

Quantum Emptiness and Buddhist Impermanence

Whenever we try to pick out something by itself,
we find it hitched to everything else in the universe.

—John Muir

All the buddhas, and most quantum cosmologists agree, in the fullness of time all physical and mental forms shall pass away into primordial quantum/*buddic* emptiness; then arise again in a never ending cycle of countless, timeless eons. Physical and mental cosmic form *relatively* arising from the nondual (subject-object unity) *ultimate* aboriginal *Kosmic* whole (*dharmadhatu*) of its emptiness/*shunyata* ground is inherently impermanent (*anitya*), and utterly absent and empty (*shunya*) of any intrinsic, ultimate existence. Yet, in this spacetime relative conventional world the all-pervasive suffering of living beings exists. What shall be our response?

It is luminous non-conceptual primordial awareness Presence of that great whole in whom we and all of this arises and abides that is metacognitively, reflexively instantiated in human cognizance, always already present at the Heart (hridaya) of the human being-by whatever name or concept. Nondual contemplative meditative practice of the Path makes it so-makes it real. All of the love-wisdom masters of the three times-past, present, future-have told it: awakening to this intimate, indwelling Presence is the cause of altruistic bodhicitta conduct the primary cause of human happiness,

As to Buddhist impermanence (*anitya*), human and other beings upon the earth shall pass. Our precious Mother Earth shall pass. Our solar system and our home galaxy, the Milky Way shall, in due course, merge cataclysmically with our sister galaxy Andromeda. Many solar systems will perish. The great galaxy super-cluster in which this new galaxy abides shall as well pass away. The physical and mental universe itself, and indeed all of the universes of the endless, infinite cyclic multiverse shall all expand into quantum/*buddic* emptiness and quite naturally cease to exist, as matter energy entropy thermodynamically peters out-in this universe of ours in a "Big Chill" heat death. All energy-motion is here *kaput!* Understanding that dark truth, there is nothing solid in heaven nor in earth to which living beings may cling. That is the impermanence of quantum suffering writ large!

But wait! We've already seen that the buddhas and recent quantum cosmology have both told that from the emptiness of the vast expanse of nearly empty space, and the zero motion of seemingly random non-physical "zero point energy" (ZPE) quantum vacuum field fluctuations similar to "partless space particles" of Buddhist *Abidharma*-spontaneously arise proto-matter as new form. Hope for spacetime stuff springs eternal!

Well, what does "quantum zero point energy" mean? The total energy density of this universe equals zero because the total mass of the universe is positively charged; and the total gravity of the universe is negatively charged. The positive charged mass exactly, cancels the

negative charged gravity, equaling zero energy density. Therefore, the total energy of this universe is zero. Sounds almost mystical; a conclusion resisted by both Buddhism and physics.

This endless process of the arising of physical form from its primordial quantum/*buddic* emptiness zero ground state is a continuity (the meaning of tantra) of infinite gravitational attraction and repulsion. Great gravity is thus, in the gloss of the Hindu *Bhagavad Gita*, the awful "creator and destroyer of worlds".

According to quantum pioneer Werner Heisenberg's Principle of Uncertainty, all matter particle fields, and every point in space undergoes random quantum fluctuations, even in its zero point energy "ground state". From this virtual ground, sooner or later new matter/mass will fluctuate into existence. There is an eternity in which this happens; brief moments, many times.

Einstein's equivalence of mass and energy, described by his illustrious Special Relativity Theory (SRT) equation $E = mc^2$, means that any zero point in space that has quantum energy potential has mass. So, every point in space has potential mass to spontaneously give rise to quantum fluctuations of new "virtual particles" of physical form. From such an ostensibly uncaused random event springs new inflationary universes, new inflationary Big Bang singularities—spacetime form arising *ex nihilo*, from nothing, from quantum/*buddic* emptiness, an infinity of universe occurrences—a multiverse, endlessly and forever arising and passing away—all of this explicate order subsumed and embraced in the nondual infinite, implicate order of the whole.

Thus, there is virtual motion/form inherent even in zero point emptiness; even at the zero atomic/molecular motion of absolute zero, at the end of time when all matter of this particular universe has finally lost its motion to the all-consuming vacuum of empty space. Then, from this nearly empty vacuum of space "somewhere" arises a new universe. How is this so?

The properties of this continuously arising matter-mass then, are nothing less than quasi empty uncaused random quantum vacuum fluctuations of the zero point energy field. In physics it is assumed that there can be no "perfectly empty vacuum". Empty space cannot be perfectly empty. "Virtual particles" enter and exit spacetime existence continuously. Quantum Field Theory (QFT) predicts them, and their effects are observable.

Scientists have often said that "nature abhors a vacuum". Perhaps our primordial Mother Nature prefers form to emptiness. It seems that utter emptiness may indeed "be" nonexistent, other than as an empty concept.

Some fine day, somewhere, a new universe instantly inflates into existence from a near empty quantum fluctuation—again and again as the cyclic multiverse, by whatever name or concept, endlessly creates and destroys cosmic worlds.

A word is now in order about this cyclic multiverse of recent cosmology—and of the Hindu and Buddhist cosmologies—the infinite complex of coexisting "parallel universes".

In the great Primordial Wisdom Tradition of humankind the cyclic arising and falling

away of multiple universes is alive and well. Just so, the relativistic quantum cosmology of the 21st century "multiverse theory" is gently becoming the new scientific cosmology orthodoxy.

Scientific theories once considered empirically and experimentally unknowable—the heliocentric solar system; electromagnetism; curved spacetime, quantum super-positions; black holes—are no longer beyond the pale of science. Such abstract notions were more metaphysical than physical. Yet, step by empirical step such radical ideas entered the embrace of accepted "scientific method". Multiverse theory now teeters rather precariously on the cusp of such scientific orthodoxy.

The good news? Multiverse theory is founded in the relative stability of mainstream relativistic quantum mechanics (QFT, QED); and most of its protocols now qualify as scientific method. That is to say, multiverse theory makes empirical predictions, and at least some of it can be empirically falsified. "Multiverse theory can be tested and falsified even though we cannot see the other universes" (Max Tegmark).

Quantum cosmologists have identified four different levels of "parallel universes" that constitute the endless infinite cyclic multiverse. Cosmologist Max Tegmark has holistically engaged these four in his excellent *Scientific American* article of May 2003. (Reprinted in *The Best Science and Nature Writing*, 2004)

All four of these timeless levels of cosmic being in spacetime are entirely dependent upon purely conceptual mathematical reasoning. These four universe levels—with mathematical variations on the theme—are presumed to exhaust our human cognitive capacity for understanding both the relative, *and* ultimate nature of not only this universe of ours, but the entire admittedly ineffable multiverse! O Human Hubris! Are there not more things in heaven and earth than are dreamt of in our mathematical philosophies? Let's see.

Historically, culturally, there are two general mathematical paradigms—Aristotelian and Platonic. These two are ancient Greek cognitive products of two ostensibly different metaphysical or ontological paradigms as to the ultimate nature of appearing physical and mental reality—our deep cultural background Western "global web of belief (Quine 1969)—in short, Aristotelian and Platonic.

The traditional distinction between the ontic views of the seminal Greek philosophers Plato and Aristotle emphasizes Plato's otherworldly, transcendental ideal, and *a priori* (prior to experience) noetic view of our human knowledge of ultimate reality—over against Aristotle's concern for earthly natural phenomena, including the nature of human reason, and of ethics.

Aristotle (383-321 BCE) was a realist metaphysician of physical form. Plato (427-346 BCE) was an idealist metaphysician of his archetypal Platonic Forms. Together they constitute the very foundation of the Western mind.

So, the Aristotelian view is of an ultimately physical/material fundamental appearing reality that mathematics attempts to explain. Mathematics is relative and conventional, not transcendental and absolute, as Plato would have it. For Aristotle here is nothing of much interest

beyond the physical dimension. The metaphysics of Aristotle is a metaphysics of matter. Aristotle's science, with his logic, which is based in his Three Laws of Thought—while superseded by today's predicate calculus, quantum logic, and multi-valued logical systems (MVL)—have provided the foundation for Western modern science with its dominant metaphysical trope, Scientific Materialism/Physicalism.

However, the Platonic mathematical paradigm views mathematics, as did Plato himself, as an ideal, archetypal, transcendentally perfect Form or Idea—abiding beyond spacetime reality—a *universal* that a *particular* human mind may only mathematically approximate. This paradigm sees the entire *Kosmos*—objective and subjective—as inherently, ultimately mathematical in nature. The conceptual rub is just that we human observers conceive of it imperfectly.

Modern physics and cosmology is profoundly mathematically Platonist. Mathematics penetrates the secrets of the universe so unreasonably well, so it is said, because the universe is *inherently* mathematical in both its relative *and* ultimate nature. What possible reason could there be to seek the ultimate truths of reality elsewhere? That is the modern physics cognitive bias (confirmation bias). Still, as we shall soon see, what is, *is*—far beyond our mere concepts and beliefs *about* it.

Can these heady truths of mathematics be truly reduced to something physical? Can the dualistic (subject-object separation) conceptual structures of mathematics that exist in the human mindspace be so easily reduced to mere physical structures and functions (Functionalism)?

Max Tegmark:

I have suggested that complete mathematical symmetry holds: that all mathematical structures exist physically as well...Any self-consistent fundamental physical theory can be phrased in some kind of mathematical structure" (*Sci. Amer.* 2003).

Notwithstanding the circular reasoning, this is a typical example of the prevailing metaphysical bias of Greek Aristotelian Metaphysical Materialism/Physicalism, "scientific" reductionism: to wit, all appearing physical and mental reality—love, goodness, beauty, truth, ethics, spirituality, and the rest—are ultimately reducible to merely physical/mathematical conceptual phenomena. To question this scientific metaphysical dogma is taboo. One could lose tenure! Given our all too human propensity to cognitive bias, perhaps it is better to have questions that can't be answered, than to have answers that can't be questioned.

Thus has our Greek materialist legacy colonized the Western mind and spirit. And, as I have argued in these pages, at considerable expense to the multidimensional truth of our appearing realities, and thus to our human happiness.

Is this relentless objective conceptual rational cognition all we are? Must the boundless

whole of reality itself be reduced to the mere conceptual objective dimension of this vast reality?

Clearly, human awareness enjoys at least four self-evident experiential cognitive dimensions: 1) exoteric, objective, conceptual; 2) esoteric, subjective, intuitive, non-conceptual; 3) greater esoteric, subjective, contemplative, spiritual; and 4) perfectly subjective, "innermost secret" nondual, the noetic primordial wisdom unity of knowing subject and its known object—just prior to the odious subject-object split, with all its human suffering. These four cognitive awareness-consciousness dimensions are then, always already an ontologically prior, and epistemologically, phenomenally present unity!

Therefore, let us add to the four multiverse levels/dimensions of recent cosmology, a fifth dimension, a *Level V Multiverse*—an all-embracing post-mathematical, post-empirical, trans-conceptual, yet contemplatively directly known (*yogi pratyaksa*) sphere of pristine nondual primordial awareness-consciousness itself in whom all of the stuff of the "many mansions" of arising and appearing reality are blissfully instantiated.

Level V Multiverse indeed. What then shall we name it? This many dimensional *Kosmic* all inclusive infinite boundless emptiness whole in whom cosmic physical form arises, evolves, and participates has for thousands of years been known to the prodigious Primordial Wisdom Tradition of our species by such names as *Parabrahman*, *Samantabhadra*, *dharmakaya*, *dharmadhatu*, *Tao*, *Ein Sof*, *Yahweh*, and many others. "What's in a name? That which we call a rose, by any other name would smell as sweet" (Juliet Capulet).

Back to the present. In 1929 astronomer Edwin Hubble, with the aid of his observatory janitor and brilliant part-time cosmologist assistant Milton Humason, discovered that the non expanding static "Steady State Model" of our universe of early 20th century physics is actually expanding! Then, in 1998 future (2011) Nobel laureates Saul Perlmutter, Brian Schmidt, and Adam Reiss and their teams, working independently, discovered that Hubble's expanding universe is actually accelerating! What hath God wrought!

The most reasonable explanation for an expanding, *accelerating* universe is a global *positive* repulsive quantum ZPE vacuum energy, an anti-gravitational force which counteracts the natural attractive-contractive force of gravity by impulsing the matter of the universe "outward".

The vacuum energy soon received the prosaic name *dark energy*. This mysterious, intuitively unnatural cosmic stuff quickly became identified with Einstein's cosmological constant λ of 1917, when Einstein first predicted dark energy as he began to apply his GRT field equations to the curved structure of spacetime. But at the time he refused to believe it! Thus did the ZPE vacuum energy, which became dark energy, become Einstein's new constant of nature Λ . This new constant of nature is the energy density inherent in the boundless whole of spacetime that is described by Einstein's General Relativity Theory (GRT) field equations.

In 1917 Einstein executed "my greatest blunder" by inserting his cosmological constant λ into his scintillating 1915 GRT field equations to "hold back the universe" expansion predicted by these original equations. He needed to conform to the static, non-expanding "steady

state universe" of Bondi, Gold, and Fred Hoyle—the waning ideology of pre-Big Bang cosmology of the early century. In his heart of hearts he knew better.

In 1931, after Hubble's 1929 discovery that the universe was actually expanding, Einstein blundered again by retracting the untidy new constant Λ from his GRT field equations. Of course he couldn't know it, but his lambda constant was, 67 years later, to become the very dark energy that propulses this accelerating universe of ours.

Had Einstein trusted his initial GRT field equations he would perhaps have discovered the expanding universe long before Hubble. But he was steeped in the ideology of the time and could not free his mind from the "confirmation bias" that blinded him to the truth present in his original GRT field equations.

Moreover, Einstein became aware in the late 1920's that he had erred in failing to accept what Georges Lemaitre, Alexander Friedman, Willem DeSitter, and others had pointed out in the decade prior, that his cosmological constant lambda Λ insertion into the GRT field equations did not at all provide the stable "steady state" universe that he intended. Indeed, this discomfiting appendix would surely result in an unstable readily collapsible cosmos! Einstein rebuffed them all.

Now, as if the cosmic irony were not already thick enough, Einstein's early static, non expanding model of the universe has been recently incarnated into quantum cosmology in a new effort to explain away the nagging problem of a physically impossible, fine-structure constant (α) busting Big Bang singularity—a quite problematic whole lot of stuff from a whole lot of nothing. Some daring, *tenured* cosmologists are now pursuing an "emergent universe" that inflates from a static pre-cosmological constant Einsteinian universe. (Ellis and Maartens 2004, *Class. Quant. Grav.* 21:223-230)

Perhaps Albert Einstein should have been known as the greatest physicist of all time (Einstein and the buddhas deny the ultimate/absolute existence of time), instead of the second greatest, behind Isaac Newton. But as Shakespeare's Dogberry told in *Much Ado About Nothing*, such "comparisons are odious". (For the cosmology of GRT see Sean Carroll's excellent *Spacetime and Geometry: An Introduction to General Relativity*, 2003. For the intriguing drama of 20th century physics and cosmology see Boaz 2021a, excerpted at davidpaulboaz.org)

Dark energy has no known cause. It has been for 20 years both mathematically and observationally utterly inscrutable.

Still, dark energy is the foundation of the current Concordance Lambda Cold Dark Matter (ACDM) Standard Model of cosmology. Quantum Field Theory (QFT) explains this vacuum ground state as a vast ensemble of constantly fluctuating zero point energy quantum particle fields present everywhere in spacetime. These quantum ZPE vacuum fluctuations contribute to the overall value of the anti-gravitational impulsive dark energy cosmological constant which causes the acceleration of the cosmos.

So, the ZPE vacuum energy offers a reasonable explanation for the readily observed

cosmological data—but at the cost of a most unnatural physical parameter. *Why is ZPE so much smaller than QFT predicts?* ZPE should be orders of magnitude larger than the observed data. Why do tiny stubborn quantum vacuum energy fluctuations refuse to produce the huge "natural" vacuum energy density that QFT demands? The prodigious quantum theory is after all always correct, "the best predictive tool in the history of physics"! Thus arises the supremely vexing "cosmological constant problem". No one has a clue how to explain this huge discrepancy between quantum theory and cosmological observation.

In other words, when quantum calculations are performed on the expected energy density of the universe we get an enormous value for the actually observed small ZPE vacuum energy—a ludicrous 120 orders of magnitude greater than the tiny values revealed by cosmological observation! This devastating discrepancy between theory and observation—between the large theoretical vacuum energy predictions of QFT, and the small values of cosmological observation—has been called by Steven Weinberg "The worst theoretical prediction in the history of physics".

This curious, most discomfiting "quantum vacuum catastrophe" has yet to be explained. It has cast a pall over one of the greatest intellectual achievements of humankind, namely, the cosmology that is the Lambda Cold Dark Matter (Λ CDM) Cosmological Standard Model of 20th century physics and cosmology.

This massive theoretical gap between quantum theory and cosmological observation and experiment represents one of the two primary conundrums of modern physics; the other main problem being the inherently vexed incommensurability of objective classical General Relativity Theory (GRT) with post-classical non-objective Quantum Field Theory (QFT). This present state of cosmic ignorance has precluded a consistent Quantum Gravity Theory (QGT) that unifies these two foundational pillars of physics. (Boaz 2021a; excerpted at www.davidpaulboaz.org)

Moreover, the dimension of physical spacetime form with all its relatively existent fermion (quarks and leptons) and boson (photons and gluons) quantum fields are *non-gravitating* zero point energy fields. Zero mass equals zero gravity. Great gravity of the "participatory universe" of gravitational physicist John Wheeler in summarizing his pal Einstein's GRT: "Spacetime tells matter how to move; matter tells spacetime how to curve".

So, here the gravitational plot thickens. Zero point vacuum energy is not subject to Einstein's gravity! The dark energy that is accelerating the universe to its final entropic thermodynamic Big Chill "heat death" demise at the end of time is usually explained by this non-gravitating vacuum zero point energy, Einstein's cosmological constant Λ . Can gravity be so easily dismissed? It is Λ after all which precludes the gravitational contraction of the universe all the way back to a "Big Crunch"; then a reflexive new "Big Bang". With the 1998 evidence of the acceleration of Hubble's expanding universe to its ultimate dissolution in timeless quantum/*buddic* emptiness—the old Big Chill-Big Bang/Big Crunch cosmology has fallen on hard times.

What if this gravity defying universe-accelerating dark energy of the cosmological

constant Λ is emotionally unstable and decides to rapidly, or even exponentially increase its acceleration? Such a bipolar manic increase in dark energy density, should it occur, is said to be caused by a very disturbed, Hubble Parameter busting "phantom energy". This scenario is even worse for any beings still hanging out in embodied form. Here, the ultimate fate of the universe is that all matter is instantly torn asunder, right down to its quarks and leptons—a karmic *Kosmic* "Big Rip"! Not good for embodied minds. Even disembodied minds require a bit of spacetime stuff to mentate upon.

Thus is impermanent (*anitya*) samsaric spacetime existence loaded with cosmic suffering for sentient beings. Even for presumably inanimate matter—if we can ignore the panpsychic notion that all matter has some degree of consciousness—it still somehow desires to be. "Desire is the creator and destroyer of worlds" (*Bhagavad Gita*).

Well, where is quantum cosmology headed, conceptually, in light of our quantum vacuum discrepancy problem? Clearly we must again consult Great Gravity. There are several interesting theories on offer that do not require a modification of Einstein's orthodox GRT gravity theory.

The most promising notion in this regard is that ZPE vacuum energy is precisely zero, and that dark energy is something entirely different, a nearly constant but non-zero *dynamical* energy field—in a word *Quintessence*—a radically new bosonic (photons and gluons) field of nature whose energy density does not much increase or decrease throughout the accelerating expansion of this universe toward its ultimate oblivion a few trillion years hence (give or take a trillion).

It has now become scientifically acceptable to seriously question mainstream physics' insistence on the purely *physical* existence of the quite problematic, diaphanous, altogether unfindable "dark sector"—dark matter and dark energy. What is it? What is its origin? No one knows.

The existence of dark energy has, as we have seen, not been detected directly. It is but a probable abductive *inference to the best explanation* based upon present data. It is therefore possible that GRT is incomplete and needs to be modified—a most unhappy thought for our cosmological GRT orthodoxy.

Clearly, GRT is extremely accurate at solar system, and even at intra-galactic time/distance scales. But if General Relativity is deceiving us at vast intergalactic time/distance scales, then perhaps we do not need the presently unscientific, non-empirical ghostly dark energy to fathom the acceleration and fate of the universe. Dark energy is after all inferred from the *global* gravitational motion of the vastness of this entire universe, even beyond the "future visibility limit" of our observable universe.

Due to the finite nature of the velocity of light we have no light signal access to most of the universe. The greatest distance we can observe is the distance that light has traveled in the 14 billion years since the proverbial Big Bang singularity that began the expansion of our universe

Our visibility limit then is this "Hubble volume", or "horizon volume" limit. Considered from this greater view, gravity may well be inadequate to the task of divining causes of the behavior of mass/energy at such vast cosmic scales. Thus arises the heretical possibility of modifying Einstein's hitherto almost sacrosanct gravity (G) field equation.

Great gravity is no longer sacrosanct. Physicists have known almost since the early 20th century inception of the quantum theory that GRT breaks down on quantum gravity *micro-scales* near the inconceivably tiny Planck scale; for example during the first second after the Big Bang, and at minute black hole temperature scales where Hawking radiation is measured in billionths of a degree kelvin. Perhaps then, GRT breaks down on great intergalactic scales as well. Evidence from quantum cosmology is now beginning to demonstrate that this is probably so.

Be that as it may, any tweaking of GRT is quite problematic for the Concordance Lambda Cold Dark Matter (ACDM) Standard Model orthodoxy of modern physics. Still, there is significant work on "modified gravity" theories—for dark matter, and dark energy—presently under way.

Well, what if the huge "natural" vacuum density predictions of QFT are actually true? What would that mean for our perfect "galactic habitable zone", our *Kosmic* "Goldilocks Zone" where nothing is too hot nor too cold, and everything is a perfect middle way—"just right" for beings to arise and evolve the smarts to ask questions like, "What is the correct vacuum density of Λ to permit the acceleration of the cosmos?" What are the physical parameters required for this great "spiritual" *Kosmic* gift—our cosmological middle way that gives us time to open and receive the nondual truth of the matter? As Plato told so long ago, "No small matter is at stake. The question concerns the very way that human life is to be lived" (*Republic* Book I).

The formally spooky, but now more respectable *Cosmological Anthropic Principle* states that any conjecture as to the origin and end of the universe is constrained by the necessity to allow for the existence of sentient beings who may evolve to ask such impudent questions. Such cosmic "environmental selection" has become a cogent explanation for the observed quite problematic value of the cosmological constant. How is this so? If the ZPE quantum vacuum energy were to actually have its "natural" QFT predicted large value, there would be no smart beings here in spacetime to question it!

Life forms could not arise in a universe with anything close to such a large cosmological constant. If Einstein's dark energy/vacuum energy constant Λ were large and negative the universe would almost instantly collapse. If Λ were large and positive the universe would almost instantly expand exponentially such that atomic structure could never form, let alone galaxies, stars, solar systems, planets, and impudent people.

Therefore, the vacuum energy of the universe could not be much different than its current small observed value, or we would not be here to observe and ponder it. So, it is ontologically necessary—so the Anthropic Principle Argument goes—that the actual ZPE dark energy of the cosmological constant Λ is relatively small when compared to its huge "natural" QFT

predicted value. But the Anthropic Principle Argument, whether in its strong (SAP) or weak (WAP) forms, is a philosophical argument. And most physicists are intimidated by philosophy.

Thus is this important cosmological reasoning consideration often given an unscientific, unsympathetic dismissal. Confirmation bias again. (Confirmation bias is the near universal human cognitive propensity to interpret new information as supporting one's current "web of belief". It is one of a set of cognitive biases by which we not so supremely "rational" human beings deceive ourselves.) This unwholesome trend of Anthropic Argument bias is diminishing as physicists begin to dialog with philosophers of physics, philosophers of mathematics, and even with Buddhist scholar-practitioners.

Still, in an ensemble of the many universes of the infinite multiverse only a universe that includes the physical parameters that permit life to arise can select an environment (environmental selection) in which intelligent sentient beings can evolve to question the nature of being here in space and time. Let us then thank our lucky stars for this great *Kosmic* anthropic gift that is our being here now in relative spacetime form—whether or not we fully understand it conceptually or mathematically.

The inherent incompleteness of physics and physical cosmology necessitates moving beyond our present cognitive limits toward post-physical, post-empirical, trans-conceptual, even contemplative technologies. Thus is the new knowledge paradigm that is the 21st century Noetic Revolution in matter, mind, and spirit now upon us. (Boaz 2021b, excerpted at davidpaulboaz.org)

Thus it is, by the lights of both Buddhist metaphysics and astrophysical metaphysics, spacetime stuff really exists, at least relatively and conventionally, and it is (almost) empty of inherent existence—just as Gautama the Buddha told so long ago. From quantum/*buddic* emptiness spacetime form continues to arise; abide; then return again to emptiness, without ever departing its infinite *Kosmic* primordial awareness-consciousness formless emptiness ground in whom physical cosmic forms arise and evolve continuously, and forever.

Once again, the trans-conceptual contemplative certainty of this intuitively obvious all-ground—by whatever name or concept—is always present in the nondual, direct experience (*yogi pratyaksa*) of our already present Presence of it, at the love-wisdom Heart of the human being. Einstein, Planck, Bohr, Heisenberg, Schrödinger, and many other great physicists understood this great physical/spiritual truth, at least conceptually. Many of them wrote about it. Some practiced it in prayer and meditation.

There is much more to be said on the matter. Still, "Form is empty; emptiness is form". The Buddha understood the objective, and subjective emptiness nature and impermanence of relative physical spacetime form 25 centuries before the relativistic quantum mechanics of Einstein and Heisenberg.

