

The “Dipole Repeller” Explained

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Introduction

Earlier this year, in 2017, a major article was published in *Nature* on a vast dipole gravity phenomenon now known as the Shapley Attractor and the Dipole Repeller.¹ A helpful short video is included.² Its thesis was largely based on studies of red-shift spectral data recently published on several thousands of galaxies within several hundred million light years radius.³

The four authors of this article have creatively built their cosmic model around General Relativity (GR), with inspiration from electromagnetism (EM). They hypothesize that the immense Shapley Supercluster (with the mass of about 8,000 average galaxies) is gravitationally attracting us from several hundred million light years away in the direction of the Centaurus constellation. Furthermore, somewhat closer lies what is called the Great Attractor (with mass of about 1,000 average galaxies) from the direction of the Norma and Triangulum Australe constellations. The Shapley galactic net attractive force is significantly greater than that of the Great Attractor, and together they pull our Milky Way toward them – in addition to the “Hubble’s Law” Doppler movement outward as the visible universe expands exponentially and uniformly, apparently from “Dark Energy.”⁴

¹ <http://www.nature.com/articles/s41550-016-0036>

² <http://www.nature.com/article-assets/npg/natastron/2017/s41550-016-0036/extref/s41550-016-0036-s2.mp4>

³ <http://iopscience.iop.org/article/10.1088/0004-6256/146/3/69/meta;jsessionid=C2E343C6040E9038FA229EEA517C9893.c1.iopscience.cld.iop.org>

⁴ <http://www.universetoday.com/113150/what-is-the-great-attractor/>

The authors combine the idea of dipoles in the GR gravity sheet with something that stretches [pun intended] what Einstein envisioned: “The conclusion that follows here is that out to $R \approx 8,000 \text{ km s}^{-1}$, the Shapley attractor’s basin of attraction and the dipole repeller’s basin of repulsion contribute equally to the Local Group motion.”⁵ Yes, a “basin of repulsion” is hypothesized to go along with a GR “basin of attraction.”

There are other areas complicating the net vector picture, as indicated in the illustration below. The Shapley and Norma background regions are mostly in the “zone of avoidance” for optical telescopes, being near the center plane of our Milky Way. Happily, that same region of deep space is now somewhat accessible through infrared and X-rays by radio telescopes.

Our home supercluster, Laniakea, embraces the Virgo mass, as well as the so-called Great Attractor mass, and other regional gravitational nodes. However, the distribution of all of Laniakea’s force vectors is mixed relative to the two poles of the “attractive” Shapley mass and the “repelling” Dipole Repeller, both of which are just outside the boundaries of Laniakea’s realm.

It was only by 2017 that optical, infrared and X-ray astrophysics had advanced sufficiently with enough data to support the idea of a Dipole Repeller in our cosmic neighborhood. The Shapley supercluster attractor is geometrically almost opposite the mass-deficient area called the Dipole Repeller. Our own galactic neighborhood is roughly in the middle.

Together, the Shapley attractor, Norma attractor, Dipole Repeller, and “Dark Energy” lambda forces are pushing us and our smaller Virgo Supercluster in a net direction only perceivable by the finest optical and radio telescopes. These instruments measure red shifts within an arbitrary mathematical cube where we are at the geometric center, and with all sides being 1.74 billion light years across.

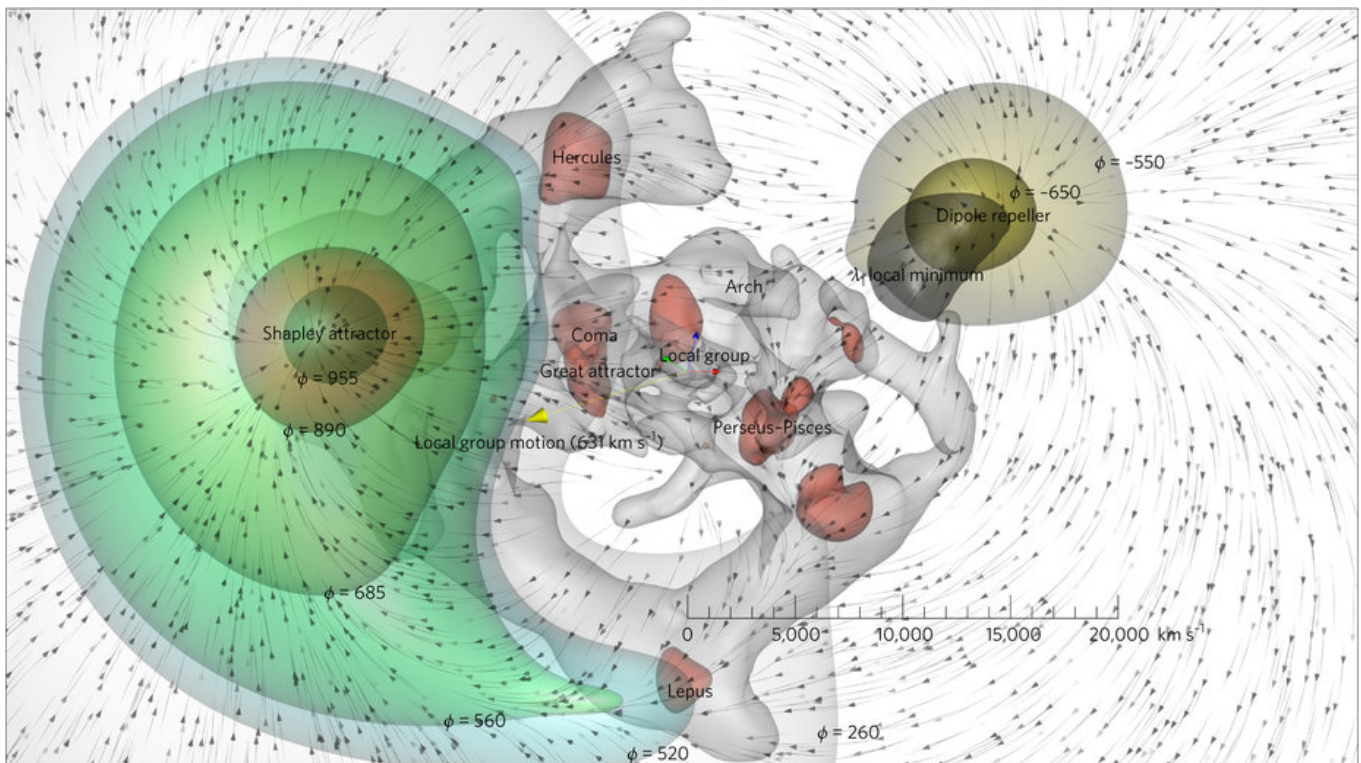
The net peculiar velocity of our MW galaxy’s local group toward the Cosmic Microwave Background (CMB) “pole” is measured to be 631 kilometers per second. We aren’t descending into the core of the Shapley mass, because the repelling force vectors from the direction of the Dipole Repeller are modestly stronger and not perfectly aligned with the Shapley attractor, enough to direct us away from the Shapley core. At this speed our local group won’t arrive anywhere near the Shapley Supercluster for several trillion years, wherein what’s physically left of today’s galactic structures will be totally transformed and unrecognizable.

⁵ Op. cit.

One alternate interpretation suggested that the Dipole Repeller's pushing of us obliquely toward the Shapley Supercluster represents a pseudo force which results from a lack of attractive mass in that zone, and thus relatively speaking yields less gravitational attraction, resulting in the pseudo net repulsive force.⁶ In a narrow way that idea is correct. However, much more knowledge needs to be applied to make sense of what is really going on.

The four authors of the original article may have implied this alternate model for their dipole repeller, as they see it – but they seem to also be somehow entranced by the idea of truly vast electromagnetic force fields.

Electromagnetic attractive and repulsive forces follow Coulomb's inverse square law – as does regular gravity follow Newton's Law of Gravity with its inverse square distance effect. *Both forces become much weaker not too far away. Neither inverse square math formula offers support for streamlines of sustainably strong dipolar forces flowing in arcs along hundreds of millions of light years.* Here below is how the original article presents their model of the highly dynamic mix of forces in our region of the universe:⁷



⁶ https://en.wikipedia.org/wiki/Dipole_repeller

⁷ <http://www.nature.com/articles/s41550-016-0036/figures/1>

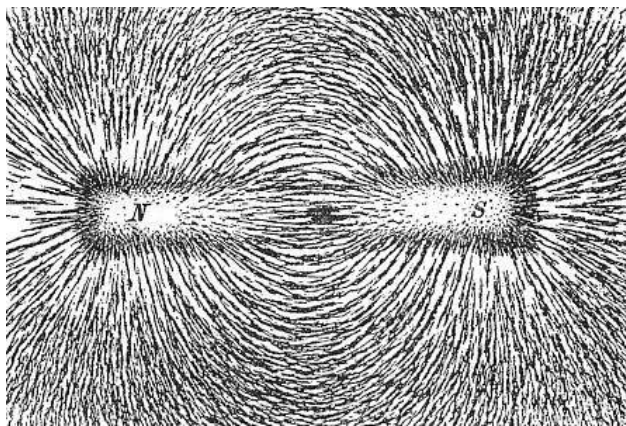
A face-on view of a slice 6,000 km s⁻¹ thick, normal to the direction of the pointing vector:

Three different elements of the flow are presented: mapping of the velocity field is shown by means of streamlines (seeded randomly in the slice); red and grey surfaces present the knots and filaments of the V-web, respectively; and equigravitational potential (ϕ) surfaces are shown in green and yellow. The potential surfaces enclose the dipole repeller (in yellow) and the Shapley attractor (in green) that dominate the flow. The yellow arrow originates at our position and indicates the direction of the CMB dipole (galactic longitude $l = 276^\circ$, galactic latitude $b = 30^\circ$). The distance scale is given in units of km s⁻¹.

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It is appropriate at this point to see how to better handle the impressive galactic red-shift spectral data dealing with what might look like a strange pushing or repelling force emanating from what is a relative void. We can do much better than the “something great from almost nothing” thesis.

The esteemed authors and minor early criticisms of the quartet’s essay are handicapped by insufficient and incorrect dynamic models. They did well, but stretched their theoretical tools toward absurdity - leaving open the door for a superior interpretation of the data. [Here it is:](#)



Electromagnetism is unlike gravity, as this force flows between poles in both directions.⁸ Classical gravity only flows in one direction. The classical idea of dipolar magnetism is shown in the relationship of iron shavings and a bar magnet on a flat surface. Note that cutting a dipolar magnetic bar one or many times simply creates additional smaller bars behaving the same way.

EM behaves with strength and clarity on a human scale, and also down to the truly elemental particles, which are Yin/Yang particles, at approximately 10E-37 meters. However, *the very small is everywhere within the large, but the very large is not everywhere in the small.* This fundamental reality is

⁸ <http://www.livescience.com/47383-cool-facts-about-magnets.html>

seen in the failure of the “Dipole Repeller vs. Shapley attractor (and the CMB pole)” theory to reflect the General Relativity paradigm.⁹

Both Newtonian classical gravity and coulombic (C) electromagnetism follow the *inverse-square relationship*. In math, both apparent forces extend infinitely. In practice, *both forces fade off quickly to where whatever force is felt is no more than background noise, if that, to more local forces.*

An example is the super force within a black hole’s event horizon. A supermassive black hole has an event horizon (the Schwarzschild radius) only on a solar-system scale. Outside its spherical event horizon the supermassive gravity sheet “vortex” cannot capture photons. Beyond every spherical volume equal to or smaller than Sol’s system is a much larger region of space – all of which inversely diminishes the attractive power of any one black-hole mass, however large. Eventually the force from any distant gravitational mass (be it singular, or from a collection of galaxies) attenuates to meaninglessness relative to closer gravitational masses.

In math always beware of formulas that feature either zero or infinity. Quantum Mechanics mathematics has been bedeviled with these extremes. Clever theorists have applied “renormalization” to their QM formulas, at a cost, so they can continue with their calculations.¹⁰

I have previously looked at the claims of General Relativity vortices from the inverse-square perspective, and have found them to functionally fail at large dimensions.¹¹ Scales of billions of light years can never equal mathematical infinity, but they can approach and approximate infinity – and thereby ultimately yield infinitesimal EM and gravity forces approaching and approximating zero. Because GR claims to be active on all levels, at least above the Planck dimension of 10E-35 meters, the theory thereby fails the test of generality.

It is also not enough for certain phenomena and GR mathematics to simply correlate in some dimensions. *Correlation alone does not prove causation, however precise the apparent match and elegant the formulas.*¹²

⁹ <http://www.differencebetween.com/difference-between-paradigm-and-vs-theory/>

¹⁰ <https://en.wikipedia.org/wiki/Renormalization>

¹¹ <http://astronomy-links.net/GGvsGR.html>

¹² <http://astronomy-links.net/correlation.and.causation.pdf>

The Dipole Repeller essay qualifies as an experiment because it uniquely reports on and hypothetically analyzes data sets of scientific observations. Einstein himself was critically concerned about the limits of his Relativity. *Brainy Quotes* has him saying: "No amount of experimentation can ever prove me right; a single experiment can prove me wrong."

The best standard explanation for the peculiar motion of our Local Group in relation to the Cosmic Microwave Background comes from astrophysicist, Ethan Siegel.¹³ He says the apparent repeller force is simply an under-dense region of gravitationally attractive mass attracting less than the over-dense Shapley supercluster attractive mass in the opposite direction from us. He says: "Dipoles are most common in electromagnetism, where we think of negative as attractive and positive as repulsive. If you thought of this gravitationally, negative would be 'extra mass' and therefore attractive, while positive would be 'less mass' and therefore, relative to everything else, repulsive."

This is a spirited defense, but it has multiple deficiencies better answered in another way. For example, Siegel switches the functional idea of polar gravity for polar electricity. Furthermore, poorly addressed is the problem of there not being enough mass in the direction of the Shapley and Norma superclusters to explain all of the peculiar vector movements of the MW and Local Group.

There is another astrophysical model that better satisfies the scientific need to correlate with causation: Every popular proof of GR is potentially explainable by this better model, though not always with equal elegance. The 21st century version of push/shadow gravity applies to all dimensions above the Planck and, most importantly, is the ONLY paradigm that elegantly explains the "Dipole Repeller" mess. Electromagnetic force is still intact below and above the Planck, even while the century-old GR paradigm fails. It is highly ironic that these four eminent GR-loving astrophysicists have unintentionally shoved the proverbial vampire stake into the heart of GR.

Here is how to correctly comprehend the cosmic activity within this 1.74 Bly cube, where we are mathematically at the geometric center:

First, understand that even a volume of 1.74 billion cubic light years is only about 1/100,000 the total cubic volume of the visible universe. Therefore, the cubic model as presented in the original Dipole Repeller essay

¹³ <https://www.forbes.com/sites/startswithabang/2017/02/04/ask-ethan-if-gravity-attracts-how-can-the-dipole-repeller-push-the-milky-way/#813e9cfbebd8>

is highly susceptible to outside forces of unknown characteristics and from all spherical directions.

Second, outside force flows from the multiverse do interpenetrate the volume of our math "local cube." The multiverse is a concept that many tidy theorists are not comfortable with. Nevertheless, the multiverse is growing in popularity among astrophysicists, because it allows for different types of solutions to what would otherwise be unsolvable dilemmas within a singular universe. The multiverse is to one visible universe as Galileo is to Ptolemy.

Third, cosmic force flows are better explainable in terms of a 21st century version of push/shadow gravity. The original push gravity idea was developed by Nicholas Fatio, a friend of Isaac Newton, in the 17th century. In the mid-18th century Georges-Louis Le Sage modified that theory to emphasize the shadow aspects of push gravity. However, all of these early ideas had a fatal flaw, using billiard-ball impactors that were refuted in the 19th century. By doing away with the antique kinetic aspect of push/shadow gravity, we can now resurrect the good parts – and thereby replace the metaphysical gravity-sheet membranes in GR. The better gravity is more like quantum gravity, with no membranes or branes, yet still has aspects of the standard model of particle physics.

In the experimental math box enclosing both the Shapley supercluster and the so-called Dipole Repeller we do not find a gigantic dipole anything, at least not in a singular electromagnetic form. EM is everywhere, but not singularly dominant on this scale or along these vectors. GR also fails to explain the something-great-from-nothing nature of the so-called Dipole Repeller. GR fails to elegantly account for a net "repelling force," a major weakness in the theory when polarity is removed.

A superior and elegant paradigm defines the modern idea of push/shadow gravity. Gravity's "push" involves pushing flows from vast numbers of sub-Planck Yin/Yang objects *coming at us from all spherical directions*, reflecting the multiple universe "bathtub bubbles" spherically around our local visible universe.

By definition, all local universes add up to the multiverse, and our local visible universe is just one big-bang bubble nestled among many. We don't need to invoke more than four dimensions. The important point here is that individual, spherical Yin/Yang (Y/Y) particles, and bead-like strings of various lengths, and looping bead-like strings – constitute a large part of the tiny energy/matter units pushing on us, or on any other mass of any size.

The pushing units mostly zip through baryonic masses, and even through accreted dark matter. Only the region inside the event horizon of a black hole captures all entering particles. A very small portion of the multiverse interpenetrating units interacts with us, constituting the effective push aspect of real gravity. These objects are NOT old-theory billiard balls.

Dark matter itself is mostly composed of elementary Y/Y particles in various combinations that have been slowed down when they transferred some of their kinetic energy to pushed matter. In other words, multiverse gravity provides a complex mixture of interpenetrating, very fast flows of sub-Planck objects – and populations of virtually stationary Y/Y particles in various configurations in the form of dark matter.

The forces pushing our local group of galaxies toward the CMB are not those in stable dark matter. The gravitational push primarily comes from free-flowing, sub-Planck, energy/matter Y/Y objects. Most, but not all, of these objects are like larger solar neutrinos, passing through us without any interaction. One imperfect way to visualize this amazing other dimension is the quantum field theory idea of “quantum foam.”

Once we understand what gravity really is, here is how it applies to the subject area of the “Shapley attractor/Dipole Repeller”:

It is a fundamental error to think of gravity as a sheet-like vortex, with attracting tractor-beam force. Even worse is to imagine stringy gravitons mediating this attracting force among multiple String Theory dimensions. The real universe is not so weird.

The Shapley and Norma superclusters seemingly attract us only because they shield us from a small portion of the multiverse flow. Quite simply, the multiverse “wind” coming from that area is diminished partially by their collective shadow, though not totally blocked. From other spherical directions our Local Group of galaxies get a net-stronger, less-blocked multiverse flow.

In short, what we experience is merely a *net difference* where the non-Shapley flows push us more in that direction, than do the diminished flows from the Shapley direction. The vector difference is especially strong when comparing the over-dense Shapley supercluster shadowing, with the much weaker shadowing of the under-dense “Dipole Repeller” region. This is clearly not the same as just saying an area of over-density attracts more than an area of under-density attracts. Again, there are no tractor beams, or differential “basins of attraction.”

The inverse square relationship of gravity and distance does NOT APPLY to pushing multiverse flows from all directions – just to the net push/shadow relationship among more local flows. Net forces change depending on how close the proximal shadowing mass is to that which is shadowed, which changes the percent of background inflow blocked. Simply put, proximal shadowing objects appear larger against the spherical background than distant ones, and they therefore shadow us better.

Moving into deep space away from the proximal shelter of any shadowing mass tends to yield apparent absence of net gravity, due to equal pushing pressures from all directions. Floating in space is just floating where incoming multiverse flows from all directions cancel each other out.

Closer to home, we on Earth are partially shielded by our Sun from the multiverse flow coming toward us from behind the Sun, enough to constitute a net “gravitational attraction” to the Sun – which is balanced by the outward centrifugal force from the velocity of our orbit. Planets even closer to the Sun feel a “greater gravity” because they experience a Sun larger in the sky, yielding a weaker flow from the Sun’s direction, and therefore less force to offset the average multiverse flows pushing in from all other directions. Planets outside Earth’s orbit experience a smaller Solar disk, and thus need a smaller orbital velocity, as the multiverse flow from the Solar direction is more like the overall multiverse flows.

Likewise, the Earth and Moon partially shield each other and thereby seemingly attract each other. Even Newton’s third law of motion can be explained by mutual shielding, as both the Earth and people standing on its surface partially shield each other.

Again, given that there is a relative paucity of blocking mass in the so-called Dipole Repeller area of the sky, we in the MW experience a stronger multiverse flow from that deep sky direction. There is no absolute repulsion from that direction, just a stronger net multiverse force, brought about by much less shadowing. We don’t need to resort to “cosmic EM vector flows” to explain what is going on – nor do we need to fantasize about direct +/- magnetic flows between the Shapley attractor and Dipole Repeller, because there is no dipolar bar-magnet relationship on that scale.

If there were statistically normal mass in the Dipole Repeller region, there would be no strong pushing “repeller” force from that narrow direction. Our Local Group of galaxies would still be drifting roughly toward the partially shadowing Shapley supercluster direction, just not as fast.