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ATTRACTION AND REPULSION
FROM A SCIENTIFIC BUDDHIST PERSPECTIVE

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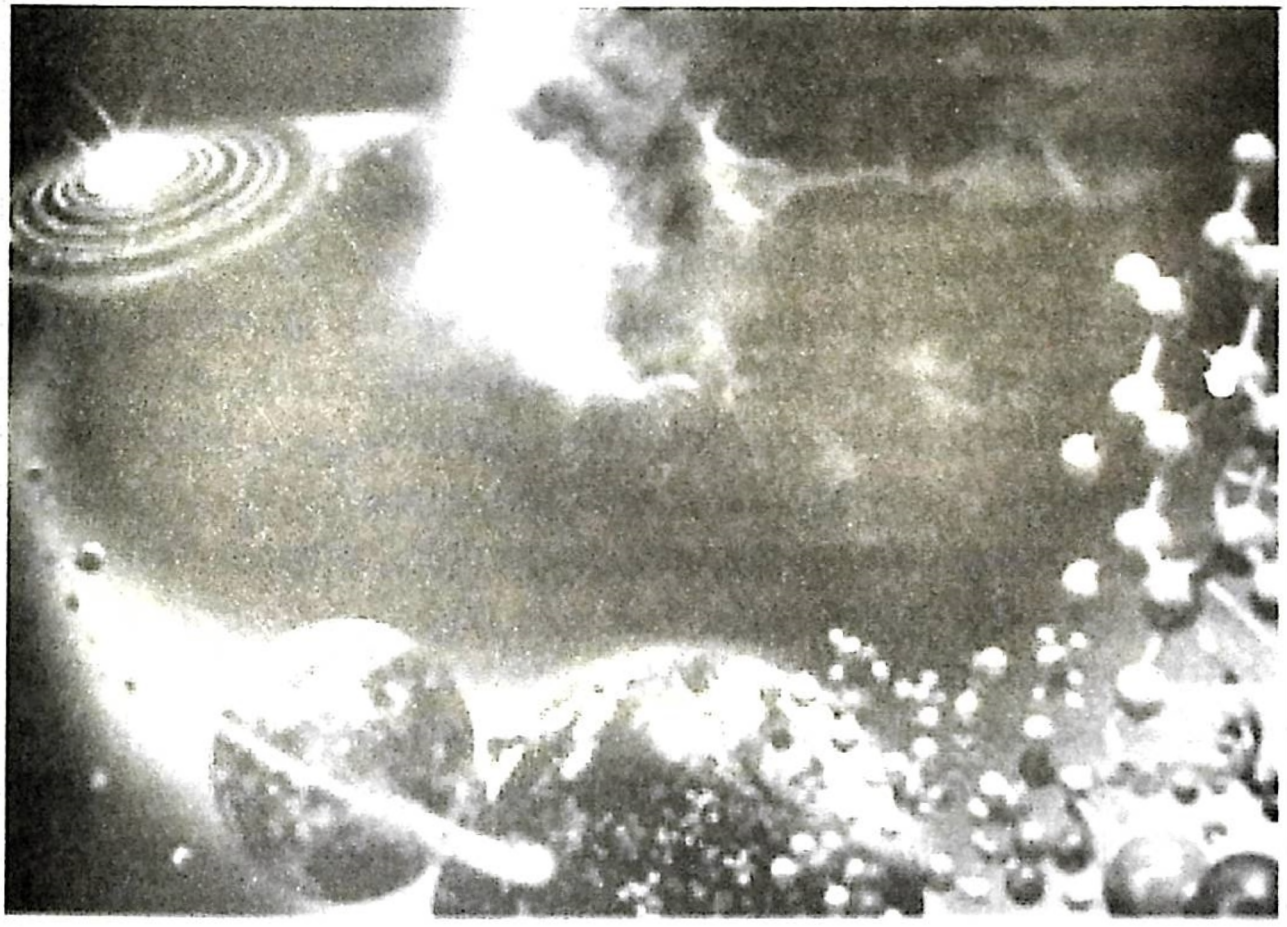

"One cannot employ an example (*dṛṣtānta*) visible in the world to repudiate the noble *Dharma*, for the noble *Dharma* and the conventional Dharma are different."[1]

[1] Bhikkhu KL Dhammajoti: *Sarvāstivāda Abhidharma* (Center of Buddhist Studies, University of Hong Kong, 2007), p. 88 – quoting: the Abhidharma-mahā-vibhāṣa-śāstra, T no. 1545

Why? The above non-scientific view should not represent absolute-dhamma. Sarvāstivādan Buddhists even object to the manner in which conventional similes are used to refute others.[2] 'Common' knowledge [figuring 'commonality' to be training below the non-specialist or university level] has certainly and rightfully departed from what was traditionally taught in various religious systems, but lags behind modern scientific discoveries. Former conventions have been over-turned, newly interpreting ultimate realities. The negligent – nearly all of which clamor to incorporate proofs that their system incorporates modern wisdom – as to remain in good standing and not defeated by higher-sciences, are, erroneously operating. Militaries often educate their young soldiers on modern technologies – to gain edges over potential rivals – then there is the *Yodhājīva Sutta* from the *Samyutta-nikāya* to overturn any call to arms. Musicians are often aware how their apparatus can manipulate audio-frequencies. Buddhist monks become experienced with high attainments during meditation. Thus, this article wishes to participate with what has been established towards the modern Buddhist scientific view of the cosmos. Please take some moments to investigate the pictures or graphic representation of the universe, above and below.

In the artistic representation of the universe's celestial-mechanics, above – sub-atomic or atomic quanta collect together to form clouds of stellar-dust, and under the laws of attraction [electromagnetic, gravity, and others] – these particles further condense, until they collapse and begin to ignite and form a star, and eventually a solar-system like the one we are currently participating in. "Simply put, star formation begins when part of the interstellar medium – one of those cold, dark clouds – starts to collapse under its own weight. The cloud fragment heats up as it shrinks, and eventually its center becomes hot enough for nuclear fusion to begin. At that point, the contraction stops and a star

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[2] Bhikkhu KL Dhammajoti: *Sarvâstivâda Abhidharma* (Center of Buddhist Studies, University of Hong Kong, 2007), p. 88-89

is born."[3] This is a demonstration of a natural, observational law that any astronomy student can ascertain.

One might investigate into the *Vimamsaka Sutta* from the *Majjhima-nikāya*, stating: "Bhikkhus, a bhikkhu who is an inquirer, not knowing how to gauge another's mind, should investigate the Tathagata with respect to two kinds of states, states cognizable through the eye and through the ear thus: 'Are there found in the Tathagata or not any [defiled states; mixed states; cleansed states...] cognizable through the eye or through the ear?... When he comes to know this, he investigates him further... The Teacher teaches him Dhamma with its higher and higher levels, with its more and more sublime levels, with its *dark and bright counterparts.* As the Teacher teaches the Dhamma to a bhikkhu in this way through direct knowledge of a certain teaching here in that Dhamma, the bhikkhu comes to a conclusion about the teachings. He places confidence in the Teacher..."[4] Like the Dhamma, matter is both known and unknown – bright and dark, sublime certainly at the atomic and astronomical levels.

Humans, are of course, limited to what can be perceived and cognized through the sense organs – certainly with what is determined from the eyes and ears. Because human's perceptions are limited, our perspective is limited as well – within that of the visual and other sensual realms of experience. Yet, do humans forget that other beings operate in different realms, apart from our own? Humans are also limited to perceive certain phenomena– only allowed by our technological developments. Consider: animals can sense earthquakes before humans and our technology.[5] Bats, for instance, may be blind and

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[3] Eric Chaisson & Steve McMillan: *Astronomy Today* – Fourth Edition (Upper Saddle River: Prentice-Hall, 2002), p. 490

[4] Bhikkhu Ñāṇamoli and Bhikkhu Bodhi: *The Middle Length Discourses of the Buddha – A New Translation of the Buddha* (Boston: Wisdom Publications 1995)pp. 415-418

[5]http://latimesblogs.latimes.com/unleashed/2008/07/whole-lotta-sha.html

utilize sonar – consider what can be found from the following chart[6] – illustrating the frequency range of hearing for different types of animals:

Hearing Perceptions		
Animal Hearing (Approximate ranges)	Frequency (hertz)	
	Low	High
Humans	15	20,000
Elephants	16	12,000
Cattle	16	35,000
Horses	31	34,000
Dogs	40	60,000
Cats	45	64,000
Whales & Dolphins	70	150,000
Sheep	100	30,000
Grasshopper & Locusts	100	50,000
Rodents	200	91,000
Seals & Sea lions	300	55,000
Bats	1,000	150,000

Humans, due to limitations placed upon them, need technology to ssist towards being a greater cognoscente. Additionally, humans cannot see everything that there is, in the 'visual spectrum'; humans cannot see x-rays, ultraviolet rays, and other types of emissions - receivable only from equipment that can measure or record 'information' available from the cosmos or hospitals. Others also are aware of this: "the eyes of different species are sensitive to different-colored light or rays that are invisible to us. A dog can see in the dark because its eyes are more sensitive to infrared light than ours. A pigeon can see ultraviolet rays that we cannot. Bats don't use sight, but perceive objects thanks to the echoes from the high-frequency sounds they produce. Their representation of the world is certainly very different from ours."[7] Humans,

[6] Source:http://hypertextbook.com/facts/1998/JuanCancel.shtml-citing Encyclopedia Britannica.

[7] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to*

therefore cannot perceive total reality, although there are some who claim such attainments; never-the-less, Buddhists should never cease striving.

It is interesting to learn that the Sarvāstivādins claimed: "The non-existence of the past and future implies that the present likewise does not exist, since the present is designated in relation to the past and future. The three times not existing, the conditioned would not exist. The conditioned not existing, the unconditioned too would not exist since the latter is established in relation to the former. The conditioned and the unconditioned both not existing, then there would not be any dharma whatsoever, which entails that there is no liberation and *nirvāṇa* – a serious false view!"[8] The light that we see from stars, is this present light, or passing [past] light – billions of years old? This being said, science should be greatly understood.

We can perceive only partial reality, although our scientific achievements allow us to gain insight into the 'relative' or 'theoretical' unknown – but may be known to other species, illustrating that there is indeed, a "physical world that exists independent of human experience."[9] Humans are subjected to even more misperceptions - the Hubble Space Telescope[10], found: "multiple images of a quasar gravitation-

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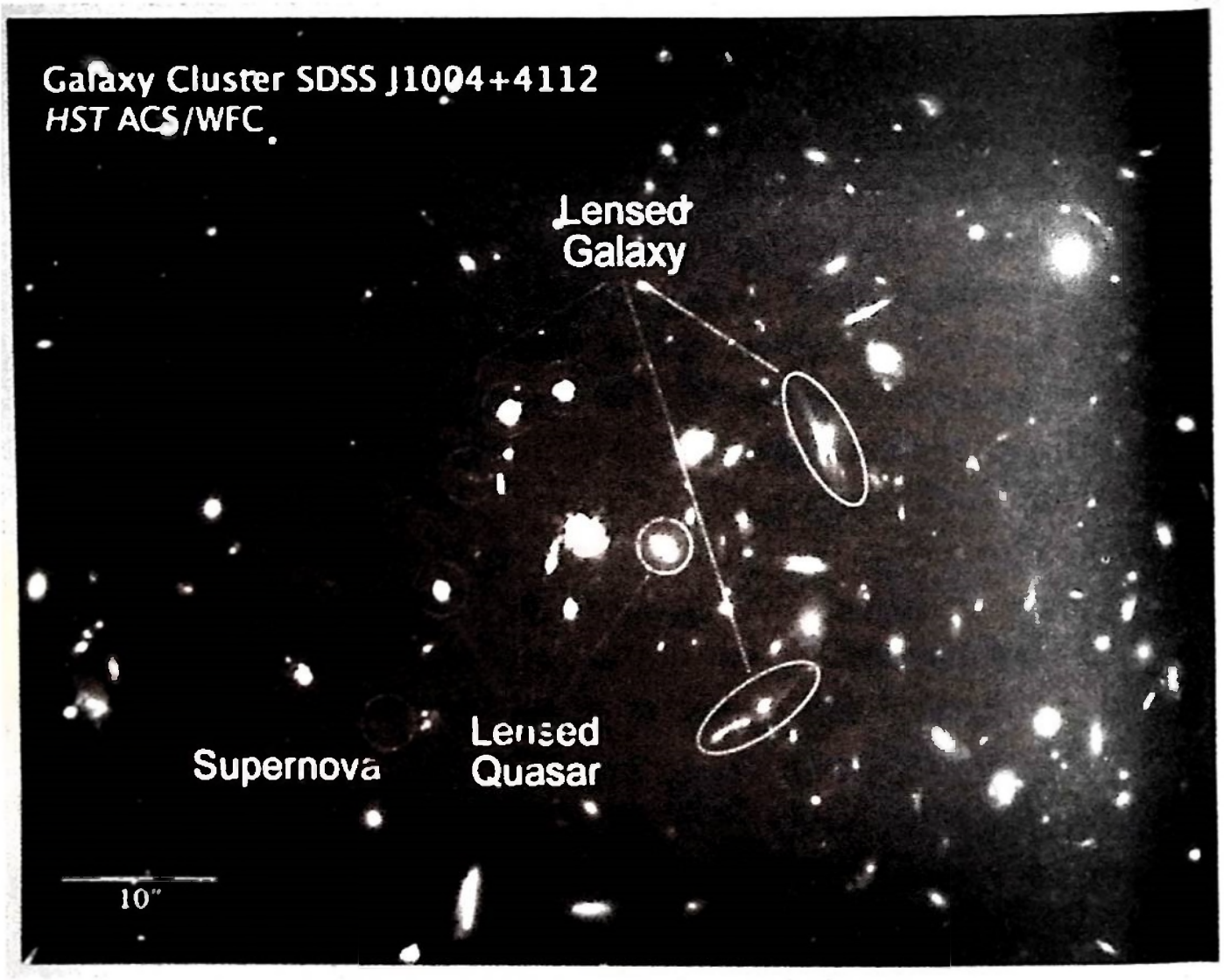
the Frontiers Where Science and Buddhism Meet (New York: Three Rivers Press, 2001), p. 120

[8] Bhikkhu KL Dhammajoti: *Sarvāstivāda Abhidharma* (Center of Buddhist Studies, University of Hong Kong, 2007), p. 73

[9] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers Where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 121

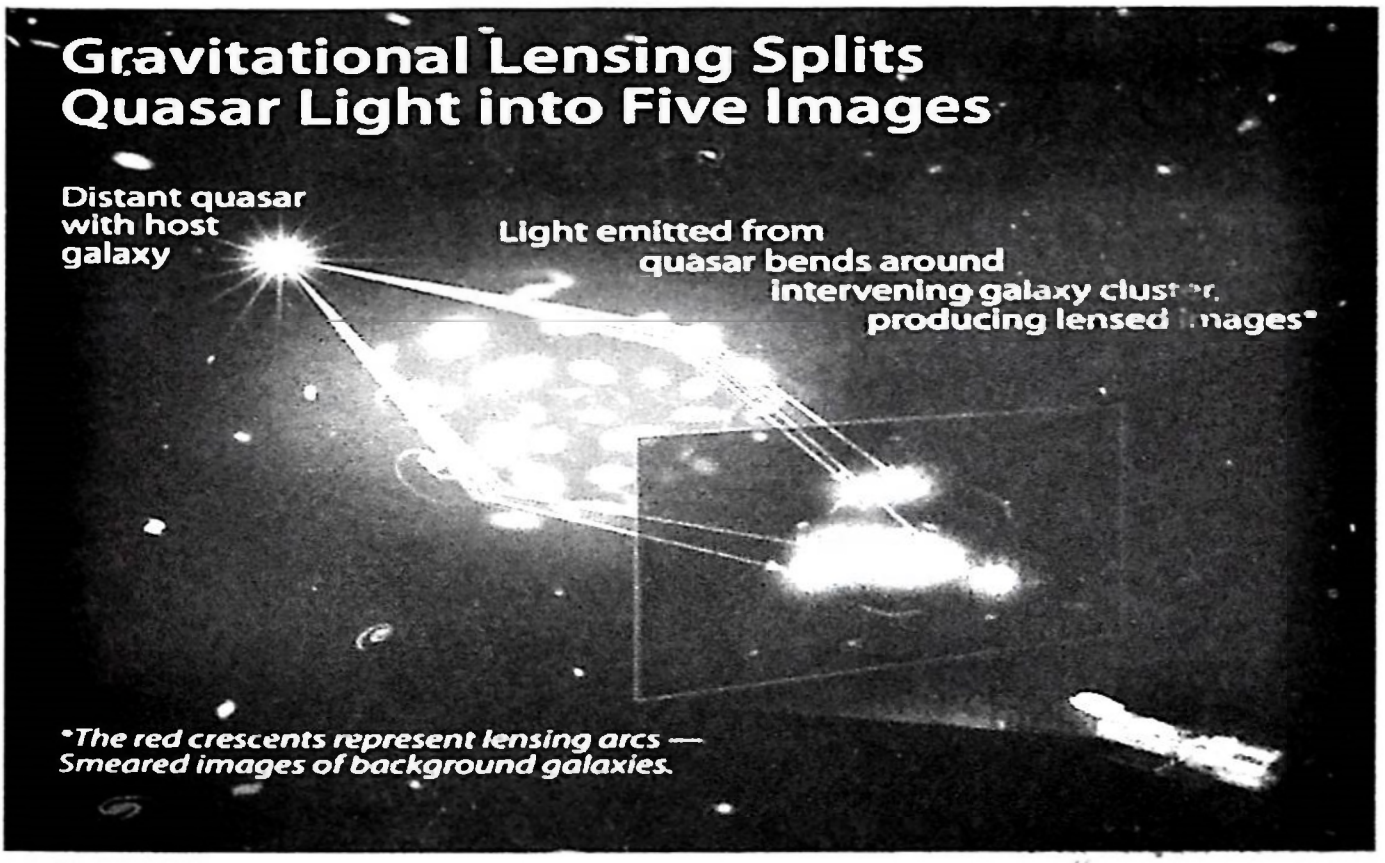
[10]http://hubblesite.org/newscenter/archive/releases/2006/23/image/c/format/web_print/ - the actual explanation reads: "Although many examples of gravitational lensing have been observed, this "quintuple quasar" is the only case so far in which multiple quasar images are produced by an entire galaxy cluster acting as a gravitational lens. The background quasar is the brilliant core of a galaxy. It is powered by a black hole, which is devouring gas and dust and creating a gusher of light in the process. When the quasar's light passes through the gravity field of the galaxy cluster that lies be-

ally lensed by the galaxy cluster SDSS J1004+4112... two images [of the same quasar] come from light bending around opposite sides of the galaxy cluster."[11]



tween us and the quasar, the light is bent by the space-warping gravity field in such a way that five separate images of the object are produced surrounding the cluster's center. The fifth quasar image is embedded to the right of the core of the central galaxy in the cluster. The cluster also creates a cobweb of images of other distant galaxies gravitationally lensed into arcs. The galaxy cluster creating the lens is known as SDSS J1004+4112 and was discovered in the Sloan Digital Sky Survey. It is one of the more distant clusters known (seven billion light-years away), and is seen as it appeared when the universe was half its present age."

[11] Vic Mansfield: *Tibetan Buddhism and Modern Physics – Toward a Union of Love and Knowledge* (West Conshohocken: Templeton Foundation Press 2008), p. 156

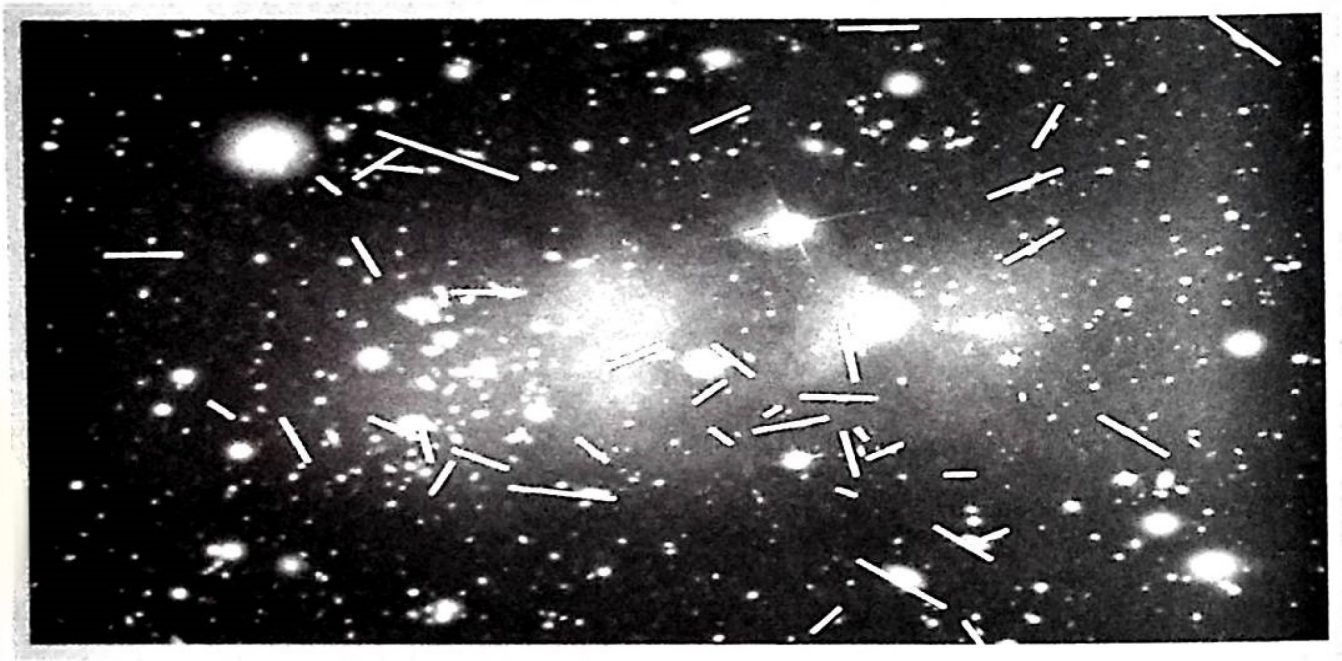


Updating our own knowledge of the 'perceived' or 'received' phenomena – through various forms [a technological education allows for this!] – this is our ethical responsibility to learn and teach to our children and young students. Teaching old scientific information can be embarrassing – when students might possess greater insights into specific subjects. Educators should learn more scientific information to support or reject teachings gained from their ancient traditions. Being attracted to new pieces of knowledge can improve our wisdom[12], being repulsed by new technological, philosophical, or even other religious traditions 'narrow' our perspectives. Buddhism mandates that we explore the wisdom or knowledge from the various systems or traditions – and when we find them to be true, we can accept and teach this wisdom to the next generation of 'upholders of the Buddhist tradition'. Laughable, it may be, if Buddhists cannot adapt to the ever-changing

[12] For instance – imagine what happens to Buddhist theories, when inquisitive students visit: http://en.wikipedia. org/wiki/Cosmology

modern world, while being respectful to our centuries-old tradition, starting from the Buddha's own Enlightenment about 2,600 years ago.

Picture of Multiple Galaxies on Different Planes
Explanation[13] & Analysis:



[13] *The Matter of the Bullet Cluster: Composite Credit:* X-ray: NASA/CXC/CfA/ M. Markevitch et al.; Lensing Map: NASA/STScI; ESO WFI; Magellan, U.Arizona, D.Clowe et al.; Optical: NASA/STScI; Magellan, U.Arizona, D. Clowe et al. Found on: http://antwrp.gsfc.nasa.gov/ apod/ap080823.html - accessed on 9 September 2008: "The matter in galaxy cluster 1E 0657-56, fondly known as the "bullet cluster", is shown in this composite image. A mere 3.4 billion light-years away, the bullet cluster's individual galaxies are seen in the optical image data, but their total mass adds up to far less than the mass of the cluster's two clouds of hot x-ray emitting gas shown in red. Representing even more mass than the optical galaxies and x-ray gas combined, the blue hues show the distribution of dark matter in the cluster. Otherwise invisible to telescopic views, the dark matter was mapped by observations of gravitational lensing of background galaxies. In a text book example of a shock front, the bullet-shaped cloud of gas at the right was distorted during the titanic collision between two galaxy clusters that created the larger bullet cluster itself. But the dark matter present has not interacted with the cluster gas except by gravity. The clear separation of dark matter and gas clouds is considered direct evidence that dark matter exists." Additional pictures can be found at:

—http://antwrp.gsfc.nasa.gov/apod/archivepix.html

Solar Systems and Galaxies operate on different tilted-planes. I draw some lines, on top of some galaxies, to illustrate this finding. What does this mean? This means that during the formation of these bodies, matter or radiation was expelled in different directions, potentially influencing nearby bodies in different ways. Therefore, some abnormalities might exist in trajectories. This should have diverse effects on where matter is, and in which direction it has traveled. We know that asteroids and other space-objects are covered with craters or have collected dust – which could have influenced its original [if uninfluenced] trajectory. Certainly, there are considerable distances between these different objects, subjected to influence from various angles at different speeds and times.[14]

Professor Trinh Xuan Thuan has stated: "Science was itself born from a total and categorical rejection of any such teleological [relating to the study of ultimate causes in nature or of actions in relation to their ends or utility] thinking, which is the province of religious doctrines. With that said, modern cosmology has discovered that the conditions that allow for human life seem to be coded into the properties of each atom, star, and galaxy in our universe and in all of the physical laws that govern it."[15] He goes on to state that the universe depends on 'initial conditions' – specified conditions that factor gravity, strong and weak nuclear forces, electro-magnetic forces, the speed of light, the Planck Constant [fixing the size of atoms]; and lesser elementary particles such as protons electrons, quarks, etc – all playing a role in the formation of a universe and location of particles or objects. Changes or variances in these can create differences in the characteristics of species – even the mass of stars.[16]

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[14] Also see: http://hubblesite.org/newscenter/archive/ releases/2004/32/text/

[15] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers Where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 39

[16] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to*

Vibrations are damped not by friction, because there is no friction inside an atom, but by the reemission of radio waves. By working backward through this chain of reasoning, one can determine the geometric arrangement of the hydrogen atom's neighboring atoms. It is also possible to locate atoms in space from determining their red or blue shift, and allow for medical images to be made using highly advanced equipment using a variety of wave-lengths. A red shift in the analyzed spectrum indicates the object is moving away and a blue shift indicates an approaching object. Atomic vibrations are of the strange and spooky kind described by the laws of quantum mechanics. It is impressive, however, that the few simple ideas we have learned about resonance can still be applied successfully to describe many aspects of this exotic system.[17] Sub-atomic quanta are now known[18]: a quark assists in the formation of protons and neutrons and its other – the lepton assists in the making of electrons and neutrinos. These quanta can be right [positive] or left handed [negative] – dependent on which way the particle spins [helicity].

Theravada Buddhists have something similar to quanta: *kalapas*, or small materialities – but few are conversant enough to explain what these are. Another interpretation suggests: "what is real is what has a svabhāva. Among these various synonyms of svabhāva is the term avayava, 'part'. A 'part' here refers to the smallest possible unit which cannot be further analyzed; it is the ultimate real. Whatever can be further analyzed either physically or mentally – a composite – is 'having a part' (sāvayava); it is a relative real, superimposed on the ultimate

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the Frontiers Where Science and Buddhism Meet (New York: Three Rivers Press, 2001), p. 39

[17]http://www.lightandmatter.com/html_books/3vw/ch02/ch02.html - accessed on 17 September 2008

[18] For a complete list, see:

—http://en.wikipedia.org/wiki/ List_of_particles - and

—http://en.wikipedia.org/wiki/ Particle_identification - and

—http://pdg.lbl.gov/2007/reviews/kmmixrpp.pdf

reals [the five aggregates]. This also means that what is real or what exists truly is what exists from the highest or ultimate standpoint as opposed to what exists relatively/conventionally."[19]

We need to consider the above artistic representation of the universe: This picture sums up the knowledge of the cosmos – and at no step is there a demonstration of deity-interaction [a mind-construction rooted from human ignorance and delusion]. Ricard states: "The Universe has not been adjusted by a great watchmaker so that conscious can exist. The universe and consciousness have always coexisted and so cannot exclude each other. To coexist, phenomena must be mutually suitable."[20] This would seem to imply a general theory of everything – which is in fact, something sought by some scientists – an excursion into modern science books or deeper inquiries into *Wikipedia* [which is actually updated by knowing 'scientists'] would reveal a wealth of scientific information. However, as anyone can determine – everything falls into three possibilities: laws of attraction; laws of repulsion, and neither or static-type operations [a broader category]. Specialized-operating scientists can better explain what is now considered basic education in these scientific disciplines.

Humans are a combination of incidental arrays of space-dust.[21]

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[19] Bhikkhu KL Dhammajoti: *Sarvāstivāda Abhidharma* (Center of Buddhist Studies, University of Hong Kong, 2007), p. 77

[20] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers Where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 42

[21] Professor Robert L. Zimmerman is from the Institute of Theoretical Science, at the University of Oregon. I attended his ASTR 121 and ASTR 122 courses at the University of Oregon. See: http://darkwing.uoregon.edu/~phys600/;http://darkwing.uoregon.edu/~phys600/ASTR121.html;http://darkwing.uoregon.edu/~phys600/ASTR122.html ; additionally, I studied astronomy as a fifth grader, taking a field trip to: http://www. griffithobs.org and as part of 7th or 8th grade – the only course from elementary, junior high or high school that I saved my coursework. I continue to save newspaper articles on astronomy and preserve them inside my textbook from Professor Zimmerman's course. For more than twenty years, I have been interested in

How is this illustrated? Recall the above graphic – space-dust 'particles' became attracted to each other – gravity, and other forces became stronger and more influential, the particles became tighter and tighter and eventually ignited into a star [generally speaking] – a nearby star's collapse and expulsion of its charged particles interacted with our solar-system and possibly created the conditions that we are knowing in our comparatively short life-spans. The secrets to 'life' can be observed from stellar-explosions and star-formations. Other 'nearby' stars collapsing and shedding of outer layers interact eventually with the next adjacent solar-system – this would demonstrate that particles are not all moving in the same direction in the galaxy, and could demonstrate a cyclic form of cosmos in terms of the age of solar-objects rising, occurring and collapsing. Astronomy presents such a picture of the cosmos.

Although Dr. Trinh Xuan Thuan discusses a "principle of organization" – this term should be defined as either: attraction of repulsion – and neither or static/erratic situations, rather than another metaphor for a grand theory of everything. Here two theories or laws need to be discussed – involving "attraction" and "repulsion" – which govern sub-atomic particles, human consciousness, and molecules moving throughout space.

Attraction:

Attraction in scientific terms includes: the above mentioned contraction of stellar particles clustering to eventually form stars; dark matter; black holes; gravity, vacuums; magnetism, protons... and any binding principle, including the Higgs-boson particles that may soon be discovered by the Large Hadron Collider CERN, operating in Switzerland, near France. In Buddhism, the terms: greed, wholesome, loving-kindness, compassion – are terms that could apply to this category of attraction.

Astronomy.

Matthieu Ricard wrote: "Buddhism considers that phenomena aren't really 'born', in the sense that they pass from nonexistence into existence. They exist in terms of what we call 'relative truth', and have no actual reality."[22] The mother's egg-cell is not dead, and the father's sperm-cell is not dead. The baby growing inside a pregnant woman is said to be in a period of gestation after conception; and the moment one is 'born' [the mother's body can no longer internally-support the baby and a period of repulsion begins with labor-pains] – the new 'life' begins, continues to grow, and then naturally decays. I have seen this through my wife's three pregnancies, and death of one newborn son. After birth, external support becomes necessary.

In Buddhism, living organisms are sensually attracted to certain phenomena – repulsed by 'another'. Flowers can sense the warmth of the Sun and thus, bloom. Animals can sense pheromones – to sexually excite another of the same species. Humans and other animals can sense phenomena through various sense-doors or organs capable of receiving and the eventual perceiving resulting from this encounter – some are even deceived or misinterpret the presented phenomena.

Repulsion:

Repulsion in scientific terms would include: the dispersal of atoms after their initial accidental clustering - the Big Bang – creating the galaxy, or the inflation that created the 'universe'; temperature [heat] which is really just a measurement of the average speed of the atomic movement; the conceptual stability of the sun is really based on the extreme pressure of high-speed atomic particles whose outward pressure equates to the effects of the inward effects of gravity[23]; radiation; and

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[22] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers Where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 29

[23] Eric Chaisson & Steve McMillan: *Astronomy Today* – Fourth Edition (Upper Saddle River: Prentice-Hall, 2002), p. 490

polarization. In Buddhism, the terms: unwholesome, aversion or hatred – are terms that could apply to this category of repulsion; and any processes of time, decay, or impermanence.

Neither:

Neither or static/erratic situations in scientific terms would include: neutrons [and any neutrally charged object; and concepts that are under the influence of attraction or repulsion, such as: rotation, diffraction, and interference or modulation of a wave's amplitude or frequency; even scientific 'analysis' or observation. In Buddhism, the terms: delusion, equanimity – are just some of the terms that apply to this category of neither or static/erratic situations, as well as consciousness and any useful analytical/ intellectual processes.

The 'void' or nothingness qualifies into categorization here, along with 'space'. Relatively speaking, then – as Dr. Trinh Xuan Thuan stated: "Quantum mechanics thus eliminates all idea of locality. It provides a holistic idea of space. The notions of 'here' and 'there' become meaningless, because 'here' is identical to 'there'. This is the definition of what physicists call separability."[24] Mansfield defines separability as: "Mutually independent existence (the 'being-thus') of spatially distant things [Inherent existence for Buddhists]."[25] This isolationized independence allows for definable properties. Further: "Quantum physics has never been found to be wrong. So phenomena do seem 'interdependent' at a subatomic level, to use the Buddhist term."[26] In a previous location, Dr. Trinh Xuan Thuan states: "if

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[24] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers Where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 68

[25] Vic Mansfield: *Tibetan Buddhism and Modern Physics – Toward a Union of Love and Knowledge* (West Conshohocken: Templeton Foundation Press 2008), p. 81

[26] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers Where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 69

something appears it means that the potential for manifestation was already present"[27] - [thus attraction].

Cosmic-Atomic Relationship:

The human brain operates between 0-30 Hertz[28], operating with Delta, Theta, Alpha, Beta, and Gamma waves. There are some interesting videos that can be found on www.youtube.com demonstrating how human brainwaves can operate – one could search for related topics.[29] However interpretations of this data can be skewed from 'artifacts' or errors caused by body movements – thus are non-cerebral in nature. There are interesting medical experiments that can be found documented.[30]

There are 'waves' in our brain/bodies, and there are waves in the cosmos – arguably, we are not so different from what astronomers see in their telescopes, or what microbiologists see in their microscopes. However, as humans we can only see a limited portion of reality. Atomic particles also emit waves that can be measured. Our realities are subjected to change. The Nine-Planets was a "reality' that has already been changed. Astronomers[31] have recently discovered more plutinos similar to Pluto – which has been reclassified as a dual-dwarf planet, locked into orbit with Charon.[32]

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[27] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers Where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 30

[28] http://en.wikipedia.org/wiki/Eeg - accessed 17 June 2008

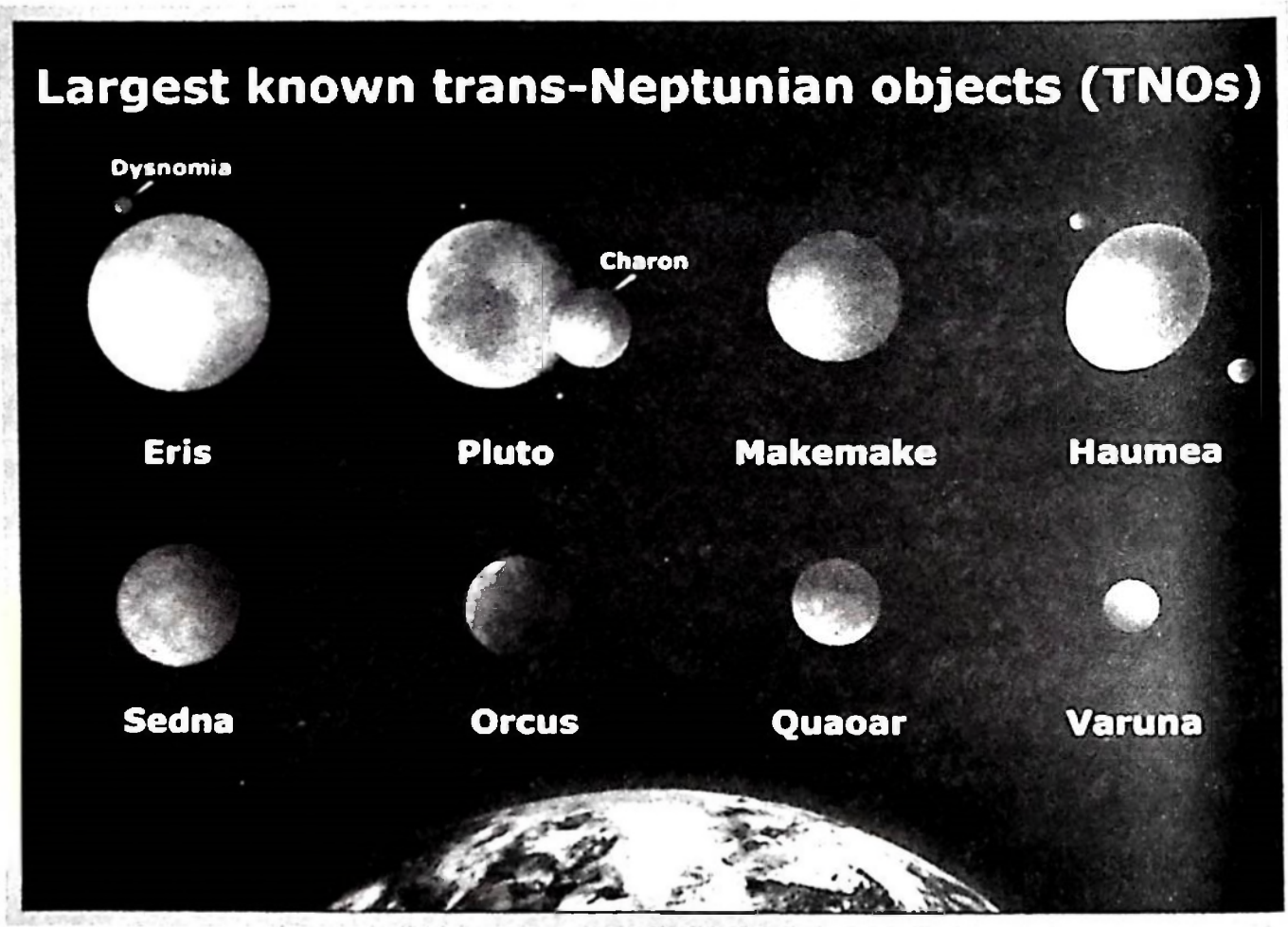
[29] "Ken Wilber Stops his Brain Waves" - http://www. youtube.com/watch?v= LFFMtq5g8N4

[30] EEG and Clinical Neuroscience Society - http://www. ecnsweb.com

[31] http://en.wikipedia.org/wiki/Portal:Solar_System – accessed on 17 July 2008

[32] http://en.wikipedia.org/wiki/Charon_%28moon%29 – accessed 17 July 2008

Trans-Neptunian Objects



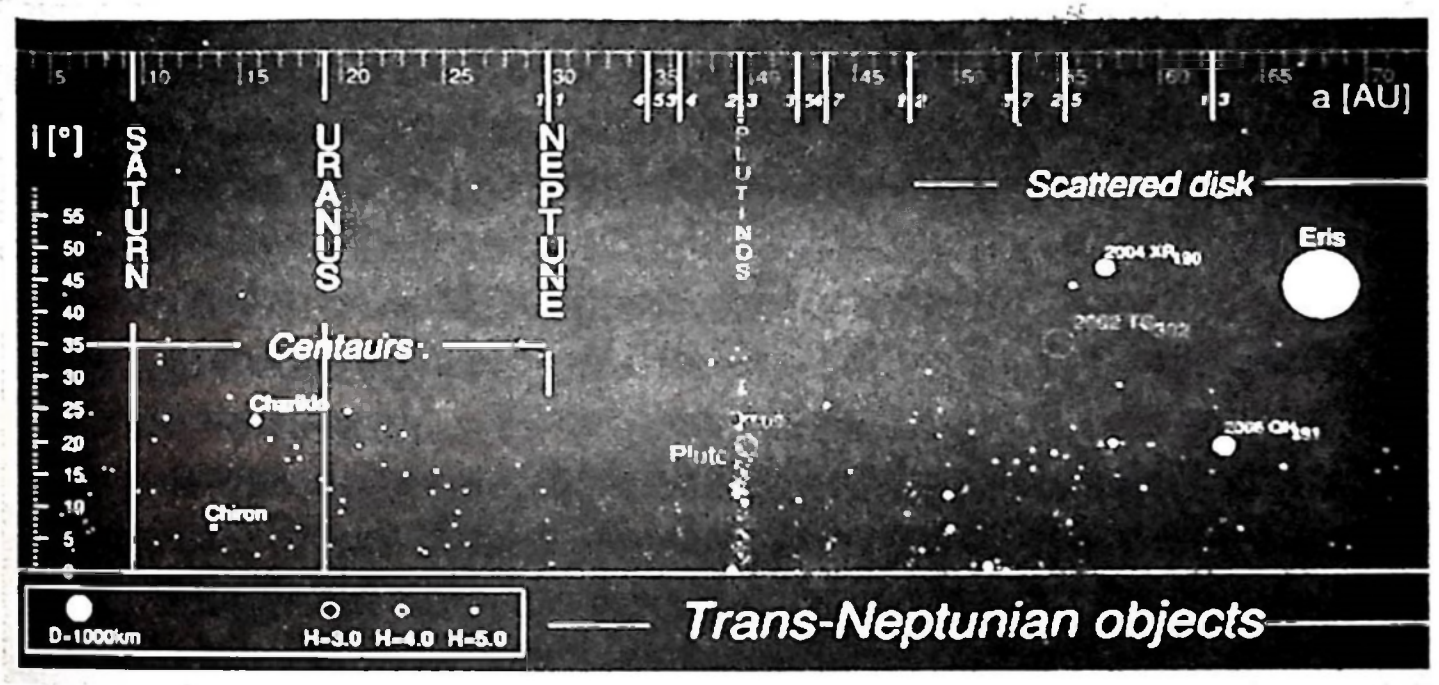
(Source: http://en.wikipedia.org/wiki/Pluto - accessed 24 September 2008)

In 2003, Eris [and its moon, Dysnomia] was discovered, and it is 27% larger than Pluto, and orbits the Sun every 557 years [according to measurements].[33] Another: Makemake was also, recently discovered. On 17 September, 2008, Haumea was officially classified as a dwarf planet.

Other Cosmic Objects

As the diagram below depicts, there are more, yet to be officially recognized, and are shown where they 'orbit':

[33] http://en.wikipedia.org/wiki/Eris_(dwarf_planet) – accessed 24 September 2008



Known objects in the Kuiper belt, derived from data from the Minor Planet Center. Objects in the main belt are colored green, while scattered objects are colored orange. The four outer planets are blue. Neptune's few known Trojan asteroids are yellow, while Jupiter's are pink. The scattered objects between the Sun and the Kuiper belt are known as centaurs. The scale is in astronomical units.

Emissions:

Our brains emit waves; stars emit waves – other 'cosmic' objects emit waves. The Buddha even emitted waves – several times since contemplating the contents of the Abhidhamma, shortly after his enlightenment, and later, as found in several Jātaka stories: On several occasions, the Buddha is known to give standing discourses in front of his 'scented chamber', and would 'emit' rays from his head... on other occasions, the Buddha would give a discourse and meditation theme, and would emit the six-colored rays... and from a final situation – an occasion finds five-hundred female friends of Vīsakha enjoying strong alcohol, and afterwards present themselves before the Buddha, in their drunken condition. The Buddha emitted a shocking ray-of-light from

his eyebrows, followed by a "blinding darkness". The drunk-women became terrified with a fear of death – until the effects of the drinks wore off. After the end of a stanza, the women became established in stream-entry – an implication that they never took up alcohol again. Rays here seem to be emitted from the Buddha's disapproval of the 'unethical situation'. Any person with 'emotions' can ascertain that when these situations are collectively analyzed, it seemed rays occurred when the Buddha was frustrated or intently focuses – perhaps signifying a 'tight forehead' or lowered-brow. It might be correct to state that these rays could be a different type of teaching to settle the masses with numerous problems or perspectives. How many of us have become 'radiating' with anger, or hot with some sort of sickness – we also emit this sort of heat. Our modern technology can detect many sorts of ·ave/particle emissions.

ɗditional Material to Consider:

Mathieu Ricard wrote: "A physical wave can be destructive, like a radioactive discharge for example [or an earthquake], or the source of well-being, such as sun-rays warming up a weary traveler. A radio wave can launch an appeal for war or for peace. In a similar way, the modifications made to our wave of consciousness by our thoughts and by the altruistic or malevolent motives behind our words and actions are expressed as happiness or suffering."[34]

This brief article demonstrates the importance of studying waves, at the micro and cosmic levels – and in doing so, this allows for a greater comprehension of the human mind – certainly when Buddhists spend durations of time trying to manipulate their personal mind-states. Buddhists, not 'should', but 'must' incorporate scientific discoveries into their literature and education – in order to provide a greater ser-

[34] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers Where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 178

vice to their lay-patrons in modernizing nations. Nothing prevents monks from seeking truths – certainly scientific discoveries. Humans don't understand or cannot perceive a total 'reality' – certain animals outdo humans in these various sense-realms. Therefore, at least cognitively - Buddhists must learn the principles of attraction and repulsion to gain a clearer understanding of reality.

Science would ask us to observe our bodies, and think about how the body works in relation to other components, then further investigate if additional tests duplicate the observed phenomena – if not the theory needs adjusted, until proven as a law – then sent out to be published. Buddhism is not far from this approach. Buddhism though, still recognizes the four primary elements: earth, fire, water, air – science tells us that there is more. There are secondary elements like color [artists], sound [musicians], smell [perfumers], taste [chefs], gender, nutriment – all of these have odd-scientific components. Even further, there are minute, elementary quanta: kalapas – forming all animate and inanimate material composed phenomena. The life-span of a kalapa can last about seventeen-mind moments. The brevity of a kalapa[35] signifies the scientific concept of radiation – as can be determined when dealing with plasma, particles or energy-waves. Kalapas originate from kamma [action/volition], citta [mind], temperature, and nutriment. Time factors into these relationships as well – and it is widely known that Buddhists can consider the past, present and future, as well as the impermanence of phenomena. Buddhism, even has the concept of akaliko [timeless] – for the nature of Dhamma, which is '*opanayiko paccattam veditabbo viññūhi*' - worthy of realizing, directly experience-

[35] The Sarvāstivādins have their own theory: paramāṇu – "the extremely fine", an atom – this is the smallest rupa. It cannot be cut, broken, penetrated. It is neither long nor short. It has no smaller parts; it cannot be decomposed... it is the finest of all rupas. See: Bhikkhu KL Dhammajoti: *Sarvāstivāda Abhidharma* (Center of Buddhist Studies, University of Hong Kong, 2007), p. 683. This type of atom is known through mental analysis and is a conceptual atom. A real atom would thus be the intrinsic nature of matter [visible] – known through direct perception. [pp. 259-260]

able by the wise [scientist] for themselves.

An 'Abhidhamma Hermeneutics' might determine: the experiencing the presence of the 'feeling'; asking to discover the root cause of the present "feeling/situation" experienced; are there other root conditions found; can one experience the passing and fading away of these experiences; move towards the experience of a new 'feeling'; and ...with the awareness of the extinction of the previous feeling? This is a highly scientific undertaking for the study of the human mind – the possession of operating wisely within equanimity and the capability to remain in this neither-wholesome nor neither unwholesome, middle-way, mental-state, takes a lot of effort to maintain. Understanding the whole human-mental cognitive process is a highly scientific system, involving: the six-senses; processes, presentations, modes, great/slight objects, absorption, registration, attainment processes, planes – clearly scientific. Hermeneutics links both Buddhism and Science together through parallel analytical tools. Buddhism additionally uses the Four Noble Truths as a tool, and depending on how one wishes to employ the tool – answers to different scientific questions can be revealed, being: The truth that there is a problem, the origin of the problem, this problem ceases, and the method/processes involved towards the solution/cessation of the investigated problem.

The higher or advanced levels of Buddhist Dhamma instruct the learner that there are Four Ultimate Realities: Nibbāna, Mental Factors, Consciousness and Form. Form is relevant here for scientific-materialists. There are four devices used to investigate form: characteristics, function, manifestation, proximate cause. Form or matter, as one of these ultimate or scientific areas for study, can be said to be a materiality or sensual-consequence under reaction/impact – generating a feeling, perception, volition, visual cognition – determined by the mind. Thus, there are: kinds of material phenomena; principles by which they are classified; their cause or means of origination; their organization into groups; and modes of occurrences. Form, then is some-

thing that can be deformed, broken, knocked around, and oppressed – undergoing and imposing alterations from the following circumstances: cold [icing causes erosion – geography, death of life], heat [fire turning organisms into organic/carbon-ash; and melting of material/rocks – volcanoes], hunger [lack of nutriment, plants wilt, death/undernourishment in beings], thirst [desert-environment, drought conditions, the need for water], insects [parasite/host relationships, human exploitation of the environment], water [erosion of river banks, deposits of minerals on soil during floods], wind [abrasion – sand-blasting particles against other objects], sunburn [radiation/oppressive solar heat can kill organisms], etc... all topics of scientific nature.

New Scientific Depiction of Buddhist Cosmology

Pertaining to contact [dependent origination] and the elements [sense-reception], as understood in Buddhism: "An element is defined as that which bears its own intrinsic nature. It cannot be split up or transformed into another. The elements are abstract qualities and as such are empty and void of substance, self... life. Except for Nibbāna, which is permanent and unconditioned, the rest of the elements are the ultimate constituents of all things which are said to be animate and inanimate... For when one has really grasped their true natures in a practical way for oneself, they will be realized as suffering and given up. Only then will Nibbāna be attained"[36]

Modern sciences may diverge to some extent with this presentation of elements, certainly when quantum physics/mechanics or chemistry with new phases of matter is examined; but is it necessary to recollect in brief, modern states of matter: solids, liquids, gases, and plasma – and other lesser known states or phases with varying characteristics – taking up 'space'. The 'space' in the cosmos, though, consists of some 4% of material with chemical properties, 23% determined as being

[36] U Nārada Mūla Paṭṭhāna Sasyadaw & Thein Nyun: *Discourse on Elements – Dhātu-Kathā* (Oxford: Pali Text Society, 1999), p. xxiii

dark matter, and 72% as dark energy.[37] Apart from matter, there is anti-matter – now hard to discover, because of its expulsion. Mandatory now, is the traditional Buddhist view on material elements:

Additional Elements	
Classification of Matter:	visible and resisting, invisible and resisting, invisible and unresisting
Six [*four*] Elements:	*the earth, water, fire, air*, space-element, and the conscious-element
Elements in the World of Sense-Desire:	of sense-desires, the element of form, the formless element
More Elements:	element of form, the formless element and the element of cessation
	the low element, the middling element and the sublime element

Consider: "Quantum physics agrees that light has no intrinsic reality, because it is neither exclusively a wave nor a particle. Instead it can appear as either, depending on the circumstances. This does not mean that we don't understand a good deal about the ways that light interacts with the world, or that the different properties of light aren't real. ...monk's robes look red and yellow because the atoms they contain absorb blue and green, but reflect yellow and red. The photons reflected by your robes enter our eyes with an energy and frequency that create the impression of seeing red and yellow."[38] What we cannot physically perceive, we might attribute this to invisible-sublime formlessness.

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[37] http://map.gsfc.nasa.gov/news/index.html - accessed on 28 September 2008

[38] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 80

According to science, the smallest *quanta*[39] that cannot be split would be the theorized Higgs-boson, which is mass-less, but provides mass. Better known than theorized quanta are: the quarks and gluons which comprise the atomic nuclei, which is splitable. An element bearing [accepting, dealing, accommodating] its own [independent of others] characteristics; however, when due to unseen forces of attraction, this isolation is short-lived, and soon re-bonding occurs due to the instability. As abstract qualities, the 'atom' is only a concept – like an image/model, to help physicists observe quanta in their coherent and logical schemes that are locked in equations.[40] Depending on circumstances matter can be transformed into energy [the Sun transforms hydrogen into photons], and energy can be transformed into matter [particle accelerators]. A look in the mirror demonstrates light, rather than the mass of matter before it – and this may very well illustrate the concept of perception that a Buddhist could understand. That the overwhelming portion of an 'atom' is empty-space is often forgotten, and the suggestion that atom are not 'things' is a concept that materialists fear – the comprehension of emptiness [suññatā] would then need further elaboration, but not here.[41] When one has grasped the practical-true nature of the material-phenomena, then one can 'give up' the search for scientific solutions/abstractions and become liberated from suffering.

Furthermore: "Since only these elements 'really' exist, no solid, substantial things are to be found outside of them." This implies, human

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[39] Lisa Randall's *Warped Passages – Unraveling the Universe's Hidden Dimensions* (New York: Penguin, 2006), p. 467: " a discrete unbreakable unit of a measurable quantity – the smallest unit of that quantity

[40] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 84

[41] Matthieu Ricard & Trinh Xuan Thuan: *The Quantum and the Lotus – A Journey to the Frontiers where Science and Buddhism Meet* (New York: Three Rivers Press, 2001), p. 98-99

minds should operate towards other concerns, possibly the alleviation of humanly suffering; again, because it is in the human realm, in the 'here and now' that the Dasabala emphasizes developing the Dhamma, to extinguish or escape the rounds of suffering, attaining Nibbāna. Recall that one of the Buddha's ten powers as the Dasabala is: understanding as it truly is the world with its many and different elements. Again – scientists have found around 25 different states of matter or elements.[42] Many Buddhists are worried that science would turn the Buddha into a great teacher with only nine-powers tarnishing his image as being omniscient.

Knowing that reactions to stimuli [based from contact] potentially lead onward to suffering – those interested do not have to wait for the next life to practice dhamma, because everyone was taught from the Dasabala to perform now - so that we or anyone won't have any regrets!

Buddhist Cosmological Realms

Ācariya Mahā Boowa Ñāṇasampanno has written: "When we say that the heavens and the brahma worlds are arranged vertically in a series of realms, one shouldn't understand this in the gross material sense – such as, a house with many stories requiring the use of an elevator. These realms exist in a spiritual dimension and they are ascended in the spiritual sense by spiritual means: that is, by the heart which has developed this sort of capacity through the practice of virtue."[43] Consider now the effort one must undertake to get to the four immaterial sphere planes – and ultimately, liberation from systemized suffering:

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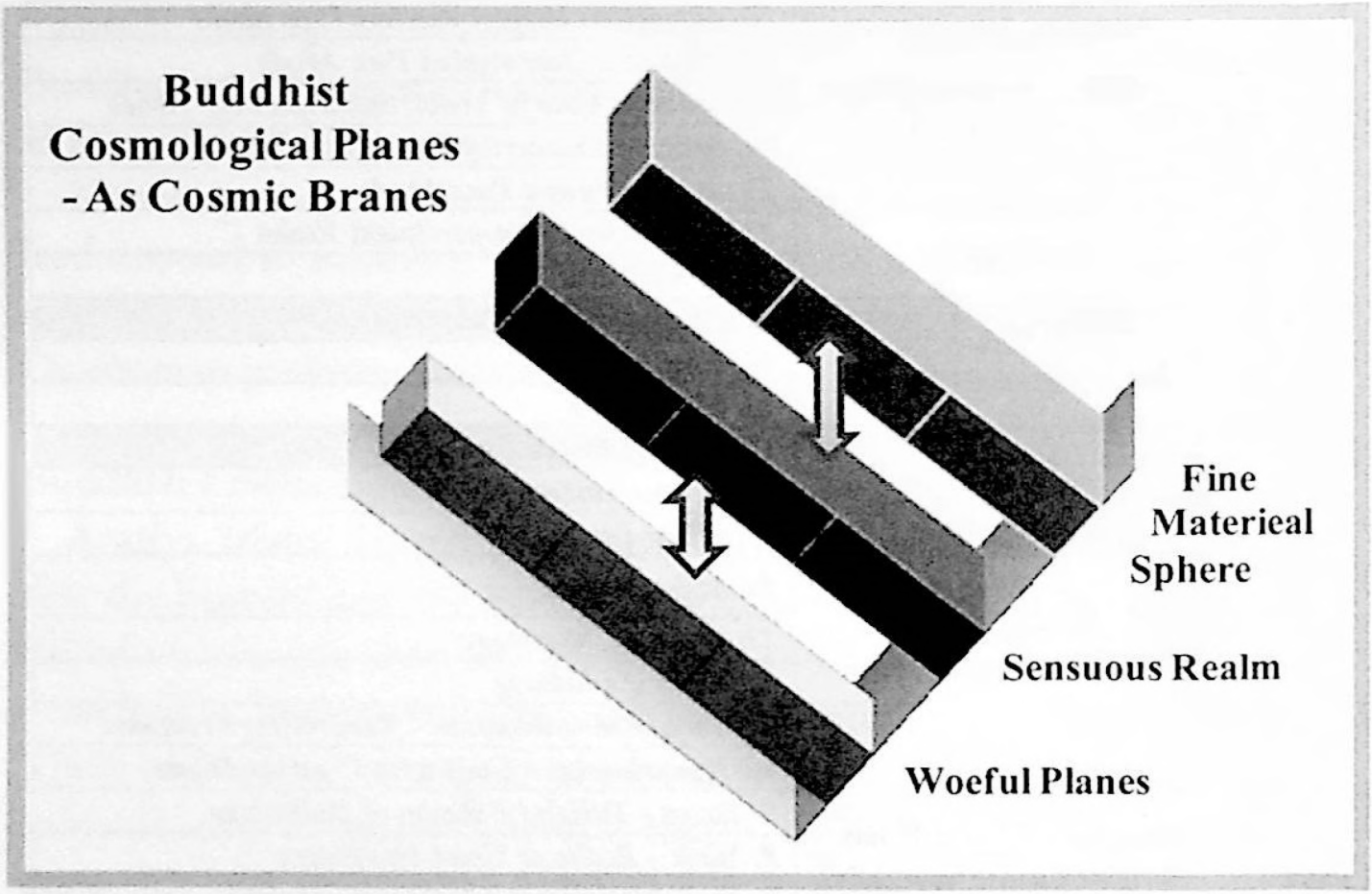
[42] www.en.wikipedia.org/wiki/list_of_states_of_matter - accessed on 28 September 2008

[43] Ācariya Mahā Boowa Ñāṇasampanno: *Venerable Ācariya Mun Bhūridatta Thera – A Spiritual Biography* (Baan Taad: Forest Dhamma Books, 2005), p. 125

Buddhist Cosmological Realms			
Plane	Buddhist Cosmological-Realm		
4 Immaterial Sphere Planes			*31. Neither Perception nor Non-perception*
			30. Nothingness
			29. Infinite Consciousness
			28. Infinite Space
16 Fine-material Sphere Planes	5th Jhāna Plane [Abhidhamma System] [23-27 are Pure Abodes – for an Anāgāmi's later attainment of Nibbana] (*Suddhāvāsā*)		*27. Akanitthā: Highest/Peerless Pure Abode*
			26. Sudasssī: Clear-sighted Pure Abode
			25. Sudassā: Clearly Visible/Beautiful Pure Abode
			24. Atappa: Unworried/Serene Pure Abode
			23. Aviha: Durable Pure Abode
			22. Unconscious/Non-percipient Realm
			21. Great Reward
	Sukhupapattiyo – Three Happy Rebirths	4th Jhāna Plane [*Lustrous Devas*]	*20. Steady Aura [Subhakinna]*
			19. Infinite Aura
			18. Minor Aura
		2nd & 3rd Jhāna Planes	*17. Radiant Luster [Ābhassarā]*
			16. Infinite Luster
			15. Minor Luster
		1st Jhāna Plane – different in body but alike in perception	*14. Maha Brahma*
			13. Brahma's Ministers
			12. Brahma's Retinue
11 Sense-Sphere Planes	Sensuous-Blissful Plane *[rebirth here due to generosity]*		*11. Paranimmitavasavattī – Controlling Creations*
			10. Nimmānaratī – Gods with Creation Power
			9. Tusita – Delightful Realm of Bodhisatta
			8. Yama – Realm of Great Happiness
			7. Tavatimsa – Realm of 33 Gods [Indra]
			6. Catummaharajika – Four Great Kings
			5. Human
	Kinds of Gain: *gain of relatives, wealth, health morality and right view – no beings arise in a happy state after death because of relatives, wealth and health, only reborn into such a state from gains in morality and right view*		
	Kinds of Loss: *loss of relatives, wealth, health, morality, right view – no beings pass into hell by losing relatives, wealth and health, only pass into hell from losing morality and right view*		
	Woeful Plane [apāya – state of loss]		*4. Asura [due to torments]*
			3. Peta [due to greed]
			2. Animal [due to negative kamma]
			1. Hell [due to evil deeds]

Therefore, please examine the following turn of interpretation: in the below graph-chart - the arrows [as stream-entry or back-sliding] act as bridges to the other planes, or 'branes' in modern astro-physics. The mind can travel to these planes via the correct vehicle. What vehicle moves one from one plane to another – any relationship to noble discipleship? Are there uncertain dimensions?[44]



I would argue, that dimensions are speculative perspectives that one must participate with [scientific-examination], if someone is, inside or outside the dimension, their perspective/feeling should be different. However, Lisa Randall defines a dimension as: "an independent direction in space or time."[45] I would suggest an internal/external dimension

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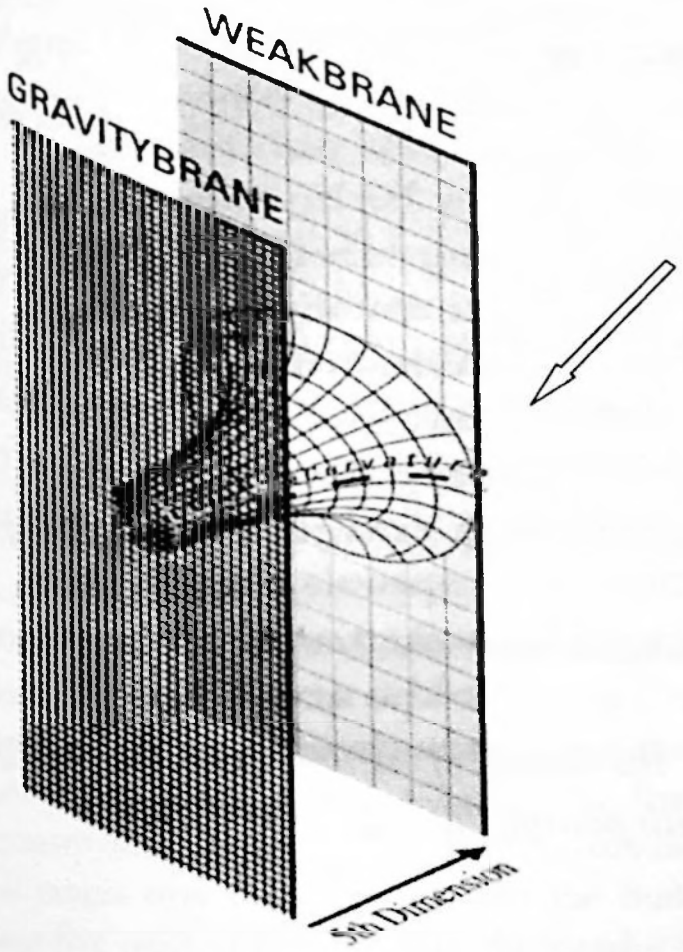
[44] See the video series: http://www.pbs.org/wgbh/ nova/elegant/program.html - accessed on 5 October 2008

[45] Lisa Randall's *Warped Passages – Unraveling the Universe's Hidden Dimensions* (New York: Penguin Books, 2006), p. 461

that is subjected to different forces, beyond distance in any direction and the time progressive/regressive in the situation – the answer is virtue. Something that the dictionaries are not figuring into their terms for dimension is 'pressure' [friction/stress/temperature could all be factors of this dimension] – either positive or negative, either inside or external to the situation – which might be another concept to consider for any sort of new dimension, which may not be seen, but could be felt – both to variances in degrees.



Space-time curvature as a bridge between branes of cosmological planes – seen as stream-entry in Buddhist mental-cosmological vocabulary.

Chart Source and Scanned from: Lisa Randall's *Warped Passages – Unraveling the Universe's Hidden Dimensions* (New York: Penguin Books, 2006), p. 399 – this illustrates the occurrence of re-sizing, re-timing, re-massing, and re-energizing dependent on brane location [re-scaling according to the amplitude of gravity.]

Scan of Randall's Branes

Along the space-time continuum, or the Buddhist "here and now" – the funnel to the higher plane/brane demonstrates a more *concentrative effort to get to the other plane.* Meditation, acts as a bridge to the other

realms, unseen through normal activities. According to Lisa Randall: "...branes can house particles and forces that string theorists didn't take into account when they originally developed string theory. Because of the many possibilities as to what types of branes exist and where they are situated in the higher dimensional space of strong theory, there are conceivably many new ways to realize the standard model in string theory that no one had thought about before."[46] However and more recently, a new model of cosmology has suggested that the multi-dimensional world of strings [10+] might have existed in the past moments after the 'big-bang' – but after time the four force-dimensional world is what we really perceive – and this according to 'Ding-Yu Chung', unifies theories in physics – as past events that physicists are only know discovering.[47]

Again, Buddhists would recognize the branes as meditational planes and the strings are the Buddhist "threads".[48] Literally, as the Netti mentions, sutta's are really threads – the heard discourses of the Buddha are linked together and equally bound teachings to other dhammas, many of which are intertwined. Discourses can be seen then, as different dimensions of the Dasabala's teachings – all of which seem relevant to the discussion – certainly the more one is scientifically aware:

- *Truly or actually understanding as it is, the possible as possible and the impossible as impossible*
- *Understanding as it truly is the results of actions (kammas) undertaken, past, future, and present, with possibilities and with causes*

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[46] Lisa Randall's *Warped Passages – Unraveling the Universe's Hidden Dimensions* (New York: Penguin Books, 2006), p. 322

[47] Ding-Yu Chung: *The Unified Theory of Physics – The Cosmic Organism Theory* – published electronically at: http://www.scribd.com/doc/3820709/Genesis-Cosmology-the-unified-theory - on 6 October 2008

[48] Bhikkhu Ñāṇamoli, *The Guide – Nettippakaranam* (London: Pali Text Society, 1997), p. xxxiii-xliii

- *Understanding as it truly is the ways leading to all destinations (all the states of existence and Nibbāna)*
- *Understanding as it truly is the world with its many and different elements*
- *Understanding as it truly is how beings have different inclinations*
- *Understanding as it truly is the disposition of the faculties of other beings, other persons*
- *Understanding as it truly is the defilement, the cleansing and the emergence in regard to the jhānas, liberations, concentrations, and attainments*
- *Recollecting His manifold past lives – with their aspects and particulars for recollection*
- *With the divine eye which is purified and surpasses the human, sees beings passing away and reappearing, inferior and superior, fair and ugly, fortunate and unfortunate... and understands how beings pass on according to their action/volition [kamma]...*
- *Realizing for Himself with direct knowledge, here and now enters upon and abides in the deliverance of mind*[49] *and deliverance by taintless wisdom through the destruction of the taints.*

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[49] Additional research discovered, pertaining to ceto-vimutti, the following to consider, from: Bhikkhu Bodhi [ed. and trns.], *The Connected Discourses of the Buddha–A New Translation of the Samyutta-Nikāya*-Vol. II. (Somerville: Wisdom Publications, 2000), p. 1325-1326 – As determined from the Godatta-Sutta of the Cittasaṃyutta: The householder Citta [summarized], possessor of the eye of wisdom that ranges over the deep Word of the Buddha, speaks to the Venerable Godatta about five types of liberations of the mind – which can be similar [meaning possible differences] in meanings, but all differ in phrasing–illustrating further interpretations of liberation or deliverance of the mind:

1. *Appamāṇā-cetovimutti: The measureless liberation [Arahantship] of the mind* [by the brahma-viharas – called measureless because of their measureless radiation towards countless beings; the path and fruits because they remove defilements, the cause of measurement]

Lust is a maker of measurement
Hatred is a maker of measurement

Equipped with the tools to scientifically investigate and know all phenomena – the Buddha, as the Dasabala, could assist modern seekers of wisdom through his powers, or power to thread together wise teachings.

Within the *Saṅgīti Sutta*, the old cosmological order can still be found, along with the possibility of rebirth – a concept still attractive to many Buddhists. In cosmological science, if a star implodes and the gasses are ejected, eventually some of these particles will re-accumulate and form another star, billions of years later. Rebirth is indeed possible, extinction is equally possible – the possibility to scientifically never-return is certainly true. Therefore, to perceive that the many as-

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Delusion is a maker of measurement

2. *Ākiñcaññā-cetovimutti: The liberation of the mind [Arahantship] by nothingness* [by transcending the base of the infinity of consciousness, and the path and fruits - aware that 'there is nothing', because there is no 'something']

Lust is a something
Hatred is a something
Delusion is a something

3. *Suññatā-cetovimutti: The liberation [Arahantship] of the mind by emptiness* [Empty is this of self or of what belongs to self; concentration based on insight into the selfless nature of phenomena, and the supramundane paths and fruits]

Empty of lust
Empty of hatred
Empty of delusion

4. *Animittā-cetovimutti: The signless liberation [Arahantship] of the mind* [with non-attention to all signs one enters and dwells in the signless concentration of mind; insight – because it removes the signs of permanence, happiness and seld; the four formless attainments because the sign of form is absent in them; and the four paths and fruits, because the defilements as makers of signs, are absent]

Lust is a maker of signs
Hatred is a maker of signs
Delusion is a maker of signs...

5. *Akuppā-cetomutti: The unshakable liberation of mind* [consisting in the fruitation of Arahantship] – is declared chief among them – empty of lust, hatred, delusion.

semblies of people and devas: Khattuyas, Brahmins, householders, ascetics, devas of the realm of the Four Great Kings, of the Thirty-Three Gods, of maras, of Brahmas [continually produce and dwell in happiness[50]], Radiant Devas [those immersed or overflowing with happiness[51]], and the Lustrous Devas - are all susceptible to the effects of kamma, as are those suffering in the lower realms – is quite, astronomically, correct. Essentially concerning humans, there are eight kinds of rebirth possible, due to generosity: to be reborn rich, or into the various heavenly realms – when the mental aspirations or intentions of a moral person are effective through purity and liberation from passion of a moral person not an immoral person – or, as one freed from passion not still swayed by passion.

When people die, as non-arahants, the *Saṅgīti Sutta* mentions the following post-mortem rebirth realms or destinies: hell, animal rebirth, the realm of hungry ghosts, humankind, and into the deva world. Accordingly, hell realms are merely painful bodily sensations – as found in the Samyutta-Nikāya[52] - or better yet, as a hydrogen particle cycling around as part of the Sun. There are three kinds of rebirth in the Sense-Sphere Plane, depending on if people still grip desirously to what is presented to them, if they desire their own creations, or rejoice in or have power over the creations of others – then rebirth into these heavenly realms is possible. Modern physics asks if there are any boundary conditions between the planes, in which physics calls 'branes'. Currently, and subjected to revision, the claim would be that the Buddhist meditative 'hindrances' are boundary conditions inhibiting one to traverse into a different cosmological or mental plane.

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[50] Maurice Walshe: *The Long Discourses of the Buddha: A Translation of the Dīgha-Nikāya* (Boston: Wisdom Publications 1995), p. 485

[51] Maurice Walshe: *The Long Discourses of the Buddha: A Translation of the Dīgha-Nikāya* (Boston: Wisdom Publications 1995)

[52] Bhikkhu Bodhi [ed. and trns.], *The Connected Discourses of the Buddha – A New Translation of the Samyutta-Nikāya* - Vol. II. (Somerville: Wisdom Publications, 2000), p. 1262

When the new consciousness links to a being, the following stations or abodes of conscious beings become possibilities [or crave for the World of Sense-Desire, of Form, in the Formless World] – based on accumulated kamma: beings different in body and different in perception, different in body and alike in perception, alike in body and different in perception, alike in body and alike in perception, Realm of Unconscious Beings, Realm of Neither-Perception-Nor-Non-Perception, beings who have attained to the Sphere of Infinite Space, beings who have attained to the Sphere of Infinite-Consciousness, beings who have attained to the Sphere of No-Thingness. With the preceding occurrence, a new continuum of the life-faculty begins. The consciousness in these realms continues to evolve into new personalities under different circumstances.

Great stress is placed on producing intentional, positive kamma in the human realm [here and now], because it is here that humanity has the most opportune occasion to be reborn in heavenly states – these heavenly states that are so often obtained during meditation. If human minds abiding lowly in pain, greed, hated and delusions – low rebirth can be expected. The meditator, striving in wholesome efforts, will be rewarded in the lokuttara realms.

Indeed, there is a tall order of Buddhist cosmological realms – as the above chart demonstrates. In order to explain this Buddhist concept of lokuttara, its opposing-partner as a starting point is 'lokiya.' However, again: all things 'lokiya' are of this world – in the human realm, and all other things are then outer-world or 'lokuttara' – imaginable only in our consciousness [and thus, reachable in our minds!]. In Thailand, morning and evening monastic chanting emphasizes the 'here and now' – or the human realm, as the location for maneuvering into another realm. Before humans undertake meditational practice or kammic endeavors, it is suggested that humans master the six-sense bases, as the foundation for other attainment opportunities.

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