# THEORETICAL IMPLICATIONS OF NANO-SCALE QUANTUM GRAVITO-MAGNETISM ON THE NATURE OF OUR STEADY STATE UNIVERSE

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**Abstract:** The Big Bang Theory has come in to question because surrounding galaxies accelerate apart faster than predicted by the theory. This has been referred to by some physicists as "inflation theory". Recent discoveries of the presence of gravitational lensing rings observed in the cosmic background of the known observable universe (Figure 1) coupled with the quantum relationship of gravity to electromagnetism (Figure 2) supports the premise for "eternal inflation" upon which some inflation theories are based, undermining the Big Bang Theory's premise that at some time in the distant past a finite temporal event occurred creating the universe of today.

**Key words:** Gravitational, Einstein Rings, Black Hole, Quantum Time, Big Bang.

## 1 Highlights

In particle physics, the ADD model, also known as the model with large extra dimensions, offers an alternative scenario to explain the weakness of gravity relative to the other forces. This theory requires that the fields of the standard model are confined to a four-dimensional membrane, while gravity propagates in several additional spatial dimensions that are large compared to the Planck scale.

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This inventor postulates that there exists an equivalent quantum nature to gravity associated with the presence and absence of matter on the spinning disk to the quantum nature in electromagnetism in the semiconductor junction, or a rectifier, as a type electromagnetic spin valve device which is based on the spin of conduction energy band electrons in the semiconductor crystal.

Fourteen defects were fabricated on a "2400 Oe 31.5 mil 95 mm MR disk" using a Focused Ion Beam (FIB). Seven bumps of ≈32 nm height were deposited, and seven pits ≈51 nm deep were etched, on a disk ≈1.27 mm apart on a radius. The US Patent Application # 13595424 [4] is for a Utility Patent on the use of a type device the inventor characterizes as a "mass spin-valve" or "gravitational rectifier" which uses gravitational frame dragging to produce an electric signal and/or associated mechanical force, for general use in surface characterization work and power produced by the presence or the absence of matter on a spinning disk.
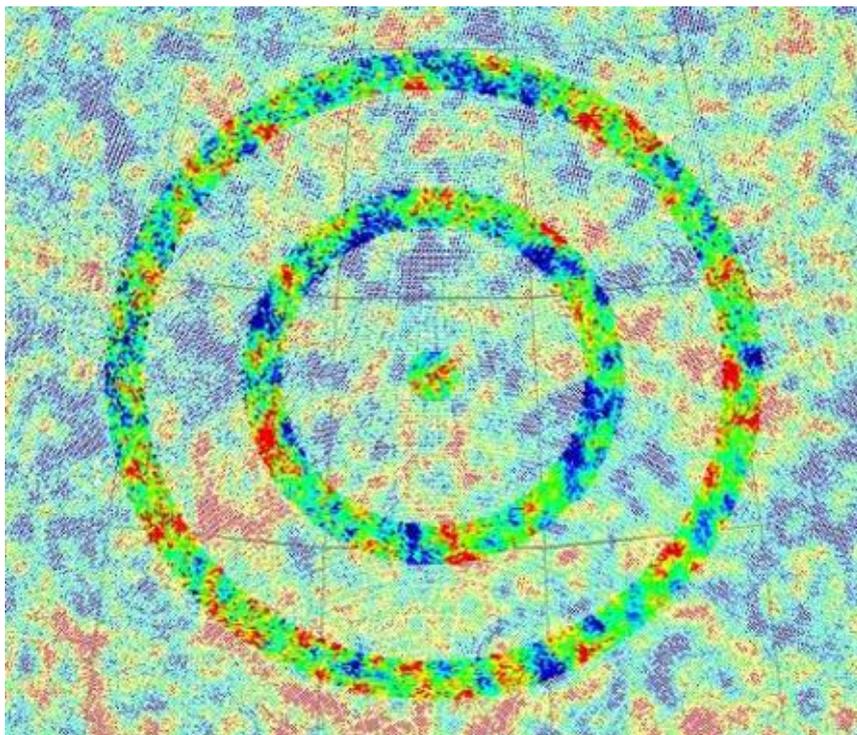


Figure 1: **A map of the cosmic background radiation (CMB) (Source: Gurzadyan and Penrose [8])**

Recently observed gravitational lensing rings in the cosmic background radiation shown in Figure 1 where "the observable effect, in our CMB sky, of families of concentric circles over which the temperature variance is anomalously low, the centre of each such family representing the point of 'I' at which the cluster converges. These centers appear as fairly randomly distributed fixed points in our CMB sky. The analysis of Wilkinson Microwave Background Probe's (WMAP) cosmic microwave background 7 years maps [3] [10] does indeed reveal such concentric circles, of up to $6\sigma$ significance" as reported by Gurzadyan and Penrose in 2010 [8]. These concentric rings are predicted by Albert Einstein's theory of general relativity. Instead of light from a source traveling in a straight line in three dimension, it is bent by the presence of a massive body, like a super massive black hole which distorts space-time. An Einstein Ring is a special case of gravitational lensing, caused by the exact alignment of the source, lens and observer. This results from symmetry around the lens, causing a ring-like structure. The size of an Einstein ring is given by the Einstein radius. This author postulates they suggest the presence of a super massive black hole.

In radians, it is:

$$\theta_E = \sqrt{\frac{4GM}{c^2}\frac{d_{LS}}{d_L d_S}} \qquad (1)$$

where:
G is the gravitational constant,
M is the mass of the lens,
c is the speed of light,
$d_L$ is the angular diameter distance to the lens,
$d_S$ is the angular diameter distance to the source, and
$d_{LS}$ is the angular diameter distance between the lens and the source.

Note that, over cosmological distances $d_{LS} \neq d_S$ - $d_L$, in general.

## 2 Theory of Quantum Gravitation

Einstein's problem was he only understood the universe from the side of electrons not the holes side that dominates it. If you think of empty space as a high density of holes and matter as regions where electron density is higher then you see Einstein Dirac etc..., where blinded by the light produced by

electrons..., that's why they couldn't see the holes in the universe all around them.

Magnetism is a property of electromagnetism produced by electron states in matter; gravity is produced by the mass of the matter which mass comes from the mass of the neutrons and protons of the element of matter as described in the periodic table of the elements of matter.

Table 1: Particle mass

| Name | Mass |
|---|---|
| proton | 1.6726 x $10^{-27}$ kg |
| neutron | 1.6749 x $10^{-27}$ kg |
| electron | 0.00091x$10^{-27}$ kg |

The mass of a neutron is greater than the mass of a proton because the neutron contains a proton, contains an electron with some subatomic particles.

Neutron stars are collapsed matter leaving only neutrons at the atomic scale that makes up the neutron star and black holes are nearly identical but made of protons [holes] instead.

Black holes are black not because light doesn't escape but because black holes are made of holes [collapsed protons] where light is not present because there are no electrons to absorb the light for re-emission of the light.

Holes are the mechanism for quantum tunneling in the semiconductor; as well as superconductivity. To understand how "holes" work it is useful to examine the Hall effect in semiconductors. The Hall effect is due to the nature of the current in a conductor. Current consists of the movement of many small charge carriers, typically electrons, holes, what are called mobile ions or all three. When a magnetic field is present that is not parallel to the direction of motion of moving charges, these charges experience a force, called the Lorentz force. When such a magnetic field is absent, the charges follow approximately straight, 'line of sight' paths between collisions with impurities, phonons, etc. However, when a magnetic field with a perpendicular component is applied, their paths between collisions are curved so that

moving charges accumulate on one face of the material. This leaves equal and opposite charges exposed on the other face, where there is a scarcity of mobile charges. The result is an asymmetric distribution of charge density across the Hall element that is perpendicular to both the 'line of sight' path and the applied magnetic field. The separation of charge establishes an electric field that opposes the migration of further charge, so a steady electrical potential is established for as long as the charge is flowing.

In the classical view, there are only electrons moving in the same average direction both in the case of electron or hole conductivity. This cannot explain the opposite sign of the Hall effect observed. One very important feature of the Hall effect is that it differentiates between positive charges moving in one direction and negative charges moving in the opposite. The Hall effect offered the first real proof that electric currents in metals are carried by moving electrons, not by protons. The Hall effect also showed that in some substances (especially p-type semiconductors), it is more appropriate to think of the current as positive "holes" moving rather than negative electrons.

Theoretical physicists Arkani-Hamed, Dimopoulos and Dvali pointed [2], out that prior to now, gravity had not been measured below a distance of about a millimeter. They whose model is known as ADD, suggest that there could be extra dimensions as large as a millimeter in diameter. In particle physics, the ADD model, also known as the model with large extra dimensions [1], offers an alternative scenario to explain the weakness of gravity relative to the other forces. This theory requires that the fields of the standard model are confined to a four-dimensional membrane, while gravity propagates in several additional spatial dimensions that are large compared to the Planck scale.

Theoretical physics typically treats the Planck scale as the highest energy scale and all dimensional parameters are measured in terms of the Planck scale. In models of large extra dimensions the fundamental scale is much lower than the Planck scale. This occurs because the power law of gravity changes. For example, assuming r is the distance between the gravitational induction sensor and the spinning disk; when there are two extra dimensions of size d, the power law of gravity is $1/r^4$ for objects with $r \ll d$ and $1/r^2$ for objects with $r \gg d$. This relationship suggests if we want the Planck scale to be equal to the next accelerator energy (1 TeV) we should take d approximately 1mm.

As suggested by ADD, gravity could be just as strong as the other forces but only felt strongly at short distances. Scientists funded by the European Space Agency have measured the gravitational equivalent of a magnetic field for the first time in a laboratory. Just as a moving electrical charge creates a magnetic field, so a moving mass generates a gravitomagnetic field. According to Einstein's Theory of General Relativity, the effect is virtually negligible. However Tajmar [11] have measured the effect in a laboratory. Their experiment involves a ring of superconducting material rotating up to 6,500 times a minute. The volume Pit & Bump Volume is expressed again in the mathematical equation that would be the theoretical mechanisms for the influx possible for a black hole. Which may be expressed by equation (1).
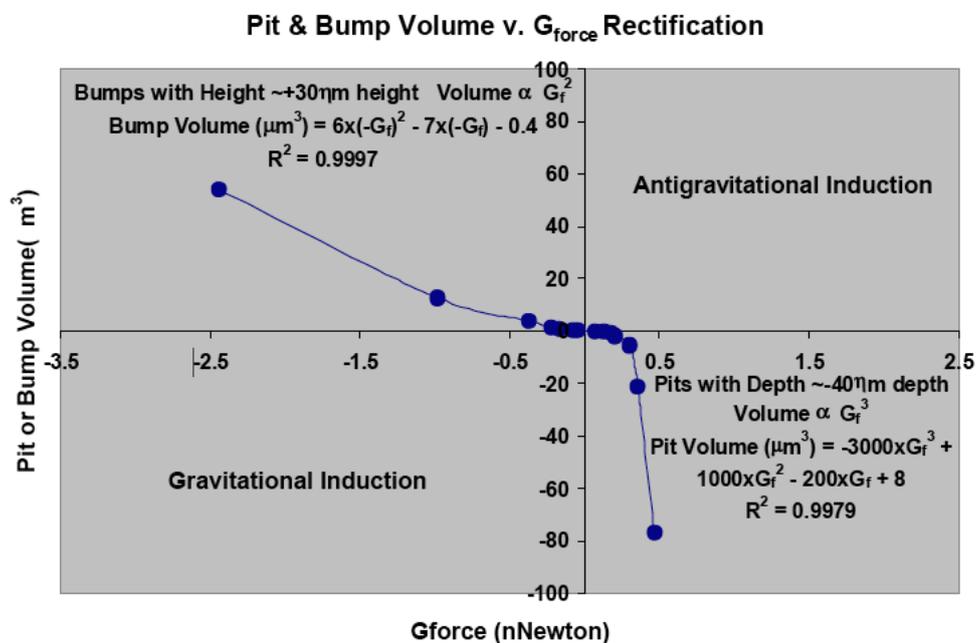


**Pit & Bump Volume v. $G_{force}$ Rectification**

Bumps with Height ~+30ηm height   Volume $\alpha$ $G_f^2$
Bump Volume ($\mu m^3$) = $6x(-G_f)^2 - 7x(-G_f) - 0.4$
$R^2 = 0.9997$

Antigravitational Induction

Gravitational Induction

Pits with Depth ~-40ηm depth
Volume $\alpha$ $G_f^3$
Pit Volume ($\mu m^3$) = $-3000xG_f^3 + 1000xG_f^2 - 200xG_f + 8$
$R^2 = 0.9979$

Pit or Bump Volume($m^3$)

Gforce (nNewton)

Figure 2: **Gravitational induction equivalent of the semiconductor rectifier (Source: Author)**

This author postulates that there exists an equivalent quantum nature to gravity associated with the presence and absence of matter on the spinning disk to the quantum nature in electromagnetism in the semiconductor junction (or a rectifier) as a type electromagnetic spin valve device which is based on the spin of conduction energy band electrons in the semiconductor crystal. Figure 2 shows the gravitational induction equivalent of the semiconductor; as a gravitational rectifier in the mass spin valve device; whereby

the downward gravitational induction force (N type donor gravitons) is produced by additional mass; equivalent to the electrons in the semiconductor rectifier; and the upward gravitational induction force (P type acceptor anti-gravitons) is produced by the absence of mass, equivalent to "holes" in the semiconductor rectifier.

# 3   The Gravitational Rectifier or Mass Spin-valve

On Earth's surface, a mass of 1 kg exerts a force of approximately 9.81 N. 1 N is the force of Earth's gravity on a mass of about 102 g (1/9.81 kg) of force down, or 1.0 kgf (1 kgf = 9.80665 N). It is shown that the presence or the absence of matter on a spinning disk's surface creates gravity-induction on the spinning disk that can be measured as a mechanical force signal from piezoelectric Glide head and also as an induced electrical signal on a GMR head. What is needed is a device to harness an electric signal and/or associated mechanical force for general use for work, and power, produced by the presence or the absence of matter on the spinning disk.

In the computer hard drive industry quality control for high density recording requires that the computer's hard disk surface be free of defects larger than 1 $\mu$m x 1 $\mu$m in area or better. Current methods for characterizing defects of this size are limited by slow metrology techniques such as Atomic Force Microscopy (AFM) or faster techniques like Piezoelectric (PZT) Glide. Another faster defect detection technique that uses spin stands such as magnetic certification testers that detect missing pulses at high frequency write and read rates (i.e. a hard disk certifier).

An atomic force microscope image from a 10 $\mu$m x 10 $\mu$m area pit is shown in Figure 3 a). A magnetic force microscope image of a written track from a typical hard disk is shown in Figure 3 b). An MR read back signal from a magnetically erased disk and a certification missing pulse test reading for the same 10 $\mu$m x 10 $\mu$m area pit are shown in Figure 3 c) and d) respectively.

Fourteen defects were fabricated on a "2400 Oe 31.5 mil 95 mm MR disk" using a Focused Ion Beam (FIB). Seven bumps of $\approx$32 nm height were deposited, and seven pits $\approx$51 nm deep were etched, on a disk $\approx$1.27 mm apart on a radius, as shown in Figure 4.
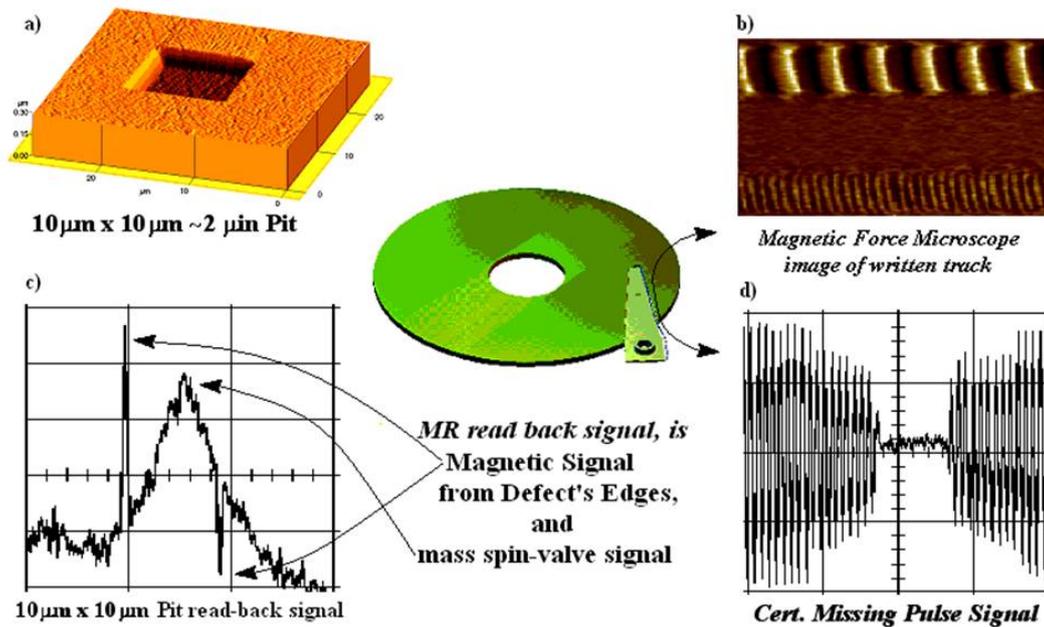
Figure 3: **10 $\mu$m x 10 $\mu$m area pit views an signals (Source: Author)**

The "mass spin-valve" or "gravitational rectifier" [4] which uses gravitational frame dragging to produce an electric signal and/or associated mechanical force, for general use in surface characterization work and power produced by the presence or the absence of matter on a spinning disk. The results from a prototype Nano-features disk (Figure 4) are shown in Table 1.

Figure 5 shows that for a 10 $\mu$m x 10 $\mu$m $\approx$32 nm bump measured with an AFM produces a characteristic PZT Glide signal (measured at linear velocity = 22.6 m/s) of the downward force of the bump on the downward facing head slider and a characteristic MR magnetic modulation signal plus MS signal of a bump (labeled as non-contact MS-valve signal).

Figure 6 shows that for 10 $\mu$m x 10 $\mu$m $\approx$51 nm deep pit measured with an AFM produce a PZT Glide signal (measured at linear velocity = 22.6 m/s) and the characteristic MR magnetic modulation signal plus MS signal of a pit.

Figure 7 shows that 10 $\mu$m x 10 $\mu$m bump defect exhibits two electromagnetic signals due to electromagnetic induction created by the edges of
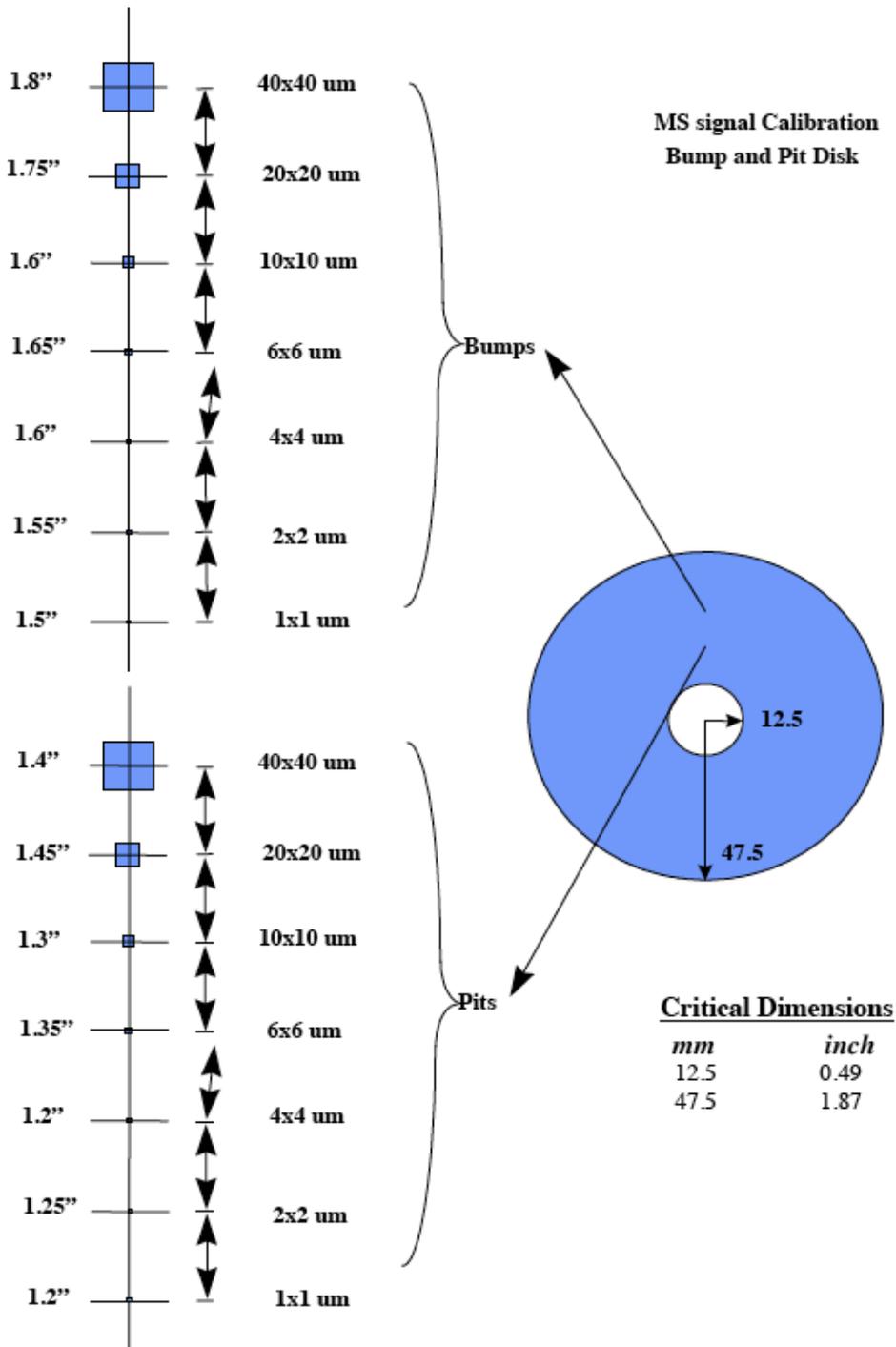
Figure 4: **Types of fabricated defects (Source: Author)**

Table 2 - Nano-feature's design and measured performance parameters

| Design Width (μm) | Defect Type | AFM Width (μm) | AFM Height or Depth (μin/ nm) | MR Modulation Pulse Delay (μSec) | MR Modulation Delay x Velocity(μm) | MR mass spin-valve Signal Maximum Ampl(Vp) Anti-G_Force nNewtons) | MR mass spin-valve Signal Minimum Ampl(Vp) G_Force nNewtons) | Expected normal Gravity Force Bump Volume x 19.3g/cm³ density of W (−nNewtons) |
|---|---|---|---|---|---|---|---|---|
| 40 | Bump | 40.9 | 1.27/32.3 | 3.23 | 41.021 | NA | -2 | -0.00010630 |
| 20 | Bump | 20.2 | 1.22/31 | 1.6 | 20.3 | NA | -0.805 | -0.00002489 |
| 10 | Bump | 10.9 | 1.27/32.3 | 0.858 | 10.8966 | NA | -0.304 | -0.00000755 |
| 6 | Bump | 6.56 | 1.22/31 | 0.518 | 6.5786 | NA | -0.185 | -0.00000262 |
| 4 | Bump | 4.76 | 1.24/31.5 | 0.38 | 4.826 | NA | -0.14 | -0.00000140 |
| 2 | Bump | 2.8 | 1.04/26.4 | 0.218 | 2.7686 | NA | -0.065 | -0.00000041 |
| 1 | Bump | 2.4 | 1.05/26.7 | 0.19 | 2.413 | NA | -0.04 | -0.00000030 |
| 40 | Pit | 42.2 | 1.7/43.2 | 3.31 | 42.037 | 0.378 | NA | NA |
| 20 | Pit | 20.4 | 1.99/50.5 | 1.59 | 20.193 | 0.287 | NA | NA |
| 10 | Pit | 10.3 | 2.02/51.3 | 0.814 | 10.3378 | 0.245 | NA | NA |
| 6 | Pit | 6.28 | 1.92/48.8 | 0.498 | 6.3246 | 0.163 | NA | NA |
| 4 | Pit | 4.25 | 1.59/40.4 | 0.34 | 4.318 | 0.141 | NA | NA |
| 2 | Pit | 2.4 | 1.65/41.9 | 0.208 | 2.6416 | 0.102 | NA | NA |
| 1 | Pit | 1.28 | 1.86/47.2 | 0.104 | 1.3208 | 0.055 | NA | NA |

the bump defect following Maxwell's right hand rule and also exhibits the gravitational induction signal of 0.304 V, or 0.304 nN of negative magnetic force (measured at linear velocity = 12.7 m/s) .

Figure 8 shows that 40 μm x 40 μm pit defect exhibits two electromagnetic signals due to electromagnetic induction created by the edges of the pit defect and also exhibits the gravitational induction signal of 0.378 V with an equivalent [upward] force of $0.378 \times 10^{-9}$ N produced by $7.69 \times 10^{-17}$ m$^3$ of missing mass. This novel upward (anti-)gravitational force (Table 1) is not predicted by the ADD model (measured at linear velocity = 12.7 m/s) .

# 4   Theory of Quantum Time

Regarding the gravitational temporal relation both forms of gravitation experience the same amount of frame dragging as described in Einstein's General Relativity theory; so doesn't that means Time must be the substance between gravitational energy and EM energy that makes up our existence? My summary follows...

Figures 5 and 6 shows the geometry of matter, or lack there of, causes a force field to be produced that I could measure. The reason gravitation is a direct tensor is because it has two components one is the normal gravitational
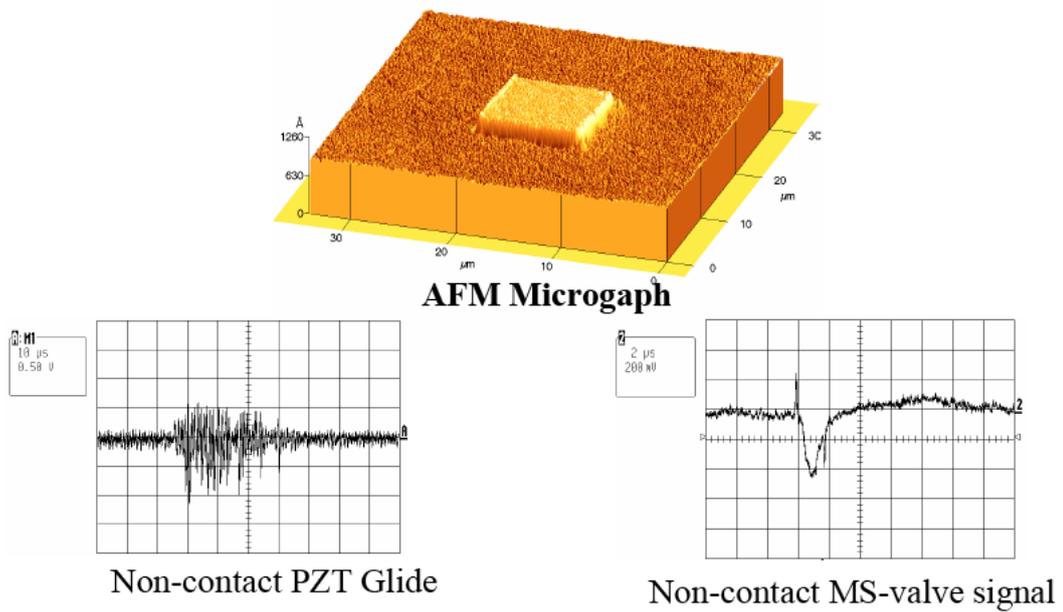
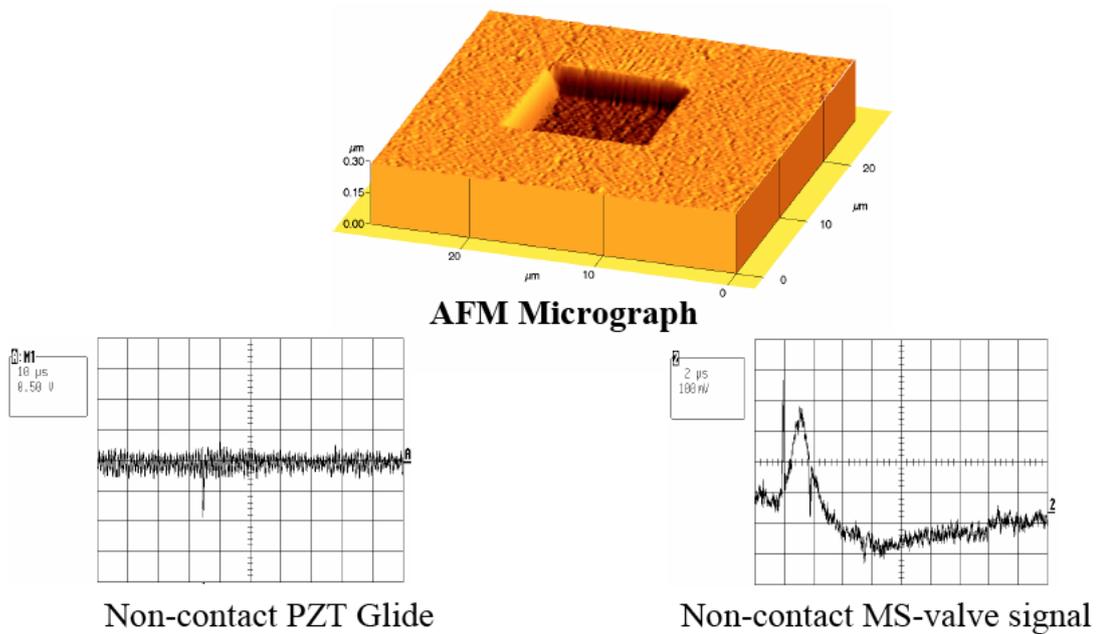Figure 5: **signal characteristics from reference 10 $\mu$m x 10 $\mu$m $\approx$32 nm tall bump defect (Source: Author)**



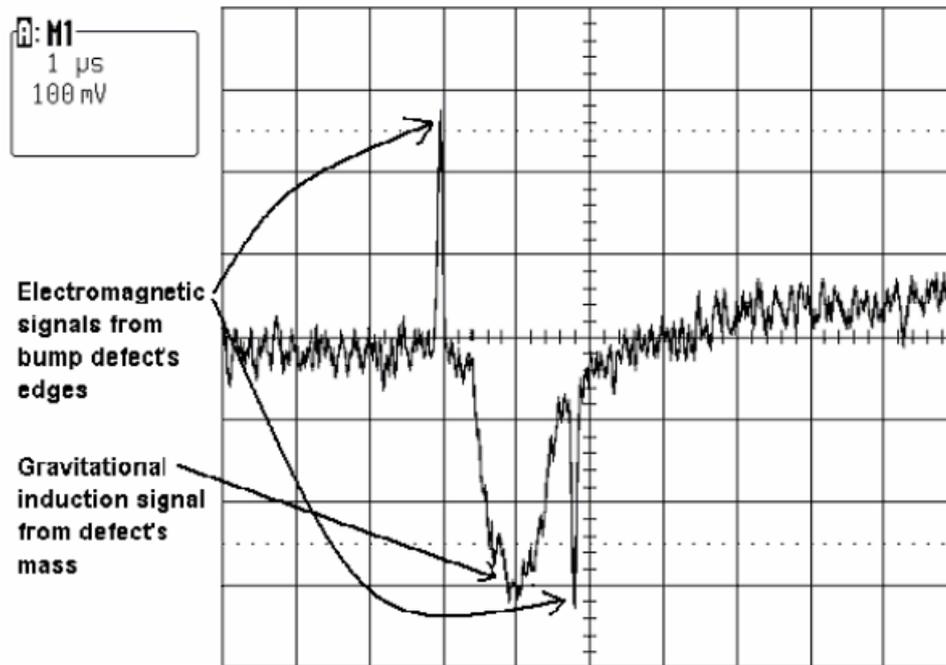Figure 6: **Signal characteristics from reference 10 $\mu$m x 10 $\mu$m $\approx$51 nm deep pit defect (Source: Author)**

Figure 7: **Typical magnetic induction and gravitational induction characteristic for a 10 μm x 10 μm nano-bump (Source: Author)**

energy produced by the presence of matter's nucleus in the universe and the other what we call repulsive anti-gravity or dark energy is produced by its absence. But the tensor for gravity is much stronger than anti-gravity since the absence of mass produces only about 16% of the magnitude for the same volume (geometry). Some other differences are normal gravity is much stronger below 1 mm from matter than it is above that distance; as is the antigravity force. I found for normal gravity above 1 mm it is consistently linear with distance; while antigravity is $\approx 0$. That means the force is $1/r^2$ above 1mm and $1/r^4$ below 1 mm but that means gravity is still linear with distance within both regions of normal gravity space time. Antigravity on the other hand is a third order force repulsive force tensor whose force fields are like that of balloon with their force field's strength being strongest at the membrane of the balloon and weak inside. Regarding the gravitational temporal relation both forms of gravitation experience the same amount of frame dragging as described in Einstein's General Relativity theory; so doesn't that means Time must be the substance between gravitational energy and EM energy that makes up our existence? My summary follows.
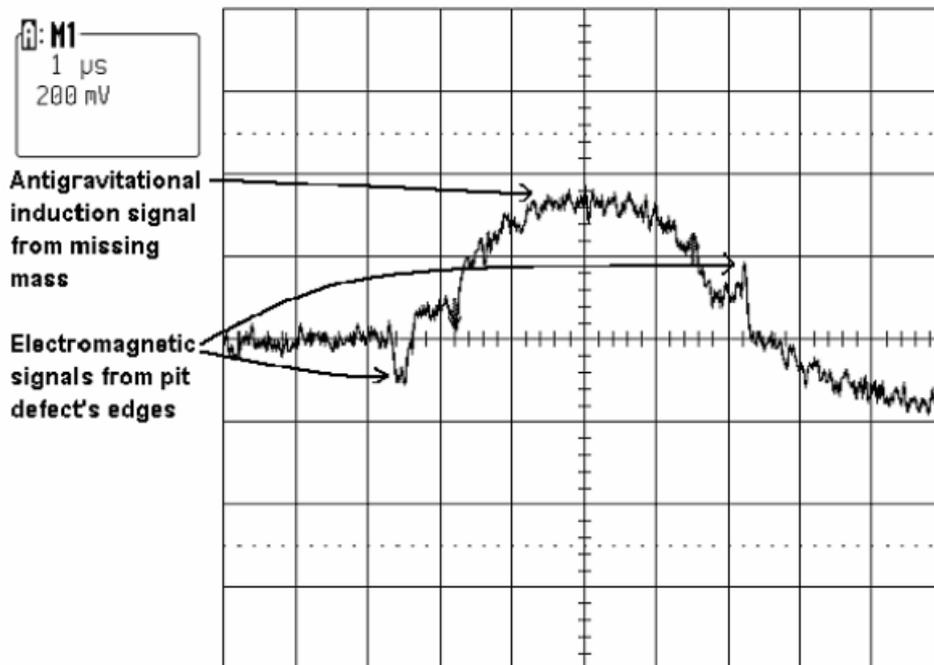
Figure 8: **Typical magnetic induction and gravitational induction characteristic for a 40 $\mu$m x 40 $\mu$m nano-pit (Source: Author)**

Time must be a substance. That's because gravitational space time is produced by hole states of matter and electromagnetism (EM or light) is produced by electron states of matter. QM is built on EM space time; not gravitational space time. However Special Relativity is built on EM space time while General Relativity is built on gravitational space time.

The manifold of events in spacetime are a "substance" which exists independently of the matter within it...Special Relativity and General Relativity created a conundrum for Einstein that he tried to resolve unsuccessfully to unit the two theory in to one grand unified field theory. My discovery is that while the speed of light is constant that's not true for gravitation. It can be slower in speed and faster too. Einstein focused to much on the speed of light and not enough on the "holes" all around him. That's where the gravitation is. That "electromagnetism is in spacetime A" let's call that space-time "[EM] space-time", and this is what Einstein's "Zur Elektrodynamik bewegter Körper" [5] ("On the Electrodynamics of Moving Bodies") described which reconciles Maxwell's equations for electricity and magnetism with the laws of mechanics, by introducing major changes to mechanics close

to the speed of light. This later became known as Einstein's special theory of relativity (SR) [6] [7] That "gravitation is in spacetime B" let's call that space-time "[G]space-time" and this is what Einstein's General relativity (GR) describes. According to general relativity [9] , the observed gravitational attraction between masses results from the "warping of space and time by those masses". When I write about this "manifold of events in spacetime are a "substance" which exists independently of the matter within it" this "manifold of events in spacetime" is this property that makes Time; as we measure it; the emergent [positive arrow of time]. Therefore time is a vector which direction depends on your position in our universe which is created by a change of energy states between gravitation to electromagnetism; and visa versa.
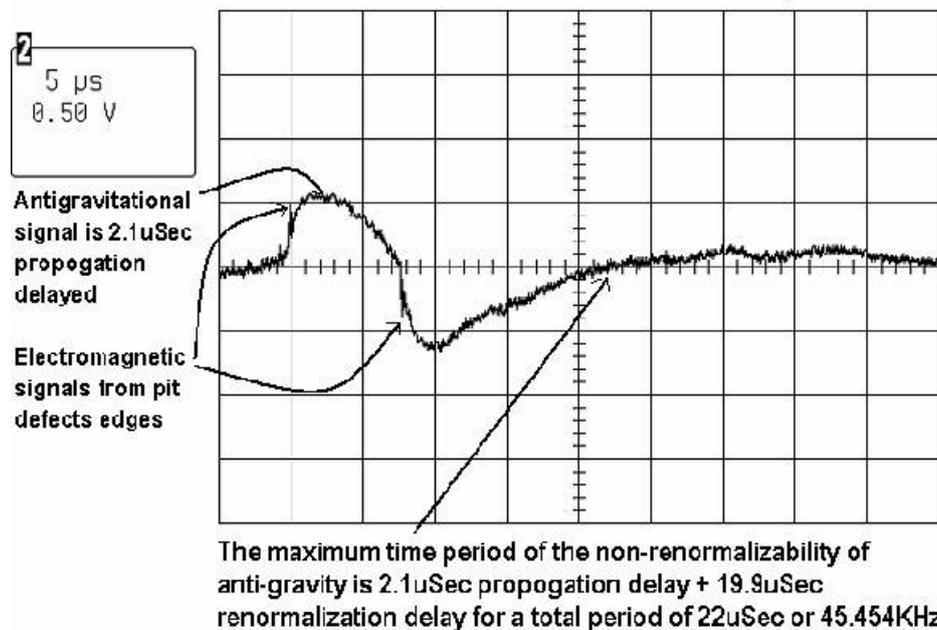


Figure 9: **Time band gap between gravity and electromagnetism in the mass spin-valve device (Source: Author)**

Figure 9 shows that in our local universe; the time band gap between gravity and electromagnetism; is about 22 $\mu$s. In this region time stops due to the non-renormalizability of gravity. Based on empirical measurements (Figure 9) this inventor postulates that time itself exists in two simultaneous space-time continuum; one based on electro-magnetism, and one based on gravity. The Wall of Planck only applies in the electromagnetic "energy" universe; not the one based on gravity. In the gravity universe; "mass-energy", or

gravity has the semiconductor quantum property called "tunneling" where mass-energy of opposite "spins" exist simultaneously quantum entangled on both sides of the tunnel; i.e.; a super massive black hole at the center of our know universe. Therefore time has a "band-gap"; much like the semiconductor again; where that time band-gap depends on the object's "mass-energy" plus "electromagnetic energy"; which is location relative to the super massive black hole.

# 5    The postulates for the known gravitational and electromagnetic universe

While special relativity constrains objects in the universe from moving faster than the speed of electromagnetism with respect to each other, there is no such constraint in general relativity due to the effects of gravity. An expanding universe generally has a cosmological horizon, and like a black hole's event horizon, this marks the boundary to the part of the universe that the observer can see. From this point of view where the observable universe is a spherical volume; space is expanding very fast to cover huge volumes, where new regions come into view during the normal expansion phase; in the spherical volume universe point of view; are exactly the same regions which were pushed out of the horizon during inflation; and so they are at nearly the same temperature and curvature because they come from the same little portion of space, i.e., the Big Bang. From our view our cosmological horizon is still at the big bang and inflation is still going on in a thin skin; where due to the non-renormalizability of gravity; time is nearly stopped. This has been called eternal inflation where eternal inflation supports the hypothesis for the Big Bang theory. In theories of eternal inflation, the inflationary phase of the universe's expansion lasts forever in at least some regions of the universe.

This author postulates that there exist two different universal structures; one based on the spin of the presence or absence of matter's nucleus, i.e., proton spin, or a gravitational space time continuum, and another based on electron spin, i.e., an electromagnetic space time continuum. In such a theory there exists a two sided gravitational space time continuum; where both sides of this gravitational universe are quantum entangled through a super massive black hole at the center of the observable universe; with two independent electromagnetic universes.

The fact that the gravity force has been measured to be as strong as the electromagnetic forces; below one millimeter distance, and gravity propagates at a slower speed than electromagnetism; implies, the universe is steady-state and the electromagnetic image of the cosmic background shown in Figure 1 suggests that fact. The observed rings are visible because there are two sides to the universe that are quantum entangled through the force of gravity; our normal 4-D universe with x, y, z, and time (Planck's Universe which follows the Standard Model); and another dimensional domain for gravity where gravity propagates in several additional spatial dimensions that are large compared to the Planck scale, i.e. the ADD Universe.

With a two sided universe our 4-D universe exists in a parabolic universe where depending on your position relative to the super massive black hole at the center of the universe (the focal point) you will be accelerating or decelerating; where at our position the relationship of mass to normal gravity is described by the relationship (additional mass) bump volume, in $[\mu m^3]$, is equal to:

$$V_{bump} = 6(-G_f)^2 - 7(-G_f) - 0.4 \tag{2}$$

where $G_f$ is the "negative" attractive force of Gravity which is a parabolic function which has two mathematically real factors (Figure 2). Assuming the Gravitational induction force ($-G_f$) is variable x and the volume of additional mass is y. Solving for y = 0, by simplifying the equation gives two real factors $x_1$ and $x_2$; where $x_1 = 1.221255$ and $x_2 = -0.054589$.

In the anti-universe quantum entangled through the force of gravity as measured from our 4-D universe; where repulsive "+" anti-gravity exists in hyperbolic space with one real part and two imaginary factors, relative to us, described by the relationship (missing mass) pit volume, in $[\mu m^3]$, is equal to:

$$V_{pit} = -3000G_f{}^3 + 1000G_f{}^2 - 200G_f + 8 \tag{3}$$

Assuming the anti-gravitational induction force ($G_f$) is variable x and the volume of missing mass is y, then y = $-3000x^3 + 1000x^2 - 200x + 8$, assuming y = 0 the roots are : $x_1 = 0.0510251$ $x_2 = 0.141154 + 0.179826i$ $x_3 = 0.141154 - 0.179826i$.

# 6   Conclusion

Recent discoveries of the presence of gravitational lensing rings observed in the cosmic background coupled with a new understanding of the relationship of gravity to electromagnetism suggest the existence of an eternal inflation gravitational universe decoupled from our local electromagnetic universe and that the Big Bang Theory is just plain wrong.

## 6.1   Acknowledgements

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