

Reality Is Analogue
It Exists in the Flow of Time and Space

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Webster's Collegiate Dictionary states that reality is something that is neither derivative nor dependent but exists necessarily. In a true sense we can never know reality.

All that we define as reality is an approximation based on our own constructs. A digital representation of anything is a discrete man-made depiction of what we see as factual information parsed into numerical or discrete units, whereas reality is analog, flowing and fertile with the promise of any outcome.

Digital reality is only a model of what is real. True reality cannot be derived or be dependent on the results of a model, although a model can help predict reality at limited points in time. Accordingly, reality is a continuously variable truth, analogous to a clock with hands capable of indicating every possible time of day.

It therefore follows that reality is not a point in time. It must be dynamic, moving inexorably forward, capable of changing in kind and mass.

For example, scientists looking for electron neutrinos produced by nuclear fusion in the core of the Sun found that about 2/3 of the electron-neutrinos produced are converted into another type through neutrino oscillations¹.

The neutrinos are changed into muon and tau neutrinos that are more difficult to detect. A digital reality could not imagine discreet happenings where electron neutrinos fly out of the fusion process in the sun's core and suddenly change into neutrinos of greater mass and type.

Humankind needs to comprehend the particulars of what is real, whether it is weather, economics, the universe, or DNA. To achieve this we model the dynamics we don't understand..

Most models are digital representations of analog events. Models are useful because they are relatively easy to store and manipulate electronically. Accordingly, digital representation is a way of perceiving reality at a single point in time.

Because reality exists necessarily it is not dependent on the existence of prescient beings to define it or measure it in the reality plane. Without our models and our ruminations, it still flows.

“Scientific theories or models attempt to find the laws that govern the universe. We have formulated a number of theories or models,” according to Stephen Hawking and Leonard Mlodinow in *The Grand Design*ⁱⁱ. All have been attempts to explain what we see around us.

“A model is a device, demonstration, equation, picture or replica of something else. One word that is often used to describe a model is ‘analogue.’ The model performs or predicts how its analogue, the actual thing, behaves.”ⁱⁱⁱ

“There is no picture- or theory-independent concept of reality,” Hawking and Mlodinow say in their book. Reality is not a point in time. It flows on, requiring infinitely smooth gradations of change, thus independent of but perhaps resembling a mathematical representation based on past observations. Such observations are usually digitally derived. They are not reality but an attempt to explain it.

Pre-modern observers posited at one discrete point in time that the Earth is composed of four elements: earth, air, fire and water. Now the Standard Model of Particle Physics at least partially explains the quantum world with 6 quarks, 6 leptons and 4 carrier forces. Physicists know that a realistic depiction of physical laws must also include dark matter, dark energy, and the force of gravity. General relativity deals with gravity but can’t merge with the Standard Model of Particle Physics.

Progress in understanding the human body and its functions have also been made during this same period of time, represented by the body of knowledge surrounding medicine, but our progress in the understanding of medicine and biology is still somewhat spotty.

We cringe while watching pre-modern historical films that depict the sick being bled to cure serious ailments. One of the basic principles of medieval medicine involved the four humors of which a human body was composed. The balance between these four (blood, phlegm, yellow bile, and black bile) was essential for the well-being of a person.

A balance of humors in humans was achieved by pushing diet, using herbal medicines, inducing vomiting, and cutting the body to drain an imagined excess of blood. This belief stretched from the time of Greek philosopher Hippocrates, who gave us the Hippocratic Oath, to the beginning of modern times.

Modern medicine applies health science, biomedical research and medical technology to diagnose and treat injury and disease, typically through medication, surgery or therapy. But with all the advances in medicine, the dynamics of the human body are still not fully understood.

For example, prescribed medicines, shown by long disclosures (hastily-stated) of possible side effects in drug commercials, have varied side effects. Medical researchers realize the unknown differences in individual bio-systems, for trial studies and digital models can only predict reaction probabilities arising from a sample of subjects.

This is to say that intricacies of the body still can't be modeled completely. Even with DNA encoding, the realities of the human DNA and the interactions of enzymes thwart a precise understanding of the body's processes, but do yield a closer approximation.

Observations of our physical world failed to see all of its variables as well.

The earth doesn't appear to move beneath our feet, but in reality, we are travelling 67,000 miles an hour around the Sun. Accordingly, Ptolemy's model of 150 AD was his reality, one that perceived the earth as motionless and at the center of the universe. The medieval world, under

the hegemony of the Catholic Church, adopted this “truth” until 1543 when replaced by the Copernicus model, based on stellar observations.

Now our radial technologies allow us to peer into the still boundless pages of history, revealing billions of years of reality’s past. The long waves of cosmic truth appear to wash upon our shores like an almost 14 billion year old ejection of a super-volcano, the ultimate eruption models calls the Big Bang, this being our way of explaining the phantom forces that still echo in our observatories of earth and near-space. But even the microwave image of the cosmic background reveals a curtain covering the Big Bang’s origin.

These long waves of the universe’s flow still yield a barrier to the expected discovery of a beginning. Yet, humankind’s assumption that nothing existed before the Big Bang is also static judgment.

There are models to depict whatever hypothesis you want to pose.

Quantum theory describes the behavior of objects based on the assumption that matter and force come in indivisible units. It is a digital model that can’t even bring gravity into its framework. Instead, gravity falls under the rubric of Einstein’s general theory of relativity.

Waves, the bending of space, vibrations, color shifts, and flows are the things of our cosmic observations, seemingly fluid, not particle.

The analogue nature of all things is proposed by string theory. It unifies the elements of matter, force, space and time in a single set of principles. All are composed of tiny vibrating strings. Subatomic particles are miniaturized, less than Planck-size strings, each having a different pitch^{iv}.

Humankind tries to frame its observations, structuring the points of its observation within a picture or a model, giving their constructs a name and an explanation. Unfortunately the picture

never seems to flow into a contiguous reality. In this vein, the Big Bang (BB) and black holes (BH) are two distinct views in current models. Both have singularities, points with infinite density and the radius of zero. Many see connections between those two phenomena.

Ironically the laws of physics break down in both, the singularity of a black hole and the singularity existing seconds before the Big Bang. Both are discrete points from which reality must flow if we see reality as necessarily existing.

In our daily lives we view and plan in very narrow scopes of time. Our attempts to understand the sublime are rooted in our short-term earthly pursuits and tainted by our vain lives, wanting to deny their terminal nature.

Birth and death are universal conditions of reality. The gods in our models are eternal but still in our own images. Our view of what should be is not necessarily reality in the small and the large.

The Big Bang and black holes could be seen as a super-massive white hole and a super-massive black hole, a duality of birth and death, recurring again and again, perhaps in a Multiverse. Many believe that reality doesn't begin with the Big Bang and ends with the demise of our universe. Some scientists theorize that the cosmos and thus reality continues and that our universe is one of billions in a conglomerate of universes.

Accordingly, cosmologists and astrophysicists have pieced together models that represent this view, incorporating developments in string theory, M theory, and particle physics for multiverse and/or cyclic universe theories, the latter involving a trillion year universe cycle.

Enlarging the mystery of the BB/BH duality the super-massive black hole (SMBH) has emerged in the center of galaxies, a singularity which is an evil twin of the big bang's singularity.

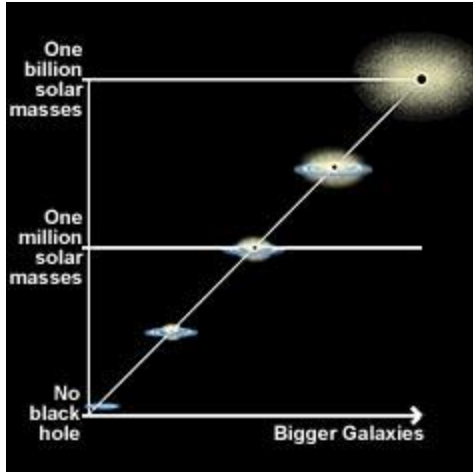


Figure 1: Black Hole Mass Vs. Galaxy Size

A study published in *Nature*^v and referenced in *Discovery* contends that SMBH appeared shortly after the Big Bang, some one billion years after. The first SMBH was identified some 12 years ago, so that scientists have come to the conclusion that every galaxy has one at its center.

Per Figure 1 above, SMBH vary in size from the Milky Way's 10 million times the mass of our sun to the M87 galaxy's 2 billion.

Over billions of years, the SMBH at the center of galaxies absorb dust, gases and even stars at the edge of the event horizon, adding to its impossible density and a steadily enhanced gravitational force. The SMBH in young galaxies, unable to digest all the dust, stars, and gas, emit the undigested gases in the form of a quasar. This in turn feeds a star nursery for the cycle of star births occurring long after quasars fade. The death of stars comes millions or billions of years later. When the SMBH becomes dense enough to digest all, the growing age of the galaxy brings only stellar death.

The nursery of stars is long gone, but the galaxy's SMBH is left gorging on stars and other stellar black holes left behind by massive dying stars. They are trapped in an ever-

broadening event horizon, its diameter larger than current huge galaxies, made colossal by the matter sucked into the core of the SMBH. Hundreds of billions of years pass as the SMBH core increases its mass and its gravitational force.

From here it would be easy to posit that clusters of galaxies and their SMBH merge into one galactic-size monster, perhaps more than a trillion solar masses, containing a singularity bursting with a pulsating energy and density that must ultimately explode into a new universe.

Each is just one of the bulging singularities created in our universe. Beyond light speed, other super galaxy clusters are expanded with the fabric of space, pushed by dark energy, trillions of light-years apart, each one eventually building an impossibly dense core and each exploding into another universe.

With the fabric of space stretching beyond light speed, gargantuan galaxies are so far away that no detection device outside can record them .

The far-flung galaxies are not seen or modeled by others but are a fluid reality, a connection of past, present, and future.

It is a lineal connection of birth, death and rebirth. From the ashes of its predecessor, new life and energy emerge like a Phoenix, arising from the ashes of its antecedent.

This ascribes a grace, a balance and symmetry to the reality of existence, seeming to fit a reality that is not discontinuous. Assuming that balance and fluidity, some of our later models more readily simulate the complexity of life, using that symmetry in pairing particles described in the digital standard model, while attempting to relate flow and force in fermions and bosons to supergravity.

One such model is supersymmetry.

If we can't know reality, we can perhaps begin to approach it with a more fluid relationship between particles that clump, others that are dynamic forces, and particles that are loners, which we call fermions. Gravitons are most likely there but not known to Earthlings.

String theory and supersymmetry help to characterize and partially marry the big and the small, giving some answers to life's mysteries.

We have models seemingly closer to a reality we all know vibrates with life, whether Planck-size quarks or galaxies billions of light-years wide.

Our models still struggle to depict reality, but, mute to their shortcomings, life and reality continue – large and small.

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ⁱ John N. Bahcall, “Solving the Mystery of the Missing Neutrinos,” Nobelprize.org.

ⁱⁱ Stephen Hawking and Leonard Mlodinow, *The Grand Design*, Chapter 3.

ⁱⁱⁱ Lesley Barker, “Why Are Models Used in Science,” eHow Contributor.

^{iv} George Musser, *The Complete Idiot’s Guide to String Theory*, page 4.

^v “Supermassive Black Holes Quickly Followed Big Bang,” 8/25/2010 *Online Discovery references Nature* study by Lucio Mayer.
