Magnetic field evolves to gravity field part:1 Repulsion

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Abstract

Current research enquiry has sought a more primitive explanation for gravity. The STOE suggests gravity emerges from magnetic effects of hods in matter structures. Four experiments are done to examine the repulsive magnetic force characteristics. Different relations of force to distance were found. A speculation that gravity may be the sum of the poles at the side of photons is formed.

keywords: magnet, gravity

1 INTRODUCTION

The gravitational field surrounding matter had been presumed to be a fundamental force field since Newton. Current research enquiry has sought a more primitive explanation for gravity. Several researchers have noted the similarity between Coulombs Law for electric charges and Newton's Law for gravity. Therefore, they suggest that electric effects form gravity.

The Scalar Theory of Everything (STOE) rejected the Biot-Savart Law and suggested two types of magnetic effects (Hodge 2018b,c). One type emanates from magnets, the other from electric currents.

Michaud (2013) noted the force of repelling magnets has a zone wherein the force is proportional to the inverse cube of the distance d between them. This observation was taken to suggest the existence of magnetic monopoles.

The Scalar Theory of Everything (STOE) posits the universe is composed of hods and plenum which emerge to form all in the universe (Hodge 2016b). The hods have the plenum highest density on one side and zero density on the other (Hodge 2018e, figure 3.1). That is, the hod is fundamentally a magnet with North and South poles and magnetic monopoles are nonexistent. Electric effects are vortices formed in the plenum by the movement of hods through the plenum (Hodge 2018a). The STOE suggests the self-similarity principle that posits small size scales are similar to our everyday size scale. Accordingly, disk

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magnets were used to model photons and leptons (Hodge 2016a). According to the STOE, gravity must be an emerged property of the plenum similar to the magnetic effects of hods and not from an electric current.

The plenum around a hod can be high (positive divergence) or low (negative divergence). The magnetic field of magnets can be attractive or repulsive. How can the plenum become a field of plenum with only a negative divergence from assemblies of hods (matter)? How can the magnetic force appear to be so much stronger than the gravitational force?

This Paper describes four experiments using disk magnets to represent hods to begin the enquiry into the properties of the plenum that emerge into the gravitational field. The description of the experiments is in section 2. The Discussion and Conclusion are in section 3.

2 THE EXPERIMENT

The diagram in Figure 1 shows the experimental setup. Disc magnets (1.82 cm diameter X 0.2 cm thick) are used as in Hodge (2016a). The magnets are glued to the wood supports. The wood supports are constrained to allow free movement vertically. The horizontal movement allowed is ± 2 mm. The bottom wood support rests on a scale that measures force in gram weight (gw). The measurements taken are the weight W and the perpendicular distance d between the magnets. The top wood support is lowered to change the d.

The scale (AWS-100, Digital scale) has a tolerance of ± 0.02 gw. (see Fig. 1). A calibration 20 gram mass weighed 19.99 gw. By repeatedly assembling a measurement setup, the scale read ± 0.4 gw for small forces. This is attributed to the tolerance of the wood support being poor for small forces.

The scale is "zeroed" by weighing the lower assembly without the top magnet in position. The weight measured W is with the top magnet in position. Therefore, the W is the force exerted by the top magnet on the bottom magnet.

(All measurement are $\pm 10\%$ unless otherwise stated).

2.1 EXPERIMENT 1

The bottom support has one magnet with its face toward the one top magnet as seen in Fig. 1. The poles of the magnets are arranged such that the W is repulsive which increases the scale measurement. Several runs were taken. Each run consisted of a magnet attachment and complete setup of the apparatus. First the North Poles face each other, then the next run had the South Poles facing. This sequence was repeated three times and the results analyzed. All runs used the same two magnets. Figures 2 through 5 graphically present an example of the data obtained for all six runs.

The longest distance L of the magnet surface perpendicular to d is the width of the disk magnet - $L \approx 18$ mm. The W versus d plot as seen in Fig. 2 appears to have distinct regions labeled "zones". Zone 1 has $d < L$, zone 2 has $d > 2L$,

Figure 1: Diagram of the experimental fixtures.

Table 1: Zone 1 (d^{-1}).

	NORTH		SOUTH	
run No.	No. pts.	W (gw)	No. pts	W (gw)
1	7	$(0.67 * 1000/d - 19.0) \pm 0.7$	5	$(0.8 * 1000/d - 17.9) \pm 1.2$
2	3	$(0.97 * 1000/d - 40.0) \pm 0.8$	5	$(0.7 * 1000/d - 29.8) \pm 0.5$
3	4	$(0.8 * 1000/d - 37.0) \pm 0.8$	3	$(0.7 * 1000/d - 21.5) \pm 0.1$
all[a]	14	$(0.70 * 1000/d - 21) \pm 5$	13	$(0.7 * 1000/d - 13) \pm 2.7$

[a]The points in the Zone from all the runs plotted on one graph.

and zone 3 has $L < d < 2L$. Each of these zones have a different relation of W to d as noted in the graphs of Figs. 3 through 5 and of Figs. 6 and 7.

Tables 1 through 3 lists the linear regression equations with one standard deviation uncertainty.

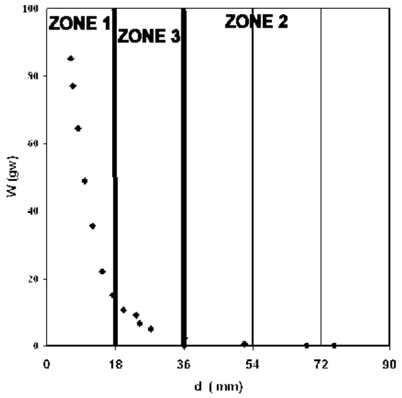

Figure 2: Plot of the W versus d for the first experiment. 1 disk is in the lower support and 1 disk is in the upper support (Experiment 1).

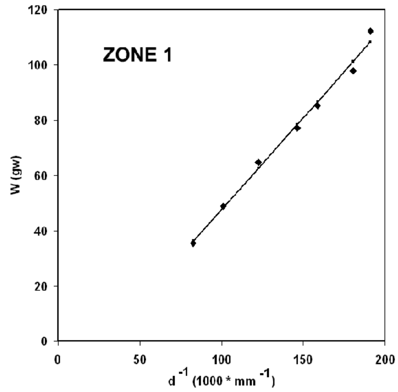

Figure 3: ZONE 1: Plot of the W versus d^{-1}.

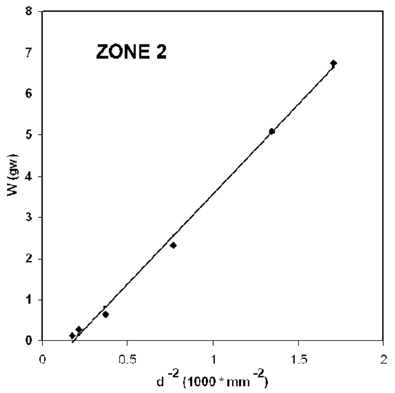

Figure 4: ZONE 2: Plot of the W versus d^{-2}.

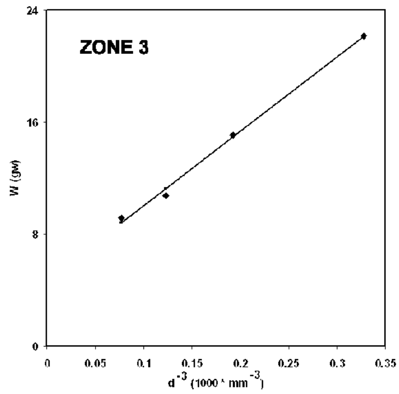

Figure 5: ZONE 3: Plot of the W versus d^{-3}.

Table 2: Zone 2 (d^{-2}).

	NORTH		SOUTH	
run No.	No. pts.	W (gw)	No. pts	W (gw)
1	6	$(4.36 * 1000/d^2 - 0.79) \pm 0.02$	3	$(6.34 * 1000/d^2 - 1.76) \pm 0.04$
2	3	$(5.70 * 1000/d^2 - 1.71) \pm 0.03$	4	$(8.3 * 1000/d^2 - 3.1) \pm 0.2$
3	6	$(4.3 * 1000/d^2 - 0.7) \pm 0.2$	6	$(5.5 * 1000/d^2 - 2.0.) \pm 0.2$
all[a]	15	$(4.35 * 1000/d^2 - 0.74) \pm 0.17$	13	$(6.1 * 1000/d^2 - 1.8) \pm 0.8$

[a]The points in the Zone from all the runs plotted on one graph.

Table 3: Zone 3 (d^{-3}).

	NORTH		SOUTH	
run No.	No. pts.	W (gw)	No. pts	W (gw)
1	4	$(53.2 * 1000/d^3 + 4.7) \pm 0.2$	5	$(125.6 * 1000/d^3 + 0.9) \pm 0.2$
2	0	no data[b]	0	no data[b]
3	1	no data[b]	2	no data[b]
all[a]	5	$(51.0 * 1000/^3d + 5.5) \pm 0.7$	7	$(44 * 1000/d^3 + 6) \pm 2$

[a]The points in the Zone from all the runs plotted on one graph.

[b] require at least 3 points.

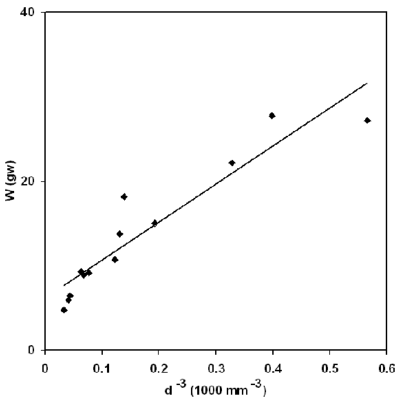

Figure 6: Plot of the W versus d^{-3} with a trend line of $W = (45.0 * 1000/d^3 + 6.2) \pm 1.7$ gw for Zone 3 of the first experiment.

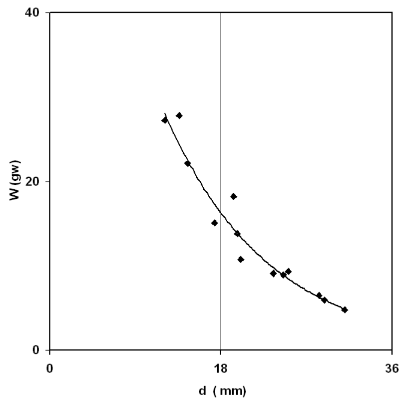

Figure 7: Zone 3 with the trend line of $W = 85.4e^{-0.09d} \pm 1.4$ gw.

Table 4: Zone 3 ($\exp^{-d}$).

	d^{-3}		$\exp^{-d}$	
run No.	No. pts.	W (gw)	No. pts	W (gw)
North	5	$(51.0 * 1000/^3 d + 5.5) \pm 0.7$	5	$75.7e^{-0.09d} \pm 0.6$
South	7	$(44 * 1000/d^3 + 6) \pm 2$	7	$99.4e^{-0.1d} \pm 1.5$
all[a]	13	$(45.0 * 1000/d^3 + 6.2) \pm 1.7$	13	$85.4e^{-0.09d} \pm 1.4$

[a]The points in the Zone from all the runs plotted on one graph.

An alternative for modeling Zone 3 is shown in Table 4 and Figs. 6 and 7. The exponential function may be preferred over the d^{-3}.

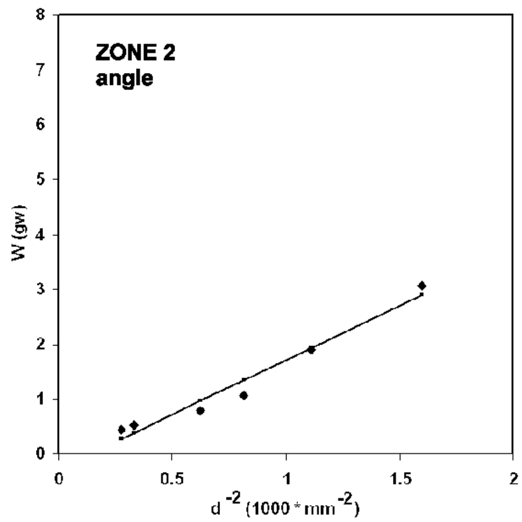

Figure 8: ZONE 2: Plot of the W versus d^{-2} for Experiment 2.

2.2 EXPERIMENT 2

This experiment is similar to the first with the bottom magnet placed at a 45° angle relative to the top magnet. Figure 8 shows the resulting plot of W versus d^{-2}. Compared to Fig. 4, Fig. 8 shows a smaller slope and less W but starting at approximately the same distance.

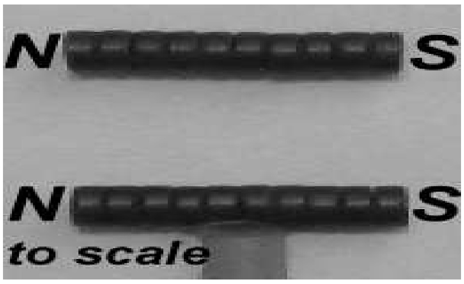

Figure 9: Photo of the magnetic disk arrangement for the third experiment.

2.3 EXPERIMENT 3

This experiment examines how a photon (bar magnet) repels another photon. The orientation is seen in Fig. 9.

The equations are:
Zone1: $W = (2.0 * 1000/d - 28.5) \pm 0.6$ gw
Zone2: $W = (16.2 * 1000/d^2 - 0.2) \pm 0.008$ gw
Zone3: $W = 47.4\, e^{-0.033d} \pm 0.4$ gw
Zone3: $W = (1746 * 1000/d^3 - 0.09) \pm 0.04$ gw

During the course of this experiment, the tendency of the bar was to rotate and translate away from the repulsive orientation to an attractive orientation.

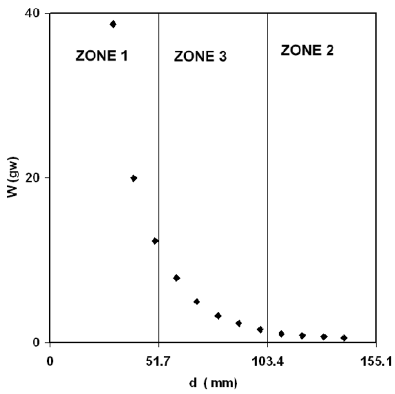

Figure 10: Plot of the W versus d for 10 disks in the lower support and 10 disks in the upper support oriented on their side so that the force is repulsive. This is shown in the Fig 9.

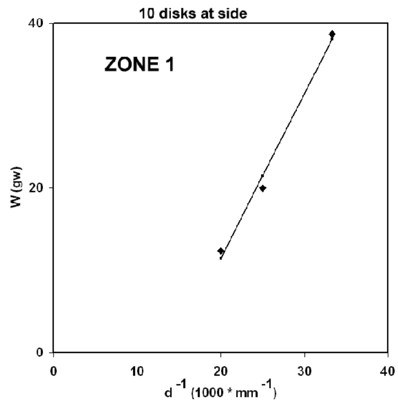

Figure 11: ZONE 1: Plot of the W versus d^{-1}.

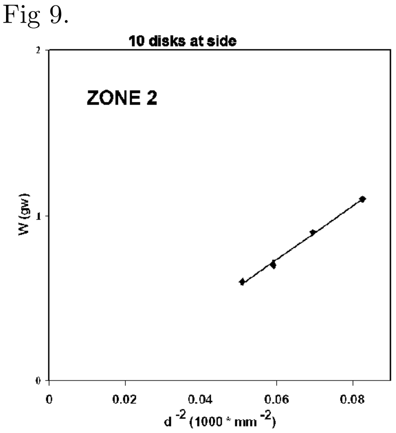

Figure 12: ZONE 2: Plot of the W versus d^{-2}.

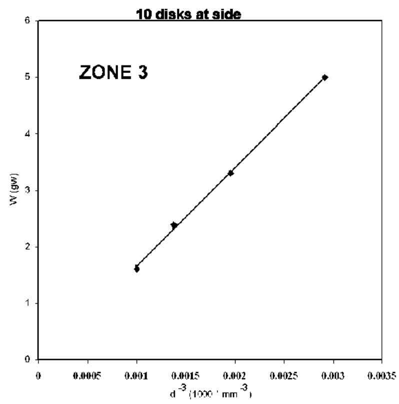

Figure 13: ZONE 3: Plot of the W versus d^{-3}.

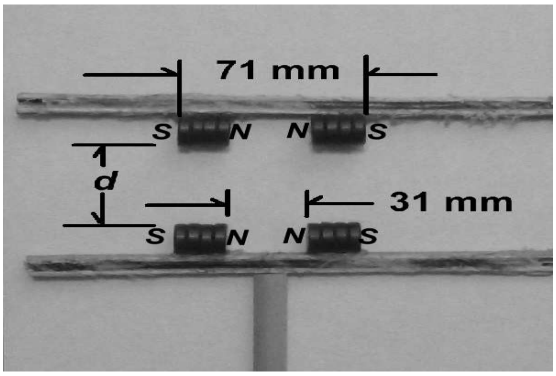

Figure 14: Photo of the magnetic disk arrangement for the fourth experiment.

2.4 EXPERIMENT 4

This experiment is similar to that done by Michaud (2013).

The equations are:
Zone1: $W = (2.6 * 1000/d - 55.8) \pm 0.5$ gw
Zone2: $W = (14.67 * 1000/d^2 - 0.71) \pm 0.03$ gw
Zone3: $W = 132.1\, e^{-0.051d} \pm 0.6$ gw
Zone3: $W = (1068.3 * 1000/d^3 + 0.2) \pm 0.7$ gw

During the course of this experiment, the tendency of the bar was to rotate but not translate away from the repulsive orientation to an attractive orientation.

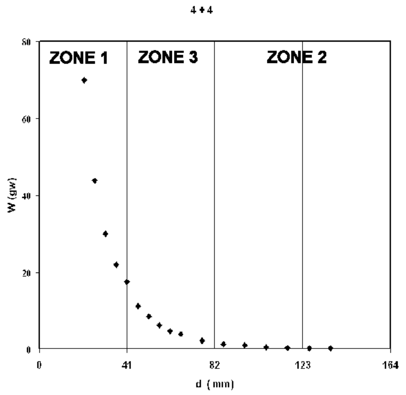

Figure 15: Plot of the W versus d for disks in the fourth experiment as seen in Fig. 14.

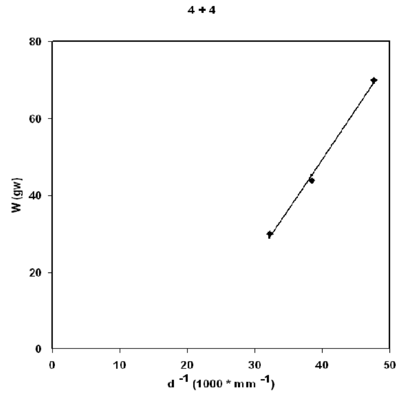

Figure 16: ZONE 1: Plot of the W versus d^{-1}.

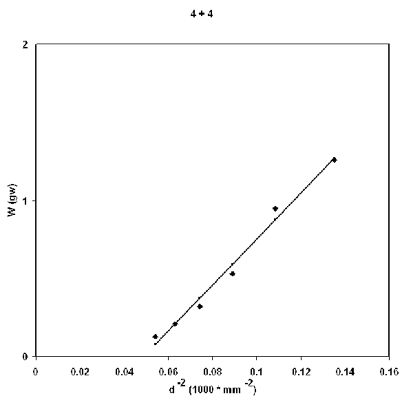

Figure 17: ZONE 2: Plot of the W versus d^{-2}.

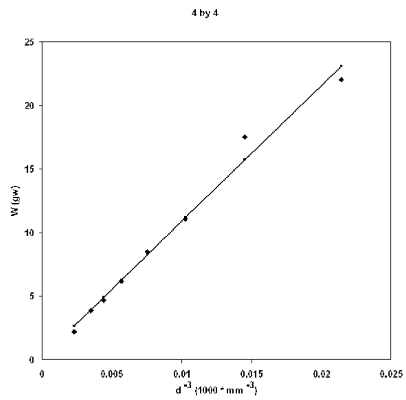

Figure 18: ZONE 2: Plot of the W versus d^{-3}.

3 DISCUSSION AND CONCLUSION

Michaud (2013) experiment was a restricted range of d. Comparing the two suggested models for modeling Zone 3 of section 2.1, Table 4 suggests the exponential is slightly better. The decay form (exponential) offers a better consistency with the STOE model because it does not require a monopole magnetic model, it is consistent with the Zone 1 decaying into Zone 2 physical model, and the separation of the two Zones is $d = L$.

The method of conjugate functions is used to model electric fields, magnetic fields, and fluid flow. These experiment suggest that the transformation $w = z + \mathrm{e}^z$ is preferred over $w = \cosh z$ which was used in Hodge (2018e). The former includes the exponential function. This function is used to model the electrostatic field at the edge of a parallel-plate capacitor which also has the field strength proportional to d^{-1} in the capacitor. The $w = z + \mathrm{e}^z$ is also used to model the flow of fluids from a channel into a sea. Zone 1 is also explained. The equipotential lines to the side is minimal as seen in section 2.2 and may be summed with the potential from the opposite pole at some distance from photon (bar magnet).

Table 2 shows the South Pole has statistically larger W vs d^{-2} slope than the North Pole while the W relation with d^{-1} is nearly identical (Table 1). This would imply the South Pole dominates at the side of the photon (bar) configuration. So, gravity may be the sum of the poles at the side of photons or the photons comprising particles. Because gravity is attractive, the labeled South Pole would be the side of the hod with zero plenum density. But this observation should be repeated with a different experiment using different means. At this stage, this concept is very speculative.

On the other hand, this speculation is consistent with the STOE prediction that gravity is an emergent effect of the plenum.

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