Supermassive Black Holes and the Multiverse

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ABSTRACT

Popular cosmological models of the universe fail to properly embrace the multiverse. Because conventional theories and direct visible evidence are very scant for the multiverse, that does not invalidate an elegant version. Supermassive black holes, as well as smaller black holes, and even such phenomena as red dwarfs, support by their very existence the multiversal paradigm.

Supermassive black holes have recently been promoted from objects of theoretical fantasy to essential engines for how the local post-big-bang universe has evolved. That's a massive paradigm shift up there with the 17th century's switch from geocentric to heliocentric, thanks to Galileo.

There is another cosmological model that has yet to receive its due consideration – the multiverse. While this idea is increasingly popular, most established cosmologists treat it as a third rail. They prefer to publicly stick with antique 20th-century General Relativity (GR) inside our universe, with expanding dark energy. Quantum theories by themselves can support or ignore the four-dimensional multiverse. The clever idea of "quantum foam" has promise, but so far has not been developed properly.

Mathematical multiverses with vast numbers of universes are found within models of string theory – with the truly weird idea of "tractor-beam gravitons" unifying many dimensions and quanta across universal branes. However, because every experimental attempt to *verify* string theory and supersymmetry has failed, even when using the Large Hadron Collider (LHC), there is no general agreement about what an actual multiverse, or multiple brane universes, would be like. There is not even agreement about the basic composition of our local 3D universe.

This essay will point to ways that supermassive black holes (SBHs) and a 3D multiverse (MV) are *at least as compatible* as the currently popular concept of GR and SBHs. Both approaches seek to somehow incorporate quanta – but the enhanced 21st-century model of push/shadow gravity and yin/yang elemental particles does it more elegantly.[1] String theory tries to unite GR and quantum theory, but extravagantly fails.[2]

At this early point in Big Experimental Science there is no way for either model to win in a "physics court of law," which is OK. Both paradigms need to be seriously considered henceforth, because recent SBH data associated with dwarf galaxies can point to both models (one universe vs. multiverse) as being possible.

General Relativity allows for the idea of large-star stellar singularities, or the ultimate vortex concentration of spacetime. Even though Einstein didn't clearly describe such GR singularities, others soon followed. Experimental wave evidence for merging black holes, thus demonstrating their actuality, has recently emerged with LIGO. This data is strong, but it does *not* prove the popular physics of GR.[3]

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1 http://astronomy-links.net/Solar.Corona.pdf

2 http://astronomy-links.net/String.Types.pdf

3 http://astronomy-links.net/LIGO.and.GR.pdf

A separate origin phenomenon that early GR did not clearly predict is supermassive black holes. Longer waves of *merging* supermassive black holes could also be directly recorded, but only with a LIGO having much longer baselines.

Doppler Shifting

For Milky Way black holes (stellar and supermassive) we look for spectrum-shifting orbiting stars, which is how we measure the Milky Way's supermassive BH which has about four million solar masses. Similarly, to detect SBHs in distant galaxies, and their nearby orbiting matter, we look for spectral shifts along opposite sides of their home galactic planes – which is required for distant galaxies where we cannot image individual stars.

The term for large-star black holes is "stellar-mass black holes," and their collapsed parent must have at least about five solar masses (our Sun is one mass unit). Stellar black holes are born with no more mass than the largest individual stars. After two or more black holes merge (as detected by the first LIGO signal) the new BH has their combined mass. A similarly collapsed star smaller than the BH minimum mass could only form a neutron star without an event horizon. A remnant senile star of one solar mass, after forming a planetary nebula, would only form a white dwarf visible at human optical wavelengths.

Doppler wave shifting with sound waves has been noticed for a long time. Both atmospheric sound waves (as with trains approaching, then passing, a station), and light waves exhibit similar Doppler wave frequency shifting. We hear different sound waves; and we also correlate cosmological light wave shifting toward the red with the idea of dark energy. Electromagnetic red shifting recorded by the Hubble telescope and other great instruments helps us estimate the increasing distance of early galaxies. Stars flying away are thus like accelerating trains leaving the station.

Briefly, light waves accelerating toward us shift to shorter (more blue) frequencies; and light waves accelerating away shift to longer (more red) frequencies. This simple color difference has enabled many of modern astronomy's greatest velocity discoveries.

Triangulation for judging distances also works from the tip of our noses out to relatively near deep space, but is worthless beyond. There are other means to measure space distances, but Doppler red shifting is best for the greatest distances.

Einstein's GR "fudge factor" to make his formulas work turned into dark energy after the Hubble shift[4] was observed in the 1920s. By itself, an observed red shift does not require any black holes or dark matter, nor voodoo GR dark energy. Dark energy theory only measures visual *correlation*, not causation.[5] Indeed, only the 21st-century version of *multiversal* push/shadow gravity *causally explains* the accelerating. Thus, dark energy as such is not causally proven to exist, at least as GR imagines it.

By comparison, a galaxy population of generally aging stars will trend toward the red, just as newer stars in dusty galaxies often burn hot and blue. This source of color difference is not from velocity spectral shifting, just recording that maturing stars tend to cool as their composition changes.

Dark energy is not the same as actual dark matter, because dark matter has been gravitationally observed for some time, even if not directly described. 20th century physics thus deals with dark matter more from occult correlation; whereas 21st century physics deals with dark matter more from parsimonious causation.

There has emerged another model that challenges the antique 20th century cosmology – *the yin/yang multiverse.* A multiverse

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4 https://en.wikipedia.org/wiki/Hubble%27s_law

5 http://astronomy-links.net/correlation.and.causation.pdf

does not stop at the boundaries of any one local universe, but is a community of *interpenetrating* “bubble” universes within possibly infinite space within infinite time.

The multiverse geometric model is not that of absurd string theory with its vast numbers of mathematical brane dimensions. Newton’s idea of three dimensions and linear space works better, taking into account how we measure time with the acceleration velocity of light.[6] The multiversal paradigm is both functionally elegant, and more aligned with scientific parsimony.

This supermassive black holes essay will soon describe yet another critical physical phenomenon associated with dwarf galaxies that is more easily visualized within the 21st century multiverse model, rather than the 20th century model.

Black Holes and Dark Matter

Consider briefly the differences between black holes and dark matter.[7] If we were to safely approach and orbit around a black hole, the circular event horizon below us and surrounding its inner “singularity” would sharply define the blackness we notice. No visible electromagnetic light escapes directly from within a gravitational black sphere’s Schwarzschild radius.[8] Nothing inside can directly or indirectly be *seen* by us, including the very center. Nevertheless, we can *envision* what may be inside.

Some visible light could visibly glow like rings just outside and around the event horizon, due to gravitational lensing of bright background objects such as quasars. This curving of background light’s path can be described either with push/shadow gravity, or with GR gravity.[9]

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6 http://astronomy-links.net/LightSpeed.pdf

7 https://en.wikipedia.org/wiki/Dark_matter

8 https://en.wikipedia.org/wiki/Schwarzschild_radius

9 http://astronomy-links.net/Allais.html

Much more light would radiate from the hot photosphere ring of plasma gas and stars rapidly circling near and outside the edge of the gravity hole's event horizon. From this fierce maelstrom some energy/matter drops into the hole, and some escapes as visible light.

None of what I have described requires dark matter or dark energy. Nevertheless, *dark matter does exist* independently of black holes. Dark matter is matter we cannot detect except indirectly through its gravitational interaction with itself and with "normal" baryonic matter. It also is attracted to black holes.

Although dark matter was hypothesized in the 19th century, the velocity-curve detection of dark matter occurred in the middle of the 20th century when astronomer, Vera Rubin, noticed the outer regions of spiral galaxies rotating faster than they otherwise should have, given their galaxy's baryonic mass.[10] This Doppler effect is not the same as measuring gravity effects of galactic BH mass, but will include it. Typically, the condensed stellar matter of a SBH is only a small percentage of a large galaxy's total.

Galactic dark matter (both inside the plane, and as an external halo) has been incorporated into vector calculations, which is somewhat amusing for something we cannot directly see. However, incorporation of dark matter into theory is justified – since *at their most elemental particulate level (approx. 10^-38 meters) all forms of yin/yang dark and baryonic matter are identical* and obey the universal law of conservation of matter and energy.

Furthermore, gravity vectors near Earth (such as with GPS) can seem to correlate with either GR or advanced push/shadow models.[11] On a grand scale, including galaxy rotation and

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10 https://en.wikipedia.org/wiki/Dark_matter

11 http://astronomy-links.net/LightSpeed.pdf

regional galaxy interactions, GR vortices must yield to the 21st century paradigm.[12]

It is important to note that so-called gravity singularities at the center of "normal" GR vortices do not lead to actual points of zero dimensions. These super-dense places are not points of infinite adjacent attraction, as would be required both by Newtonian and Einsteinian gravity, and by Coulomb's electromagnetic law. These collective centers are dimensionally very small, given their mass, but *not yet totally compressed*, and therefore cannot be infinitely powerful at their geometric centers.

A *mathematically pure point singularity* is only *approached* toward maximum "velocity compression" at the beginning of another big bang, which is a rare, but not unique, event.[13] Here is the maximum Yin moment – which then instantly reverses into an explosion, the maximum Yang moment, leading to the birth of another new local universe. This birth is the purest expression of what the *Lotus Sutra* calls *renge* (pronounced ren-gay), the simultaneity of cause and effect.

Loop quantum cosmology also has an origin paradigm that can model the quantum push-back *bounce effect* within a black hole's Planck dimension.[14]

Within the event horizon of a BH may be one or more energy zones as yet unknown. We only know that the electromagnetic *centrifugal* escape velocity just inside the event horizon radius is less than the *centripetal* gravity velocity of the central mass just inside the same radius. Approaching the central mass, all within the event horizon, the centripetal gravity velocity far exceeds the escape velocity of light.

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12 http://astronomy-links.net/DipoleRepellerExplained.pdf

13 http://astronomy-links.net/Gravities,BlackHoles,BigBangs.pdf

14 https://en.wikipedia.org/wiki/Loop_quantum_cosmology

As for transformation of types of matter into different types of plasma, that shift should occur much closer to the gravity center, as tighter orbital velocities and particulate collisions accelerate and intensify. This leads to the destruction of all composite particles, leaving only pure y/y units at the very core. In this way the dichotomy between dark and baryonic matter disappears.

"Hawking radiation"[15] from just inside an event horizon helps to deplete any stellar or supermassive black hole mass, but only over many billions or trillions of years. This leakage is a quantum effect, and does not reflect the actual speed of light. For the time frame of this narrative we can mostly ignore Hawking radiation, but not within the multiverse question.

Within a non-big-bang SBH the center appears to stay stable within our local time frame of reference, and still retains its dynamic yin/yang nature as it "munches" on various "meals." We expect nothing less from any sufficiently dense collection of units cohering from their primary electromagnetism.

In sharp contrast, during the formation of a new universe, core elemental integrity will dialectically change when primary EM bonds are disrupted as the latest primal SBH itself collapses and instantly rebounds to create a new big-bang local universe. Newly ejected elemental y/y particles thereafter re-express their matter/energy duality as they recombine into new plasmas, and later as beaded strings into dark and baryonic matter.

The more things change, the more they remain the same. The baby local universe becomes like the old local universe, *all within the one geometric framework of the very old multiverse.* Thus continues the law of simultaneous conservation of energy and matter, which can express as particulate energy/matter duality.

Here's something that deeply puzzles cosmology: There is a 50% possibility of any new universe's composite *matter* initially

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[15] http://astronomy-links.net/hawkingerrors.html

expressing as *antimatter*. In a new universe protons could have negative charges, and electrons positive charges. Such a flip from the local past would be catastrophic for residual local matter from the previous universe, as each new particle annihilates its charged opposite. Very soon all traces of the earlier universe would be annihilated by the vastly greater number of new, oppositely charged particles. On the other hand, a new universe could itself vanish almost as soon as it starts, if it encounters more oppositely charged particles awaiting the new expansion.

Let's say that every other post-big-bang is randomly built on antimatter, or on matter like ours. Given that the fringes of each universe interact with its neighbors, there would by this math be a 50% probability that adjacent universes would mutually destroy each other. Because each universe in a "bubble multiverse" interacts with several adjacent universes at the same time, it mathematically would not be too long before *every* universe in the multiverse would be mutually extinguished.

Happily, a clear explanation exists for how and why adjacent universes all have positive protons and negative electrons, *without* mutual annihilation.[16]

Dwarf Galaxies and SBHs

A recent paper covered how galactic encounters and mergers help create dwarf galaxies.[17] The resulting predominance of dwarf galaxies forming around large galactic equators is at odds with the older popular model of dwarf galaxies randomly forming in space.

There are many more dwarf galaxies than large galaxies like the Milky Way. One recent estimate has their population 50 times

16 http://astronomy-links.net/Antimatter.pdf

17 http://astronomy-links.net/Dwarf.And.Large.Galaxies.pdf

that of large galaxies like the Milky Way.**[18]** The typical large galaxy has nowhere near fifty orbiting dwarf galaxies. A number of the dwarfs are now scattered about deep space. Billions of "Earth years" of galaxies interfering with each other's gravity environment would be sufficient to scatter many dwarfs, even if most dwarfs started in large galaxy nurseries.

However, it is equally possible that a number of dwarf galaxies and black holes not found in galaxy arms came from elsewhere. The "elsewhere" is possibly a pre-existing universe that was already occupying space in what is now "our" universe:

Red dwarf stars are the most common species in our visible universe. Unlike larger and hotter stars, red dwarfs, and to a lesser extent white dwarfs, can survive for hundreds of billions of years, far longer than 13.8 billion years.**[19]** If these small, dim stars are so abundant, when and where did they form? There is no way to prove that a number of our visible universe's red dwarfs are not actually remnants from previous universes.

Short of conveniently invoking an unknowable, omnipotent god**[20]** – *it is the height of absurdity to model everything before our big bang becoming coordinated and pre-concentrated.* This absurd dream envisions everything before our big bang being symmetrically shot into our nascent big-bang singularity at *precisely* the same time. Such perfect preparation ensures that previously populated regions of what is now our 3D universe's space would be left truly empty precisely before our local, hyperluminal inflation fills up the local void.

Even within that absurd cosmogonic scenario, it is highly unlikely that enough gas would next quickly organize into dense clusters to allow *all* the supermassive black holes that have been

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18 http://www.sdss.org/press-releases/winds-of-change/

19 https://www.space.com/23772-red-dwarf-stars.html

20 https://www.big-bang-theory.com

recently discovered in large and dwarf galaxies. *Mass collapse* makes sense when large galaxies are rapidly forming SBHs this way, but not from randomly merging dwarf galaxy black holes.

New theory has SBHs appearing quickly from discrete mass collapsing of adjacent early-universe dust clouds, not from accreting stellar-mass black holes.[21] The reason for SBHs appearing quickly has to do with the *Eddington limit*[22] from Eddington luminosity – a strong concept that explains how matter/energy dropping into growing *stellar* black holes can only proceed at a pace too slow to accumulate SBHs with hundreds of millions, even several billions, of solar masses since our big bang.

Some spaghettified energy from stars spiraling inward close to the event horizon escapes as outwardly flowing electromagnetic winds that somewhat slow down (push back) the approach of other incoming energy/mass eventually destined for destruction. Therefore, the idea of mass collapse of dust clouds to allow within a reasonable time singularities with as many as several billion solar masses is brilliant, since a massive gas collapse can supply huge quantities of matter AND bypass the Eddington limit.

This tidy dialectical model is sharply questioned by the recent discovery of compact dwarf galaxies with their own supermassive black holes.[23] The current idea is that these smaller galaxies at some time in the past had most of their stars stripped away by encountering even larger galaxies.

However, even with as much as 15 percent of a dense dwarf galaxy's mass residing in its SBH, why wouldn't the *entire* smaller galaxy eventually be consumed by the much larger galaxy's gravitational field? Partial consumption along this model may be true for some dense dwarfs that we can measurably see – but is

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21 http://www.astronomy.com/news/2017/11/cooking-up-supermassive-black-holes

22 https://en.wikipedia.org/wiki/Eddington_luminosity

23 https://www.space.com/27179-monster-black-hole-dwarf-galaxy.html

not yet proven for all such dwarfs in our visible universe. To date our statistical sample is too small.

It is critical to note that just as we hope to find intelligent life somewhere else, if only to prove we are not "alone" in the universe – it is also possible that there are many undetected and undetectable virtually naked SBHs in deep space. If there are many pure SBHs with very few if any nearby stars yet to be identified, then we have no way to detect them other than noticing by chance some gravitational lensing without an apparent "gravity lens."

If several such lenses are found, then the door swings open for the idea of earlier universes, and possibly a multiverse. If red dwarfs can last for as long as a trillion years, why not expect the same for SBHs?

It is possible for a smaller BH to be ejected from a merging of two large galaxies, including a near-merger of their SBHs. It is possible for the smaller of the two singularities to be ejected from the combining galaxy, rather than be added to make a new, even larger SBH. For example, such ejection might occur (or not) when the MW SBH of some 4 million solar masses encounters the Andromeda SBH of some 100 million solar masses, several billion Earth years hence.

The takeaway from this idea is that it would be relatively rare when highly attractive SBHs meet. If only one of the occult SBHs precedes our local big bang, then we have a multiverse, at least in *time* if not in *geometry*. Over hundreds of billions of years the "multiverse-ness" should also include "bubble" geometry. That's space and time, not GR spacetime.

Supermassive black holes can survive for hundreds of billions of years, or many times the expected life of any local universe. That means a percentage of the naked SBHs we will identify inside our universe's current volume could have been sitting there in "our" local space long before our current visible universe.

Only the "divinely magical idea" of everything in our present universe's space perfectly collapsing almost 13.8 billion years ago can explain away the elegant reality of residual SMBs from previous universes. Indeed, a SBH could survive a succession of several local universes inside one multiversal 3D place. This new model wrecks the too-tidy GR local space model.

If multiversal space is three-dimensional and potentially infinite across all local universes inside the multiverse, then all motion is relative within that absolute grid-space. Motion is thus relative to the multiverse, not just to any observer. Gravity is particulate kinesis from all directions within multiversal space, not just a geometric aspect of space itself, as GR would have it.

Multiversal geometry and kinesis are primarily why push/shadow gravity theory works so well in all dimensions – with *kinetic y/y particles* coming at us *equally* from all directions, crossing numerous local universal boundaries. *What we experience as gravity are not the total push forces from all directions, but the net difference between pushing and partial shadowing.*

The multiversal 3D "space" is also filled with *a calm sea of y/y particles expressing more potential energy than kinetic.* These myriad elemental particles form the "quantum sea" beloved, but partially misunderstood, by quantum theorists. These y/y quanta are unlike Schrödinger cat ideas, but merely expressing the deep duality of energy and matter.

Real elemental particles do not pop like magic into existence and randomly go out of existence. Such particles merely change expressions of their existence. Think of Brownian motion for how they stay together and randomly disperse inside their sea.

LIGO experiments to date may not prove pure GR waves. The waves they record are most likely De Broglie-Bohm pilot waves**[24]**

[24] https://en.wikipedia.org/wiki/De_Broglie–Bohm_theory

within the ubiquitous y/y particles sea. Both merging black holes and neutron stars create similar but distinctive pilot waves. The new theory does not pit GR against standard model and quantum ideas, which together are closer to a unified theory.

There are an estimated 7 TRILLION dwarf galaxies inside our visible universe.[25] With a number that large, is it likely that *every* one of them was serendipitously formed during the brief hyper-density period of our current, post-big-bang universe? Is it not *more* likely that at least some dwarf galaxies are residual galaxies from earlier local universes in our space?

Since red dwarf stars and black holes can last for hundreds of billions of Earth years, how many local-universe life spans (between sequential local big bangs and subsequent dissipation) in our general region should we expect to discover that overlap within a "timeless" multiverse?

Considering that a proper 3D multiverse should over sufficient time have many "local universal spaces," how large could the grand total of all galaxies and their black holes be? This final question can never be answered by any theory. However, the emerging 21st century cosmological model reveals itself as more elegant than weak models built around century-old theories.

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[25] http://www.dailygalaxy.com/my_weblog/2013/03/an-infinity-of-dwarfs-a-visible-universe-of-7-trillion-dwarf-galaxies.html