

The “Dipole Repeller” Explained

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ABSTRACT

The “Dipole Repeller” is a cosmological region inside a billion radial light years from us populated by thousands of galaxies, which has been suggested as further proof of General Relativity gravity. Close inspection of the thesis reveals data sufficient to seriously question GR cosmology itself. Data analysis supports another elegant paradigm of universal and multiversal gravity.

Introduction

Earlier this year 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 almost a billion light years radius from us.

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 normal galaxies) is gravitationally attracting us from 650 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 normal galaxies) from the direction of the Norma and Triangulum Australe constellations. The Shapley net attractive force is

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>

significantly greater than that of the Great Attractor, and together they pull our Milky Way toward them – in addition to the “Hubble’s Law” movement outward as the visible universe expands exponentially and uniformly, apparently from “Dark Energy.”

Creatively, they combine the idea of dips 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.”³ Yes, a “basin of repulsion” is hypothesized to go along with a “basin of attraction.”

There are other gravitational areas complicating the net vector picture, as indicated in the illustration below. The Shapley and Norma 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 gravitational nodes. However, the sum 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 infrared and X-ray astrophysics had advanced sufficiently for the idea of a Dipole Repeller in our cosmic neighborhood to be formalized. The Shapley supercluster attractor is geometrically on the opposite side from the mass-deficient area called the Dipole Repeller. Our own galaxy is roughly in the middle.

Together, the net Shapley, Norma, Dipole Repeller, and “Dark Energy” forces are pushing us and our smaller Virgo Supercluster in a net direction only perceivable by the finest radio instruments measuring red shifts within a mathematical cube where we are at the geometric center, and with all sides being 1.74 billion light years across. We know this geometry from several data sources, including one that catalogs over 8,000 galaxies.

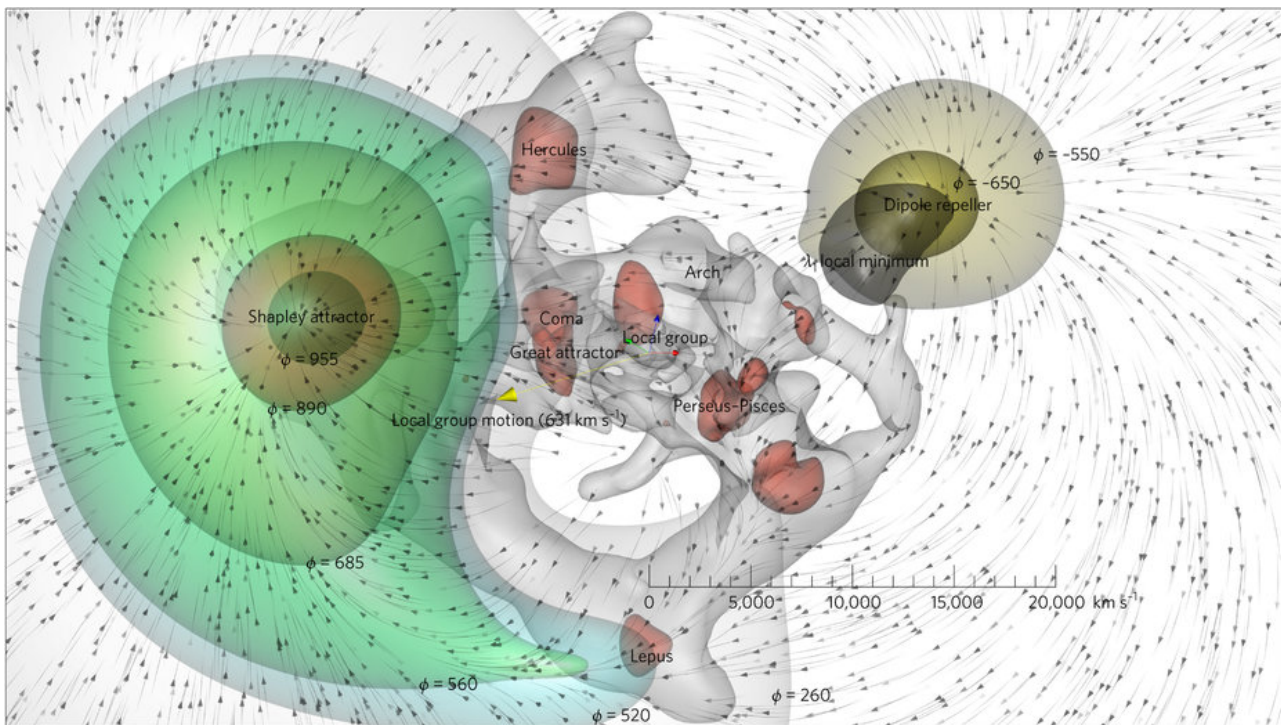
The net speed of our MW galaxy’s local group toward the Cosmic Microwave Background (CMB) “pole” is measured to be 631 kilometers per second. We aren’t descending into the core of the Shapley mass because the repelling force vectors from the direction of the Dipole Repeller are

³ Ibid.

modestly stronger, enough to send us away from the Shapley. At this speed our local group won't reach anywhere near the Shapley Supercluster for several trillion years anyway, wherein what's physically left of today's galactic structures will be totally transformed and unrecognizable.

One alternate interpretation suggests 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 toward that direction, resulting in the imagined net repulsive force.⁴ In a narrow way that idea is correct. More knowledge needs is needed to make sense of what is really going on.

The authors of the original article may have implied this alternate model for their dipole repeller, as they see it – but they seemed to be somehow entranced by the idea of truly vast electromagnetic force fields, without saying as much. EM force follows Coulomb's inverse square law, as does regular gravity inversely follow Newton – both thereby becoming *much* weaker not too far away. Neither inverse square formula offers a clear justification for streams of sustainably strong dipolar forces flowing hundreds of millions of light years. Here below is how the original article presents this picture of the highly dynamic mix of forces in our region of the universe:⁵



⁴ https://en.wikipedia.org/wiki/Dipole_repeller

⁵ <http://www.nature.com/articles/s41550-016-0036/figures/1>

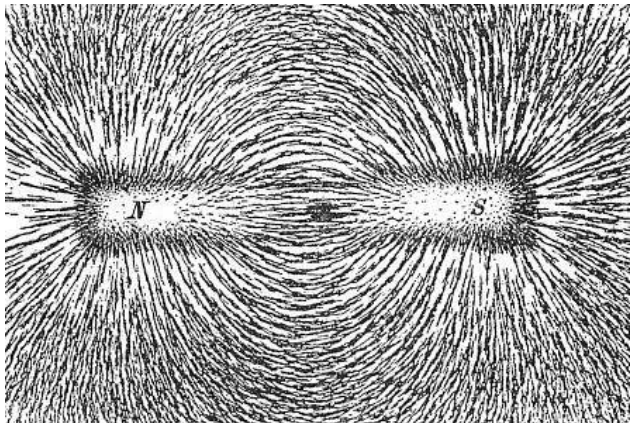
A face-on view (above) of a slice $6,000 \text{ km s}^{-1}$ thick, normal to the direction of the pointing vector:

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 from almost nothing” thesis.

The esteemed authors of this essay are handicapped by insufficient and incorrect dynamic models. They did well, but stretched their tools to 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. Classical gravity only flows in one direction. The classical idea of dipolar magnetism is shown in the relationship of iron shavings to a bar magnet. Note that cutting a magnetic dipolar 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. *The very small is everywhere within the large – but the very large is not everywhere in the small.* This fundamental reality is seen in the failure of the Dipole Repeller vs. Shapley attractor (and the CMB pole) to reflect their General Relativity models.

Both Newtonian classical gravity and coulombic (C) electromagnetism follow the *inverse-square relationship*. In theory, both apparent forces extend infinitely. In practice, *both such forces fade off quickly to where whatever force is left 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 the very local area equal to or smaller than a solar system is a much, much larger region of space, all of which inversely diminishes the attractive power of any one mass, however large. Eventually the force from any distant gravitational mass attenuates to infinitesimal meaningfulness 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.

I have previously looked at the claims of General Relativity from the inverse-square perspective, and have found them to functionally fail at large dimensions.⁶ Scales of billions of light years do not equal mathematical infinity (and never could), but they can approach and approximate infinity, and thereby yield 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 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.*⁷

This 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 SR and GR.

The best standard explanation for this motion of our Local Group in relation to the Cosmic Microwave Background comes from astrophysicist,

⁶ <http://astronomy-links.net/GGvsGR.html>

⁷ <http://astronomy-links.net/correlation.and.causation.pdf>

Ethan Siegel.⁸ He attributes the apparent repeller force as simply an under-dense region of gravitationally attractive mass attracting less than the over-dense Shapley supercluster attractive mass. 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 idea of polar gravity for polar electricity. Furthermore, the problem of there not being enough mass in the direction of the Shapley and Norma superclusters to explain all of the vector movements of the MW and Local Group is not well addressed.

There is another astrophysical model that better satisfies the need to correlate with causation. Every popular proof of GR is potentially explainable by this better model, though not always with elegance. The correct 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. The electromagnetic force is still intact below and above the Planck, even while the century-old GR model 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 activity within this 1.74 Bly cube, where we are at the geometric center.

First, understand that even a volume of 1.74 billion cubic light years is only about 1/100,000 the cubic volume of the visible universe. Therefore, the data model as presented in the original Dipole Repeller essay is highly susceptible to outside forces of unknown characteristics and direction.

Second, outside force flows from the multiverse do interpenetrate the volume of our "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 in a singular universe.

⁸ <https://www.forbes.com/sites/startswithabang/2017/02/04/ask-ethan-if-gravity-attracts-how-can-the-dipole-repeller-push-the-milky-way/#813e9cfbebd8>

Third, the 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 concepts 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 also replace the outdated gravity sheet membranes in GR. The better version is more like quantum gravity, with no membranes, but still has aspects of the standard model of 4-D 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-from-nothing nature of the so-called Dipole Repeller. GR fails to elegantly account for a net “repelling gravity,” a major weakness in the theory when polarity is removed.

A superior and elegant paradigm defines the modern idea of push/shadow gravity. Gravity involves pushing flows from vast numbers of sub-Planck objects and their beaded strings coming at us from all spherical directions, mediated by the many universal “bubbles” around our local 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 energy/matter units pushing on us, or on any other mass of any size. The pushing units mostly pass through baryonic masses, and even through dark matter. A very small portion of the interpenetrating units interacts with us to a greater or lesser degree, constituting the push aspect of real gravity. These pushing objects are NOT classical 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 comes from free-flowing, sub-Planck, energy/matter Y/Y objects. Most, but not all, of these objects are like solar neutrinos, passing through us without any interaction. One imperfect way to visualize this 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 vortex tractor-beam force. Even worse is to imagine stringy gravitons mediating this force among multiple String Theory dimensions. The real universe is not so weird.

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

In short, what we experience is merely a *net difference* where the non-Shapley flows push us more in that direction than the diminished flow from the Shapley direction. This is clearly not the same as just saying an area of over-density attracts more than an area of under-density. 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 – just to the net push/shadow relationship among flows. Net forces change depending on how close the shadowing mass is to that which is shadowed, which changes the percent of background inflow blocked. Simply put, proximal shadowing objects appear larger than distant ones, and they therefore shadow us better. Moving away from the shelter of the shadowing mass results in the inverse square relationship.

Closer to home, we 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 our orbit. 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.

Given that there is a relative paucity of blocking mass in the so-called Dipole Repeller area of the sky, we experience a net stronger multiverse flow from that 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" to explain what is going on, nor do we need to fantasize about +/- energy flows between the Shapley attractor and Dipole Repeller, because there is no dipolar EM relationship on that scale.

If there were greater mass in the Dipole Repeller region, there could be little or no net pushing "repeller" force. Our Local Group galaxies would still be drifting roughly toward the supermassive, blocking/shadowing, Shapley supercluster direction, just not as fast.

