (2009) told it, "The clear light mind which lies dormant in human beings is the great hope of humankind".

For Dōgen, there is always, through all of our cognitive states—perceptual, conceptual, emotional, and trans-conceptual contemplative—an ontic prior unity of past, present, future, already being here now. Once again, we must learn to be present to the in-dwelling, nondual noetic *presence of that*, by whatever name. Contemplative mindfulness practice is a beginning.

Dōgen asked his Chinese master Ju ching, "If there is no self, who is it, this ever present Buddha mind that I am?" Said the master, "To understand, drop body and mind". When

Dōgen had dropped body and mind, the master spoke, "Body and mind have dropped. Now drop dropping". Dōgen understood, and prostrated. Said the master, "Now that's dropping dropped." Who is it? All is Buddha mind; ever free of any *essential*, permanent self-nature.

We cannot *become* Buddha mind. We are already Buddha mind! Seeking happiness is a kind of unhappiness. Happiness is not the goal. Compassionate *bodhicitta* is not the goal. Thus we make this very Path our goal. Buddha told, "Don't believe what I teach; just come and see".

## Toward a Centrist Noetic Science of Matter Mind and Spirit

Value-free science? Science's "fact/value" dichotomy is a misleading modernity myth. Science is quantitative *and* qualitative. The "qualitative" —judgment— is active, yet suppressed in scientific praxis. So let us shamelessly recognize and strategically develop this brave new world of our post-ideological, ontologically relative qualitative dimension in science.

*What is now urgently required is a new Wissenschaft; a "post-empirical", post-ideological integral noetic ontology, with a centrist epistemology and first-person methodologies that explore our experience of this trans-rational, yet contemplatively knowable subjective ultimate or universal post-quantum reality matrix, this original emptiness base, our "groundless ground".* This reflexive primordial awareness wisdom base (*gzhi rigpa, vidya, gnosis*)—"fundamental innate mind of clear light"—is known to our wisdom traditions as perfectly subjective great *kosmic* whole, our "supreme source" in whom relative spacetime cosmic particulars—energy, mass, force, charge, waves, particles, fields and people—arise and participate. How shall we understand this?

Mereologically, wholes and their parts are interdependently related. The prior ontic unity that is this vast unbounded whole—this perfect sphere of *Dzogchen*—transcends yet embraces its parts, while the nested holonic parts perforce participate in the whole. *From the dualistic view of Relative Truth, part and whole are separate. From the nondual view of Ultimate Truth, part and whole are not essentially separate but a prior and present unity, one truth, invariant through all cognitive states—objective exoteric, subjective esoteric, pre-conscious, supra-conscious and nondual.*

This view is, to the savants of the *culture imaginaire* of "normal science", experimentally remote. Clearly, such an integral noetic science requires a methodological "post-empirical" relaxing of the *a priori* knowledge taboo of our obsessively objective positivist view and praxis of classical (non-quantum) Scientific Realism/Materialism. Such a Kuhnian scientific revolution is now upon us. I have here and elsewhere referred to this seismic paradigm shift—our new wisdom meta-narrative—as the noetic revolution in matter, mind and spirit (Boaz 2015 a).

The physical, basal quantum vacuum ground energy—dark energy, Einstein's cosmological constant  $\lambda$  ( $\Lambda$ ) of quantum cosmology—with parallel Buddhist primordial emptiness ground (*shunyata/dharmakaya*) in which this vast energy vacuum arises, provides a holistic basis for the arising rapprochement of objective Science with subjective Spirit. Objective and subjective: these two dimensions of mind—our noetic doublet—are the two voices of unified human cognition. Such an integral psychology requires noetic contemplative research methodologies that utilize both quantitative objective third person data sets, and qualitative subjective first person reports: introspective personal, transpersonal, contemplative (Boaz 2015 a).

In 1928 English physicist Paul Dirac derived a relativistic wave equation, the prodigious Dirac Equation, which reconciled Einstein's Special Relativity Theory (SRT) with Bohr's and Heisenberg's matrix mechanics, predicted antimatter, and won its creator a Nobel Prize (1933).

The result of this sublime equation was Relativistic Quantum Field Theory (QFT), the quantum logical formalism for fabrication of quantum mechanical models to describe interactions of hitherto *physical* spacetime located subatomic particles, and their trans-physical fields. Holistic QFT moved quantum mechanics from a particle ontology to a field ontology resulting in the computer, the laser, and the bomb. The two forces of the Standard Model—unified electroweak and strong nuclear (gravity is post-SM)—abide within the mathematical formalism of QFT. Physical particles are now subsumed by the ontic priority of the quantum field. Matter/mass becomes participation of excited particle states in a new reality of the dynamical zero-mass quantum field. Particles are now but theory-laden factoids embedded in a greater reality.

### The Collapse of Objectivity: Non-Locality is Quantum Emptiness

"The essential fact of quantum mechanics is entanglement" (Leonard Susskind). It was this "lucid mysticism" (Pauli) of QFT with its holistic quantum entanglement—Einstein's "spooky action at a distance"—that begat the catastrophic violation of the essentialist scientific realist *principle of locality*: no signal or information between "space-like separated" particles can exceed Einstein's light speed limit; yet superluminal speed seems required for one entangled particle in a two part quantum system to instantly "know" the spin state of the other particle, even when separated by many light years. Enter, the "spooky" antirealist *principle of nonlocality*.

At this inherently vexed nonlocal substrate, the zero point energy field vacuum ground state (ZPE), subject and object merge. There are no "substantial" points/objects, but rather a continuous Heraclitean flux of structural *relations*. Cosmos is process, not things. Things are but Hume's inferred "bundles of properties", mass, charge, spin. ZPE pervades the quantum continuum hence wave/particle *processes* are embedded in and subsumed by this whole. Only the whole has properties. Particles are conceptual confabulations, not objective realities. Atomistic ontology breaks down. *Relationship* is all there is. Indeed, for *habitués* of this fuzzy quantum realm, an "affrighted and confounded" (Hume) collapse of objective reality, of a RWOT.

The "unfolding explicate order" of wave-particle parts is for David Bohm (1980) always "enfolded" in his "implicate order" of the great holographic "holomovement" continuum, the "vast unbroken whole" itself. For Bohm it is misleading to speak of observer-independent separate "parts". He prefers the untidy epithet "relatively independent subtotalities". Here, QFT fields are not real objective *things*, but subjective *relations*. Bohm's "implicate order of the whole" helps us to understand the intrinsic connectedness of our above two entangled particles, without exceeding Einstein's light speed limit. How? Separate relativistic particles are *ultimately* embedded in the whole. As are we. Might such Realism obsequies be premature?

Bohm and his mentor Einstein were "hidden variables" realists. Both believed quantum theory incomplete; but Bohm retained non-locality. We need undiscovered hidden variables to explain all this. Hidden variables theory is now refuted. Physical spacetime locality has been

tested many times and found wanting. The definitive work consists of John Bell's "inequalities" (1965); then Alain Aspect's proof of Bell's inequalities (1982). All have demonstrated the truth of non-locality. Ronald Hanson (2015 arXiv.org) has finally closed the "locality loophole".

Einstein's 1905 SRT opposed Newton's substance view of spacetime, the *physical* foundational ground of appearing reality. Einstein inveighed for a non-substantial, relational, atemporal spacetime. Yet his inner realist 1916 GRT curved spacetime geometry ( $T_{ij}$ ) seems to commit him to a substance view. And he rejected quantum non-locality to the very end. The bad news for any local realist ontology? *Quantum entanglement/nonlocality means the end of our beloved metaphysic of foundational, local, objective Scientific Realism*. Must 2400 years of Platonic Realism—a physical, observer/model-independent separate RWOT—now be relegated to the ontological trash bin of history? It seems so. Objectivity, causality, even spacetime are *kaput!*

This quantum quandary—quantum emptiness—has shaken the very foundations of classical deductive logic, to wit, Aristotle's Law of Excluded Middle: "either A or not-A"; for any proposition, *either* that proposition is true, *or* its negation is true. Upon this logical bedrock we base our objective atomistic treatment of elementary particle discreteness, countability and physical identity. Scientific Realism, with "common sense realism" (Russell's "metaphysics of the stone age") are no longer tenable. *Either* spacetime reality exists; *or* it does not. If quantum non-locality obtains, then spacetime reality does not. Could be bad for the economy.

Perhaps then, we should dump this learned bivalent Western logical canon for a contradiction-tolerant trivalent (3VL) deductive logic that accesses the subtle precision and depth of the contemplative *Dzogchen* "logic of the non-conceptual" (Kline 2006). Indeed, there's a lot of reality between true and false. Such multi-valued paraconsistent logics, including Indian *Nyaya* with its five axioms, surpass Aristotle's "Three Laws of Thought". Further, the Logical Intuitionism of Brouwer denies altogether the validity of excluded middle. In any case, there are more things in heaven and earth than are dreamt of in our course objectivist philosophies.

## Much Ado About Nearly Nothing

With the demise of our spacetime foundational background—the physical space/place where stuff happens—goes pernicious Scientific Imperialism: doctrinal Realism/Materialism that has colonized the Western mind. The "naturalness problem": cosmologists admit that 96 percent of physical cosmos is metaphysical—spooky, utterly ineffable dark matter and dark energy. Merely 4 percent of cosmos is physically "real" atomic matter! The mechanistic cognitive architecture for local realism and monistic materialism has been blown asunder! The ontic seed for a centrist metaphysic—perhaps a *Dzogchen*/quantum emptiness proto-idealist panpsychism—has been sown. A Kuhnian paradigm busting shock to four centuries of Baconian/Cartesian Modernity, to be sure. "All that can be shaken shall be shaken" (Dōgen Zinji).

In the beginning was the universal wave function  $\Psi$ , cosmos itself. Eugene Wigner's "consciousness causes collapse" of the indeterminate superposed probability states of Schrödinger's non-physical  $\hat{H}\Psi$  into physical, objective, determinant eigenstates seems required.

That a conscious observer is requisite is the prodigious "quantum measurement problem". Who is it, this observer before conscious beings evolve to observe and measure *things*? Theists use the *concept* of a theistic creator God observing His separate creation. Non-theists find such dualism troubling. The notion "observer" presumes a *relative* duality of an observer, and something else observed. Yet, from a nondual *ultimate* view there is no observer and no *thing* observed—no subject/object split. The yogi contemplatively surrenders such adventitious duality. From a trans-conceptual nondual wisdom view *primordial awareness*—boundless whole, consciousness-being-itself (in which possible conscious beings are self-reflexively instantiated)—*is* the observer. Here there is no "observer problem". The cognitive coupling of observing subject with its apprehended object is a prior yet present nondual ontological unity.

Physics' Promethean epistemic challenge is this: that greatest of human intellectual achievements, the Standard Model of particles and forces with its Concordance  $\Lambda$ CDM Cosmology, still strains against its intrinsic quantum uncertainty, clinging to the orthodox classical paradigm metaphysic—the deterministic Scientific Realism of a bygone Newtonian cosmos.

Again, the furniture of this "inflationary hot Big Bang universe" is presumed to be observer-independent, objectively real physical objects existing in a causal, local spacetime reality. "Locality" is place, spacetime location, physical support/ground state for arising stuff. Subtle non-locality transcends, yet embraces this foundational background. Indeed, apparitional material spacetime cosmos naturally *emerges* from non-spatiotemporal *kosmos*, a more fundamental ontic substrate (*alaya vijñana*), spacetime's primordial matrix base (*gzhi rigpa*) ontologically prior even to the zero point energy vacuum ground (ZPE) continuously arising herein.

## The Limit of Scientific Method

Scientific theory and ideology evolve in historical time. Scientific theories "true" 100 years ago are history. Just so, Newton's G has evolved into Einstein's curved spacetime; venerable Standard Model QFT, and classical GRT, the two great pillars of physics are incomplete and incommensurable. Science is not so much *truth* as it is informed cultural historical opinion.

The nature of "scientific method"—its epistemic process—is inherently *inductive* and inferential. And the very foundational axioms of its *deductive* mathematics, logic and geometries are unproven, unprovable assumptions. The reach of pure reason is here exceeded. The *ultimate* nature of reality runs deeper than our rational web of concept/belief—deductive and inductive—can penetrate. Objective explanation bottoms out where subjective, contemplative, radically empirical experience/knowledge begins. The spirit of Hume resounds: scientific knowledge has always been, and shall ever remain inferential, provisional and uncertain.

Our 20th century knowledge crisis, the collapse of objective reality that resulted from Lobachevsky's non-Euclidian geometry, Heisenberg's uncertainty relations, Quine's ontological relativity, the Gödel/Rosser Incompleteness Theorems, and Russell's Paradox has demonstrated this truth about scientific truth for over a century. Let us not expect objective certainty from science when its explanatory ambit precludes it. Scientific knowledge is conceptual and *relative*. It must not presume an *ultimate* ontology, to wit, a separate, observer/model-

independent, merely objective RWOT. Nor can it produce an *ultimate* explanatory "theory of everything" (TOE) as to the atomistic forces/interactions of such a world (Boaz 2015a).

Let us then surrender (*wu wei*), in fear and trembling, our ideological dreams of a mathematically certain, *uber*-reductionist TOE, a perfectly inclusive *objective* final theory of everything—of gravity and the two SM forces—that we may proceed with our inchoate pragmatic centrist view (Boaz, "Is a Theory of Everything Logically Possible", blog, davidpaulboaz.org)

Kuhnian quantum scientific revolution or no, what has not changed much is four centuries of science's deep background cultural zeitgeist, namely, foundational Platonic Metaphysical Realism, nor Realism's ontic handmaid, monistic Scientific Materialism/Physicalism. Notable historical exceptions to this unwholesome furtherance may be our antirealist, ontological relativity champions—Dōgen, Leibnitz, Nietzsche, Bohr, von Neumann, Gödel, Quine, Wheeler, Wigner, Kuhn, Barbour. The great gravitational physicist John Wheeler's elegy to Scientific Realism: "The universe does not exist 'out there', independent of us. We are inescapably involved in bringing about that which appears to be happening". Again, the problem and opportunity of consciousness. After all, it takes an observing consciousness to "collapse the quantum wave function" and reveal our really real objective realities, "out there". Or does it?

There is much vertiginous conjecture as to the many ontological interpretations of QFT. For Nick Herbert (1985) there are 21. There is no outbreak of agreement as to the correct one. The prevailing view is the instrumentalist Copenhagen Interpretation of Bohr and Heisenberg. Viable alternatives include the Many Worlds Interpretation, the Bohm/deBroglie Pilot Wave, Ontic Structural Realism and Fuch's and Cave's QBism or Quantum Bayesianism (Boaz 2015b).

*Clearly, this lack of a settled post-quantum ontology—realist or antirealist—is arresting growth of post-Standard Model physics.* QFT/QED must get its hermeneutic house in order if it is to buttress superstrings, or super-symmetry, or other quantized gravity theory—that grand desideratum that is the unification of Einstein's vast gravity realm with Bohr's quantum realm of the very small. Large scale structure of physical cosmos—universe or multiverse—is determined at the tiniest quantum scales. Matter—cold dark or hot visible—has both quantum *and* gravitational fields. Physical reality is both quantum and gravitational in nature—the quantum in the cosmic. The Big Bang regime is described by QFT; black hole entropy, the pre-bang multiverse and fate of large structure, including us, is the realm of GRT. Epistemic unification of these two incomplete pillars of physics/cosmology awaits a propitious quantum ontology.

Bohm's "implicate order of the vast unbroken whole" (cosmos) is, prior to concept/belief, an ontic unity. In Buddhist Vajrayana's tantric gloss this unbounded whole is prior and present unity of appearance (form) and its emptiness ground. The epistemic Two Truths of our wisdom traditions—Ultimate Truth, and spacetime form or Relative Truth arising herein—are ever this primordial nondual *one truth*, numinous whole itself (fundamental *kosmos*). Therefore, let physicists, cosmologists and their philosophers engage Buddhist philosophy.

## Gravity Behaving Badly: Problem and Opportunity

Gravity—Wheeler's mystical "Great Smokey Dragon"—is the entropic creator and destroyer of worlds. What/who is it? With any cognitive challenge there is a consciousness procession of at least three inherent levels of understanding: 1) exoteric objective; 2) esoteric subjective; 3) contemplative innermost esoteric/nondual. These three are present to human cognition as an epistemic unity. Let us now consider this method in a brief note on great gravity.

As to our exoteric and esoteric understanding, Roger Penrose, at the end of his noble epic, *The Road To Reality*, poignantly laments this profound gravity mystery: "Our theories are powerless to describe it...we shall need...a radical conceptual renewal...a subtle change in perspective—something that we all have missed" (Penrose 2004, p. 1045).

Perhaps what "we all have missed" through our metaphysical presumption that is the merely exoteric objectivist, observer-independent realist-materialist knowledge paradigm—with its "taboo of subjectivity"—is the "radical conceptual renewal" provided by our inchoate, centrist, ontologically relative, observer-dependent middle way epistemology and ontology of "post-empirical" physics. This 21st century scientific and cultural revolution is well under way.

Is this not what the subjective indeterminacy of the uncertainty relations of quantum theory has pointed to all along? Does not data interpretation require an observer-dependent, ontologically relative unifying middle way to tame the wild horse of dualistic, materialist concept-mind with its unruly infinities? Thus do we strike a cognitive balance between the objective and subjective voices of our human nature and knowledge. Perhaps the final purpose of pragmatic, instrumental scientific *knowledge* is not mere exoteric, atomistic objective facts about a separate RWOT, but rather, a relational, holistic, subjective innermost, even nondual *wisdom understanding* of our interdependent self-reflexive participation in this vast unbounded whole. We've seen that this requires Dōgen's *shoshin*—Socratic aporia of belief—our innate, open "beginner's mind". This "poetry begins in delight, and ends in wisdom" (Sir Philip Sidney).

"A billion stars spin through the night,/ blazing high above your head./ Deep within us is the presence that will be,/ when all the stars are dead". —Rainer Maria Rilke

## A Noetic Pause

Our titular concern: with the collapse of objective reality, what *is* real? Who am *I*? We've seen that our venerable *quantitative* Standard Model of particle fields and forces, with its two incommensurate, incomplete epistemic pillars—Quantum Field Theory and General Relativity Theory—is in process of a post-empirical, Kuhnian knowledge paradigm shift. Let us view this incipient scientific/cultural revolution by the lights of the *qualitative* methodological enrichment of pragmatic Buddhist *Prasangika/Dzogchen* ontology, epistemology and psychology.

Does not this all point toward a providential coming to meet of pre-modern East and modern/post-modern West through this auspicious 21st century epistemic colloquy of Buddhist philosophy with recent physics and cosmology; and through this, a gradual rapprochement of complementary objective Science and subjective Spirit? Such a unified objective/subjective view—with its new science of consciousness, and its numinous post-ideological soteriology—presents a propitious opening for the integral noetic science of matter, mind and



spirit that is both origin and aim of our emerging Noetic Revolution; and the compassionate, healing wisdom that abides herein. It's like coming home. Let it be so.

Excerpted in part from my forthcoming book, *The Noetic Revolution: Toward an Integral Science of Matter, Mind and Spirit*, 2017, [www.davidpaulboaz.org](http://www.davidpaulboaz.org)

### Bibliography

Boaz, David Paul. 2015 a. *The Noetic Revolution: Toward an Integral Science of Matter, Mind and Spirit* (manuscript). [www.davidpaulboaz.org](http://www.davidpaulboaz.org).

\_\_\_\_\_. 2015 b. *Being and Time: Toward a Post-Standard Model Noetic Reality* (manuscript). [www.davidpaulboaz.org](http://www.davidpaulboaz.org).

Bohm, David. 1980, 1983. *Wholeness and the Implicate Order*. New York: Ark

Dōgen Zenji. *Shobogenzo*. 1986. Thomas Cleary. Honolulu: University of Hawaii Press.

Hawking, Stephen. 2010. *The Grand Design*. New York: Bantam.

Herbert, Nick. 1985. *Quantum Reality*. New York: Anchor Press.

H.H. The Dalai Lama. 2009. *The Middle Way*. New York: Wisdom Publications.

\_\_\_\_\_. 2005. *The Essence of the Heart Sutra*. Boston: Wisdom Publications.

Klein, Anne C., Tenzin Wangyal. 2006. *Unbounded Wholeness*. New York: Oxford Press.

Longchen Rabjam. H.H. The Dalai Lama. 2007. *Mind in Comfort and Ease (Samten ngalso)*. Translated by M. Ricard and R. Barron. Boston: Wisdom Publications.

Penrose, Roger. 2004. *The Road to Reality*. New York: Vintage Books.

Quine, W.V.O. 1969. *Ontological Relativity and Other Essays*. New York.

Wallace, B. Alan. 2003. *Buddhism and Science*. New York: Columbia University Press.

\_\_\_\_\_. 2012. *Meditations of a Buddhist Skeptic*. New York: Columbia Press.

Wald, Robert M. *General Relativity*. 1984. Chicago: University of Chicago Press.