

## Induced Electric Dipole Red Shift & Restructuring Cosmology

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### Abstract

The material in the current paper was written between the years 1979 – 1981, when I was fortunate enough to be on the faculty in both the Physics and Mathematics Departments of Cornell University, Ithaca, NY. This was when vast amounts of data were flowing in from NASA space probes arriving at many of the planets, and I had access to it in addition to Cornell's Library of Congress with all journal publications present in the stacks including rare books. NASA had a large presence at Cornell which was a depository of all NASA data and staff of many resident NASA scientists. These all played important roles in the development of this work.

Additionally, my personal research was attempting to find new mathematical methods of solving the N-Body problem of celestial mechanics. As a hypothetical, I included electric and magnetic fields to see what would result. By the time I arrived at Cornell I had mastered the important theoretical aspects of electric and magnetic fields in outer space and how they interacted with free plasma. As I daily was in data sessions seeing data from the planetary probes for the first time, I started seeing my theoretical work in the data. I also realized that the NASA scientists had no clue what they were looking at and frequently misinterpreted or simply ignored the data. I began publishing and was told by the head of the Mathematics Department that I was the only faculty member to be published in peer review astrophysics journals. This, however, was short lived.

At that time there was sufficient evidence to show that the Big Bang Expanding Universe theoretical constructs were incorrect. Two of my papers were published in high level peer reviewed astrophysics journals only to be met with an unbelievable backlash and reprisal. These first two papers "Continuing Galactic Formation" and Saturn's Sweeper Moons Predicted" were the first of many papers that had been submitted for publication building an entirely new restructuring of astrophysics. Although the editors of the journals were excited to publish my work, the scientific political arena raised a letter writing campaign that blocked my other papers from publication, so I had to publish it all for posterity in an obscure peer refereed journal to wait for the politically correct time to publish it. It appears that time has finally arrived.

In private and over the past decades, I continued my research adding many new observations to the theoretical structure. I attended American Geophysical Union meetings as an independent scientist, gave invited talks presenting my work within the US Military physics community and Los Alamos National Laboratories to name a few. There was a dichotomy in acceptance. Tier 1 science arenas (what I call military science) was more than accepting of me and my work, stating that my work was 100% correct, whereas the Tier 2 (University peer review journal community) was less than accommodating. Another group that not only accepted my work, but regularly taught it in their course work, was through a lengthy collaboration with atmospheric physicists from the University of Novosibirsk in Central Russia in the mid-1990s.

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**The Induced Electric Dipole Red Shift (IEDRS) was conceived during the Cornell Years. It is a laboratory verifiable effect that accounts for both the red shift and bending of light around fusion based objects (stars, galactic centers, quasars, etc). It essentially states that photons have a charge pair that can separate in a non-uniform electric field causing a slight attractive force and thus a red shift. Part of the discovery process was identifying the existence and source of the non-uniform electric fields around fusion based objects. It also exists in many forms in nature from the subatomic world (the basis of electron positron pair production) to cosmologically large structures and a host of other phenomena. A side effect details the real source of the microwave black body radiation (including its blotchy nature) showing that it is a remnant of a local nebular cloud of dust and gasses that surround our solar system.**

**The work also answers the Einstein dilemma that General Relativity did not include the total field. Other difficulties long ignored include problems with the core fusion model of stellar objects (ref. private conversations with Hans Bethe). The result was the identification of fusion in the solar atmosphere ignited by energetic lightning discharges (an electric fire) which involves the separation of charge. This has led to an entirely different theoretical base and the restructuring of cosmology. When the smoke has cleared, very little if any of modern Big Bang cosmology will remain. There are many more processes related to non-uniform electric fields in outer space beyond the scope of this paper but will be briefly mentioned. This paper only concentrates on red shift and related topics germane to replacing the Big Bang cosmology.**

***Keywords: Cosmology; Big bang; Einstein dilemma; General relativity; Electric dipole red shift***

## **Introduction**

Since the early 1900s, when spectroscopic equipment was combined with telescopes sufficiently powerful to resolve galaxies and coupled with the Doppler red shift of Special Relativity and soon after the bending of light Eddington Experiment, these pillars of modern Cosmology have been seen as one of the most stable aspects of astrophysics. Many defugalties emerged over the past 125 years all to be dismissed or “accounted for” by new concepts. However, the basic premises always survived ... until today. Later developments included the discovery of microwaves and the microwave background radiation which resulted in multiple Nobel Prizes and a monopoly force within the grant agencies, peer reviewed journals, public news outlets and university hierarchies. Although oppositions rose and faded over the decades, they were always met with sufficient resistance or simply ignored. Many of those objections still exist and are en masse being revitalized in protest of the dominance of the Big Bang priority in funding, telescope time, publication in peer review journals, funding for experiments via NASA, NSF and other US Federal funding agencies as well as access to the news media to form public opinion that ultimately leads to the funding cycle, since today all depends on the source of funding which drives what I call the science industry.

The multiple great pillars of modern Cosmology were established early in the 20<sup>th</sup> century. The first was the Hubble interpretation of near universal red shift giving rise to the expanding universe concept. The second was the ability to calculate a rate of expansion based on interpretation of red shift data giving rise to the Hubble Constant. The third was General Relativity which gave rise to the concepts of curved space, the bending and lensing of light, and black holes. When quasars were discovered, their high red shifts made them some of the strangest members of the cosmological community, seemingly breaking all the rules. How could the most massive objects fly out of the original explosion with the greatest velocity, contrary to any known principles of physics? With their interpretation as the farthest objects coming out of the Big Bang, they fit well within the stranger than strange universe.

The fourth was the microwave background black body radiation which had been predicted as a remnant of the “Big Bang”. It is held that all matter was previously contained in an area no larger than a pin head. The final stage was the development of subatomic particles and matter as we know it today. All of this allegedly came later after billions of years to be followed by the structuring of matter, galaxies, star systems and eventually biological evolution. Further assertions became necessary as the light curves of galactic arms contradicted the idea that galaxies rotated as if on a solid disk, giving rise to “missing mass” and eventually dark

matter and dark energy to fill the void that Newtonian gravity could not fulfill. This leaves the state of cosmology today, searching for something that has yet to be defined.

The order of this paper is that first the complete restructuring will be defined and stated as facts. Later will come the historical development of the concepts to show the data (much of it never published) and then further discussions of the theoretical structure. This will give researchers direction as to where the future of research should go.

## **Preface**

Before presenting the history and reasons for the complete revision of Cosmology, I want to brace you for: 1) the history of fatal flaws that have been overlooked over the past 120 years (many of which were ignored or swept under the rug) and 2) the complete revision of almost everything that was believed before. Unfortunately, what has happened over and over was that when new data or conflicting observations were presented, a rush to create fixes such as “Bubble Theory” or “String Theory” or “Missing Mass” or “Dark Matter” or “Dark Energy” (and the list goes on) were agreed upon and when the heralding stopped, life returned to normal and gave new life to the Expanding Universe.

In other cases, data was simply ignored or at best given a prompt review and dismissed. In the current situation, with the James Webb Telescope resolving galaxies beyond all prior distances and discovering what should not be there, and with literally 10s of thousands of physicists around the world realizing that the Expanding Universe concept does not work, the science world is more than ready for a complete overhaul and not another “fix” theory. So, before you read on, prepare yourself for nearly everything you thought was correct to be replaced.

The problem is that I know beforehand what is going to happen. Every scientist has his favorite theory that they could not imagine could be in error. Each will clamor for his own favorite piece to be retained intact. Open source unrefereed online journals are full of every idea conceivable to man in efforts to put patches on what are completely incorrect concepts. Therefore, in the spirit of being as blunt as possible while still being polite, almost every concept of modern astrophysics is going to be replaced if not seriously revised.

I even believe that we must find a new name to replace “Cosmology” because it carries the past concepts as baggage. Again, to warn the reader, when you see your favorite theory being cast aside, please brace yourself and understand that the overhaul is necessary to move on. The reason no one else has been able to accomplish this is because all have vested interests that go back to graduate school or before and all your mentors and colleagues have the same. I do not. Everyone will be looking for some minor change that will preserve the majority status quo. Not only is the theoretical structure broken, but so is the grant, funding and publication system that created it. Fortunately, there are journals today that are willing and able to break the mold.

I will close this preface with a simple fact. Albert Einstein doubted the bending of light premise of General Relativity and stated so in his autobiography “Out of My Later Years”. He stated that the general theory was potentially flawed “because it did not include the total field”. What he meant was the following. How could it be that gravity affected electromagnetic waves and light but there was no known effect that was caused by electric or magnetic fields? Einstein’s efforts when he died were in not only the unification of the fields, but a search for a broader understanding of electromagnetic effects in outer space in general including the completion of General Relativity with the complete field. In the 1950s, he had no data and only had rudimentary knowledge of the solar wind and similar topics. He knew that something was missing, and he died before he found it. In private conversations with Hans Bethe when I was at Cornell, we discussed the issues with the core fusion model of the sun. The answers to these and other problems are in this paper. The key is that there was one small item that everyone has overlooked and at best misunderstood. This key is what opens the door to restructuring astrophysics.

**The problem with chapman physics and electrically neutral space:** The basic premise that there cannot be charged entities in the free plasma environment of outer space is flawed. It states that a charged object cannot exist in this environment because it would rapidly be neutralized by free plasma. The fact is that this is correct on the surface; however, it is only part of the real situation. The subtle reality is that it depends on how the charged object got to its location in the first place. It also depends on a small detail that in any discharge of free plasma, the electrons with higher charge to mass ratio are the primary charge carriers in the discharge current. It assumes inherently that there is no source of charge separation in the plasma itself by way of the energetic processes exhibited in fusion based objects. All these oversights create the missing details by which gravity still dominates the overall large scale processes but with subtle electrical and magnetic effects.

It turns out that gravity dominates celestial mechanics for any object larger than a golf ball and the electrical effects come into play only under certain conditions ... but mainly for small objects the size of grains of sand and smaller. It was during the Cornell Years that I searched for and discovered the mechanism of fusion that creates the electric charge separation and what I called “the Solar Capacitor” and fundamental nature of non-uniform electric fields which are the driving forces for all systems with a fusion based object. The observations of magnetic fields in data assumed that these simply exist as autonomous entities, not realizing that they are coupled with electric fields and electric currents. Autonomous plasma magnetic fields cannot exist in outer space without electric currents to sustain them, and this requires potential differences to be maintained over long periods of time.

In summary, no one really had a good grasp on the subtleties of non-uniform electric fields in outer space nor where they came from nor how they responded to ongoing solar system or galactic movements of objects. They are very different from normal electric fields. My work provides the theoretical and experimental basis to not only show the flaws in traditional thought, but to replace it with a completely different set of principles and structure.

### **Restructuring of cosmology – The induced electric dipole red shift**

The following outline is a summary of restructuring point by point. The details are given after in the following chapter on “History of Discovery” that will discuss each point in greater detail. The first bullet point will give the Standard Cosmology explanation followed by the Restructuring.

#### **Red shift**

**Standard cosmology:** There are 2 red shifts. These are dominated by the special relativistic doppler red shift. Since red shifts dominate the spectrum of all large scale objects (galaxies, quasars, etc.) it was assumed that this was proof that the universe is expanding. If traced back in 3-dimensional time it concludes that the universe is approximately 13.5 billion years old and began with all matter in a volume the size of a pin head and exploded in a Big Bang. This led to the Hubble Constant and vast number of other conclusions and has dominated Cosmology for 120 years. A second red shift rarely seen is related to light being pulled by the large gravitational fields of super massive objects based on General Relativity.

**Restructuring:** The special relativistic doppler red shift still occurs for objects moving towards or away from the observer and has been verified in the laboratory, however, the primary red shift observed from large scale objects in the universe (galaxies, quasars, stars etc.) is due to the laboratory verifiable Induced Electric Dipole Red Shift (IEDRS). The experiments available to demonstrate this are discussed later in this paper. The excess current of protons in the fusion wind (solar wind with our sun) sweeps the solar system clean of small particles and forms a positively charged cloud of material which is now known to exist beyond the orbit of Pluto, forming the positive plasma region of this capacitor. There are singular or in some cases multiple return current sheets to complete the circuit. The Sun (central fusion object) is left with a slightly net negative charge sheath (the solar corona of relativistic

electrons). The IEDRS is due to a slight attractive force on a photon moving over astronomical distances emerging from the non-uniform electric field around fusion based objects, the non-uniform electric fields caused by an excess current of protons in the fusion wind. The photon contains a charge pair whose wave functions can separate in the non-uniform electric field causing a slight attractive force (the induced electric dipole force is always attractive and therefore always causes a red shift), thus the dominance of red shifts in large scale cosmic structures. Current work suggests that the IEDRS is frequency dependent and therefore with proper analysis of spectral data, can be separated from the special relativistic doppler red shift. This non-uniform field is responsible for many other subtle effects only referred to by name but not discussed in this paper. One very important related phenomenon is listed below dealing with positron electron pair production which further solidifies the concept of a charge pair contained in all photons.

### **Pair production**

**Standard cosmology:** See standard physics for Feynman Diagrams and related topics.

**Restructuring:** Pair production is well understood however the more fundamental aspect of the pair is that mass results from energy conversion from the photon (well understood), however the charge pair (the positive and negative electric charges) existed in the photon prior to being separated in the high non-uniform electric field of an atomic nucleus. In any photon of any energy, the positive and negative charge wave functions are separable by the Induced Electric Dipole Red Shift Effect that also causes the red shift on any photon passing through a non-uniform electric field. In the case of stellar, galactic or quasar surrounding non-uniform electric fields, the induced electric dipole force on the photon is very small but acts over astronomical distances whereas in the case of pair production, this occurs in the strong non-uniform electric field of the atomic nucleus acting over subatomic distances (the larger the atom the greater the field). The difference between lower energy photons and gamma rays is that a gamma ray photon with sufficient energy can convert to create the masses and can therefore separate completely whereas lower energy photons do not have sufficient energy to create the masses of the positron and electron so therefore cannot separate but are only deflected by the induced electric dipole force. This also implicates a conservation of charge (the positive and negative charges exist in the photon prior to pair production) and their wave functions separate in the non-uniform electric fields. Other similar effects include the Zeeman and Stark Effects with line splitting (due to a photon being produced in a static magnetic field and uniform electric field respectively). The IEDRS expands these effects for existing photons moving in non-uniform electric fields. This covers the range from subatomic to large scale objects.

### **James webb telescope recent discoveries of large scale structures**

**Standard cosmology:** The recent discovery of large scale structures at distances near the alleged source of the Big Bang has finally convinced most scientists that there are serious problems with this traditional cosmological structure.

**Restructuring:** I have said all along that if you build a larger telescope, you will find more of the same. The best we can say from an experimental point of view is that the Universe is larger and therefore older than we can measure. We also have no basis for predicting the lifetime into the future. If you could put a James Webb Telescope at the farthest location that we can currently see, you may easily see again that far to the other side of our current field of view. Part of the need to produce and maintain a Big Bang type of theory appears to have been more philosophical than scientific.

### **Anomalous red shifts (Stars, the edge of the Sun, Jupiter, Saturn, etc)**

**Standard cosmology:** There are historically many red shift anomalies that must be re-examined. A red shift exists for almost all stars including our own Sun. I spoke with an astrophysicist about this, and the response was that this data was anomalous and was

simply ignored. The Marconi Oscillators that provided the carrier signal for radio transmissions on the Voyager spacecraft to Jupiter and Saturn were red shifted on passage of both of these objects with the red shift at Saturn being larger. At the time it was said to be due to General Relativity, however neither of these objects have sufficient mass to cause a GR red shift and the larger red shift is anomalous from Saturn since it has a much smaller mass. In 1986 a number of astronomers took the spectrum of Halley 's Comet and noted a red shift as the comet approached (this should have produced a blue shift). In these cases, the data was never published.

**Restructuring:** The data suggests that there are non-uniform electric fields surrounding these objects. Atmospheric Fusion is created by energetic lightning bolts in the atmospheres of stars and small star-like objects (Jupiter and Saturn). When Voyager 1 passed Jupiter, it was reported to have a proton wind rising off its surface. The primary cause of non-uniform electric fields is the capacitors built by proton winds from fusion based objects, or around objects that discharge this capacitor (See below charging process of objects discharging non-uniform plasma and the reason why attached quasars have larger red shifts than the parent galaxy). I presented this theme many times at American Geophysical Union and other closed meetings although mainly ignored at the time.

### **Age of the universe (With note on age of the Solar System)**

**Standard cosmology:** The standard Big Bang estimate based on regression of 3 dimensional times is 13.5 billion years. The idea of the long established Hubble Constant used in reverse to pin point the time line for the 3 dimensional explosions begs the question as to how fully develop large scale structures could exist less than 500 million years after the explosion. In linear time the case might be made that you could simply add a few billion years into the past and that would fix the problem. In the 3-dimensional time scenario there is no way to add time before the initial explosion since it converges to a point in 3 dimensional spaces. This is the crux of the issue.

**Restructuring:** The James Webb telescope is seeing large scale structures in regions previously seen as black space with the Hubble Telescope so from an experimental point of view, we do not know, nor can we make any statements about the age or dimension of the universe. It is older and larger than we can measure. The physical property on the farthest large scale structures is the same physics that we see here which fully supports the concept of a grand design and not a random universe. The estimated age of our solar system has always been stated to be about 4.5 billion years old, however there is little if any real evidence for this claim by looking at rocks collected on the surface of earth and the moon which have nothing to do with the internal age of the solar system. It is another example of very little real data existing. Furthermore, there is little reason to support the idea that the solar system formed all at one time with most of its members showing differing ages. For example, 27 of Saturn's moons are known to have been captured.

### **Spacecraft charging and the misconception of neutral space**

**Standard cosmology:** Space craft charging is one of the most misunderstood aspects of astrophysics. In the early days of the space program, space craft charging was openly discussed and recognized. Then it became politically incorrect to mention anything electrical in outer space.

**Restructuring:** Charging of any object in outer space occurs when the object discharges a local non-uniform electric field. My work has identified 17 local electrical batteries in the vicinity of Earth and the primary source of charging in the solar system is the discharge of the Solar Capacitor built by the excess current of protons in the solar (fusion) wind. The primary charge carrier in any free plasma discharge is via electrons which have mobility about 2000 times that of protons and more for molecules and millions of

times more for fine dust. As the electrons encounter the object, a back pressure potential builds causing a space charge in the region of the object. This then induces a space charge sheath of positively charged particles to form a spherical Debye shield round the object and slower moving positively charged particles drift in along field lines towards the object. This is primarily ionized hydrogen and lower mass molecules. This process continues until the entire plasma capacitor is drained (or continues if the capacitor is continuously re-supplied as in the case with fusion based proton wind supported capacitors). This is what has been missing from understanding how charged objects occur and how the charge is maintained in spite of the rush of plasma to neutralize the charged object. It is in fact the rush of charge that causes the charging. The additional point is that particle sensors on the space craft will always report equal numbers of electrons and positively charged particles which has led scientists to believe they are measuring neutral space. This same process is at work for large objects that discharge the solar capacitors (to be discussed below). It is always working towards zero potential, the issue is that the solar capacitor is huge compared to the small discharges so it cannot be depleted by normal processes. It is impossible to measure electric potential in outer space with a single spacecraft because there is no reference point (e.g. ground). Potential difference by definition is the voltage between 2 points and since a space craft is a single point, it can only adapt to the local space charge and therefore to the space craft perspective it is always “neutral” electrically.

**Core fusion model vs atmospheric fusion - Lightning fusion fire (Jupiter and Saturn) proton wind (may be both but there is fusion in the atmosphere) coronal holes electrons in orbit around positive sun (net current of protons in the solar wind)**

**Standard cosmology:** original model created when sun was believed to be a smooth orange ball with smooth surface and no solar wind. Random walk x-rays from the center of the core.

**Restructuring:** experiment by Russian scientists at University of Novosibirsk shows a cooler core with the atmosphere X-rays becoming hotter as you go higher in the solar atmosphere-Hans Bethe discussion-replenish stellar atmosphere from the galactic environment.

### **Microwave background radiation**

**Standard cosmology:** there are 3 Nobel Prizes given for work on these data and theoretical work. The concept sees a 3 degree microwave black body radiation as a background emanating from progressive stages of the Big Bang explosion and is a corner stone of the Expanding Universe theory.

**Restructuring:** The proton dominated solar wind sweeps the solar system of dust and gasses (molecules larger than atomic sizes) and creates a “Nebular Ion Cloud” (term developed in my original work) that we now know exists beyond the orbit of Pluto in the form of an ionized doughnut nebular cloud. These have been observed around over 50 neighboring stars all emitting a black body microwave signature. This is the positive side of the capacitor that surrounds the solar system and emits the microwave radiation observed. It also is blotchy because within this region are regions of conglomeration of matter that are forming the thousands of Kuiper Belt Objects observed. There are numerous simple tests to show that the microwave radiation is a local effect. For example, the clouds of denser material observed will be seen to move slowly as they orbit the sun and would be the simplest method of disproving the idea of microwave background radiation being due to the Big Bang. It is a local solar system signature. Below are examples of stars with surrounding Nebular Ion Clouds that produce the black body microwave signature **FIG. 1.**



FIG. 1. A local solar system signature.

**Eddington experiment and gravitational lensing (General relativity)**

**Standard cosmology:** The Eddington Experiment results were presented in 1918 and have never been verified since. Even amateur equipment today is better than what Eddington had at the time. Although the original plates no longer exist, a replica of the data from the plates is available. It shows that Eddington cherry picked the data points to show only the ones that fit the General Relativistic predictions. The result is a flawed basis for one of the General Relativistic claims of gravity interacting with electromagnetic radiation (in this case visible light from stars passing by the Sun).

**Restructuring:** The Induced Electric Dipole Force explains the randomness of the Eddington data. The vectors of movement were in all directions and lengths. The bending even moved in many cases perpendicular to the radial direction (showing the light was bending around proton streamers in the solar corona). The next topic will further add to the weight that the bending of light in a gravitational field is not correct physics. There is “Lensing”, but it is not “Gravitational Lensing”. Fortunately, there are simple laboratory experiments that can verify this whereas General Relativity has always lacked controlled laboratory experimentation.

**Anomalous bending of electromagnetic radiation (space probes behind the sun, other)**

**Standard cosmology:** When I was at Cornell and daily attending the data sessions in the Physics and Space Science building after classes in the afternoon, one day a data set was presented using the radio signals from a Venus orbiting satellite that had passed behind the Sun. The idea was that the bending of the radio signal could be used as an Eddington Experiment type of test to very accurately measure the General Relativistic prediction and giving a very complete picture of the gradient since the space craft



location was precisely known and moving through the entire field surrounding the Sun. The data showed the spacecraft bouncing all over the place (up down in out sideways every which way). The data session turned into a idea session on what “correction factors” could be used to rectify the data. The data was never published, and the topic never discussed again as far as I am aware.

**Restructuring:** The region around the Sun and in the corona region is very volatile and rapidly changing non-uniform electric field. As far as I am aware, there is no data that clearly shows the bending of light to fit General Relativistic predictions. Everyone is afraid to touch it and report the data. How many times has this same experiment been conducted with no data reported?

### **General relativity (Principle of equivalence, the elevator analogy, bending of light and red shift)**

**Standard cosmology:** The standard explanation of the Elevator Analogy and Principle of Equivalence lacks experimental verification. The leap of faith that the equivalence is correct is at best a Gedanken experiment.

**Restructuring:** There are two main aspects of General Relativity. This is the first which has as an alternative explanation the Induced Electric Dipole Red Shift that is laboratory verifiable.

### **General relativity (Curved space, Physical effects, Black holes, Precession of mercury)**

**Standard Cosmology:** This is still a viable part of the general theory.

**Restructuring:** It is unknown at this time how the Total Field will affect this aspect of General Relativity. One of the monumental achievements of General Relativity is the curved space time concept.

### **Formation of galaxies**

**Standard cosmology:** Standard theory states that Galaxies form when “Density Waves” initiated by passing large scale objects near a forming galactic cloud and induces the waves that are seen as the galactic arms. The greatest issue with this is that then one requires the addition of an invisible “missing mass” ring midway out the arm system to account for velocity light curves. A second more subtle and more fatal flaw is that it does not account for the extreme level of symmetry found in galactic structures.

**Restructuring:** This is why my first peer reviewed published paper when I was at Cornell dealt with galactic structures and showed how the arms formed in pairs using a 3 dimensional fluid flow of matter swirling into the region near the nucleus and the twin arms forming as the outflow of matter sprayed out in diametrically opposite directions. This eliminated the need for missing mass and explained the symmetry. The following is the abstract from the Continuing galactic formation paper plus the formation **FIG. 2**.

**CONTINUING GALACTIC FORMATION:  
A NEW CONCEPT OF GALACTIC EVOLUTION**  
**by J. M. McCANNEY**  
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(Received 2 May, 1980)  
Astrophysics and Space Science

**Abstract:** A new theory for galactic arm formation shows the arms to be continually emanating from the galactic nucleus due to a continual influx of cosmic dust. In the neighborhood of the nucleus the problem is treated as a fluid flow and a simple solution is given using conservation of momentum. When rotational dynamics are included the spinning arm system is the result. This solution resolves the problem of the 'missing mass', accounts for warped disk galaxies and gives a probable source for the gravity waves measured by Weber which emanate from our galactic center. Reversal of arm direction is demonstrated and examples of such reversals are cited. An approximate theoretical estimate of the age of our Sun is found to be in good agreement with radio isotope dating. A general result shows why twin star systems are in such great abundance in a galaxy. It gives a model of galactic evolution which begins with only a single massive nucleus with the collapsing gas clouds forming the arms.

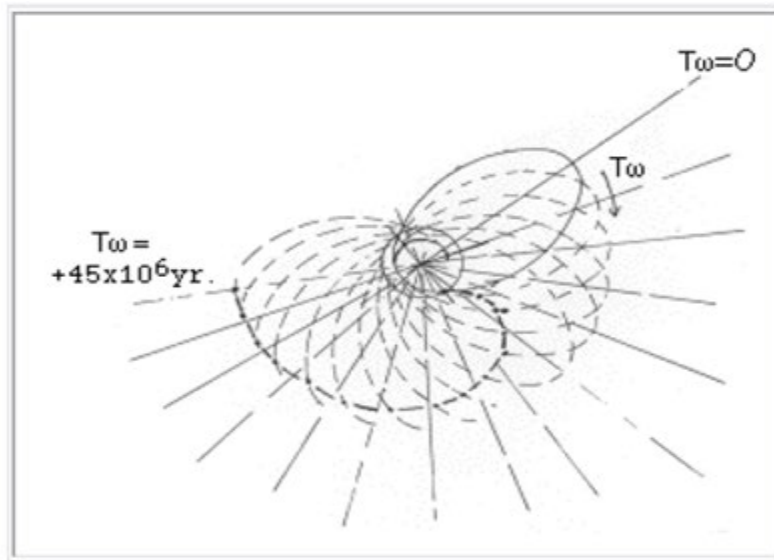


FIG. 2. Continuing galactic formation.

### Galactic nuclei (Black holes vs super massive objects vs missing mass vs cumulative matter)

**Standard cosmology:** It is said that all galaxies need a black hole or minimally a super massive object in the nucleus, but this is not necessary from a celestial mechanics point of view. The issue of missing mass was discussed in the note above on the formation of galaxies and has been one of the unsolved dilemmas of large scale structure theory.

**Restructuring:** The issue of missing mass was discussed in the note above on the formation of galaxies. Another fact is that as you move out from the nucleus of the galaxy in the radial direction, the cumulative mass of all the stars in the galaxy adds to create a cumulative force towards near the center of the galaxy.

### Galactic symmetry

**Standard cosmology:** There is no satisfactory explanation for galactic symmetry, in fact the Density Wave theory would require the wave to be initiated by a perfectly symmetrical gravitational interaction from the initial perturbation but the odds of this randomly happening for all galaxies or even a single galaxy is next to zero **FIG. 3**.

**Restructuring:** The most important aspect of galactic structure and a theory of galactic formation and evolution are to explain the symmetry including nuances such as warped disc arms that warp symmetrically even though the warpage is on the far sides of the galaxy. My paper referred to above “Continuing Galactic Formation” (1981) explains these issues. Below is a small sample of hundreds of galaxies that have been examined for symmetries (star clusters, voids, smaller secondary arms, etc.)



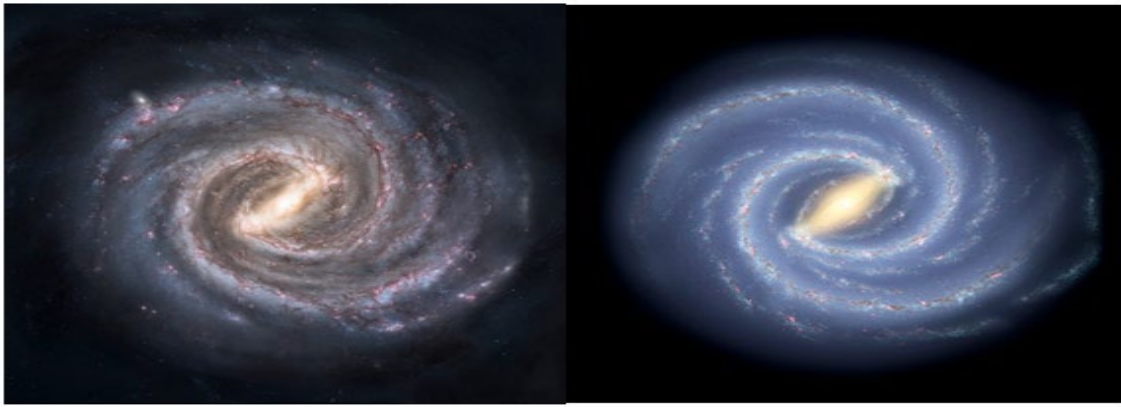


FIG. 3. Hundreds of galaxies.

### **Discharges of the fusion proton wind capacitors (Electron current and space charge)**

**Standard cosmology:** Does not recognize space charging.

**Restructuring:** Any object from the smallest dust particle or grain of sand to the largest objects (Jupiter) all discharge the solar capacitor with the result that there is a negative space charge that surrounds the object and creates a plasma discharge with electrons coming from the sunward side as the primary charge carriers. This is the cause of many phenomena including the Plasma Discharge Comet Model, Bremsstrahlung X-Rays to the sunward side of comet nuclei and the planet Venus (which does not have a protective magnetic field to deflect the sunward electron current), as well as many other effects.

### **Electric currents in galactic arms (Electric highways to the stars)**

**Standard cosmology:** Does not recognize electric currents in the galactic arms.

**Restructuring:** The galactic nucleus is a fusion based object with an excess current of protons in its fusion based wind and the return current to balance the circuit returns along the galactic arms. In the 1982 era I invented a number of non-inertial propulsion systems that used these currents to move spacecraft between the stars in the galactic arms. I presented this to a number of sessions including as invited speaker at the 19<sup>th</sup> International Electric Propulsion Conference. I also gave the talk entitled “Electric Highways to the Stars” at many venues including the Air Space America Air Show in San Diego, CA, USA in 1986 and closed military venues. The fact that the galactic arms have significant electrical currents passing is essential for the stars to create discharges that continually feed hydrogen into their atmospheres to continue the fusion process.

### **Quasars attached to galaxies (Why larger red shifts?)**

**Standard cosmology:** Quasars were believed to be the farthest objects in the universe said to have left the Big Bang at the highest velocity creating some conflicting principles. In a normal explosion the smallest particles leave the fastest. Additionally, the quasars would have had to have had enormous mass to have burned for the age of the universe.

**Restructuring:** Quasars are high red shift galaxies which may be attached or separated from other lower red shift galaxies. The red shift is due to the Induced Electric Dipole Red Shift (IEDRS) caused by an excessive proton current in the fusion based wind. In the cases where they are attached to normal red shift galaxies (visible connections across the electromagnetic spectrum), they are also discharging the proton wind supported capacitor of the normal galaxy. In many cases the quasars are visibly attached electrically to the arms with return current sheets, causing a higher charging and therefore higher red shift than in the attached galaxy. Below are just a few of the hundreds of examples of a high red shift quasars and galaxies attached to the central galaxy via the arms (Halton Arp Collection) **FIG. 4.**

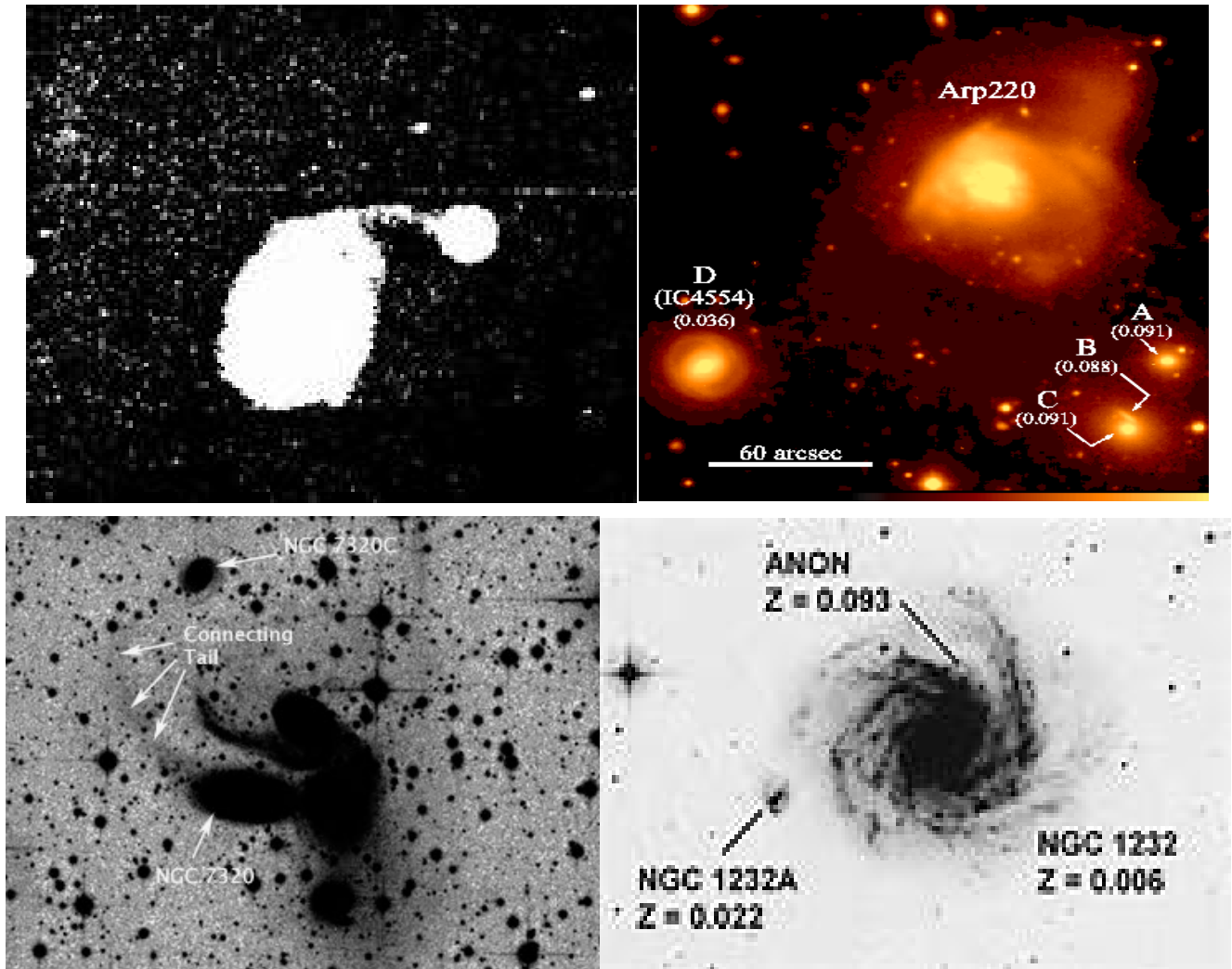


FIG. 4. Halton Arp collection.

### Dark matter and Dark energy

**Standard cosmology:** Dark Matter and Dark Energy were constructs needed to balance the non-Newtonian results of the light curves of normal galaxies (an extension of the original Missing Mass problem).

**Restructuring:** The issue of missing mass and the need to compensate for discrepancies in the expanding universe are no longer a factor since the red shift does not support the idea of objects moving away. The entire quest for correction factors in the expanding universe timeline is no longer needed.

### Comets- The plasma discharge comet model vs Dirty snowball comet model

**Standard cosmology:** Since Kepler first hypothesized that comets were melting when near the sun, the concept has dominated the theoretical scene. It was established in 1950 by Fred Whipple as the “Ice Ball Comet Model” and the name eventually migrated to the “Snowball” and then to the “Dirty Snowball” model. In 2018 after the Rosetta mission to comet 67P landed on the nucleus of a comet it was established by en situ observations that comets are not dirty snowballs. There was no ice or snow nor was there anything coming off the nucleus of the comet. The surface was dominated by organic material. I asked the lead investigator what the closest they detected water from the nucleus and the answer was “about 10 km”. So if comets are not dirty snowballs, then what

are they and where do the water and all the other chemicals in the tail comes from?

**Restructuring:** My main research when I was at Cornell in the 1979-1981 years, was defining the Plasma Discharge Comet Model and Comet Capture processes in the solar system. The work on the Induced Electric Dipole Red Shift was an offshoot of this theoretical work now proven correct. This is a complex and enormous topic for which I have extensive writing but is not germane to the current paper which is concentrating on the IEDRS.

### **The pinch effect**

**Standard cosmology:** Does not recognize electric currents.

**Restructuring:** The importance of the “pinch effect” was recognized in my original work as an essential aspect of the processes involved both the atmospheric fusion and in the discharges of the fusion processes that create the excess current of protons in the fusion based winds. It is also an essential part of the discharges of the capacitors. It essentially states that the self-induced magnetic field of plasma discharges pulls the currents together. The fusion “fire” in the atmospheres of even smaller objects such as Jupiter and Saturn and up to the large scale fusion based objects (stars, galaxies, quasars, etc.) is the result of pinched currents where the magnetic fields ignite the fusion reactions. Whether there is fusion in the core or not is not the issue. The issue is that there is atmospheric fusion, and it is this reaction that creates the excess currents of protons. The stellar atmospheres reflect this as they get hotter with increasing altitude and are surrounded by a sea of relativistic electrons (the corona) held in orbit around the star by magnetic fields. It is the sea of electrons in the corona that interact with proton streamers to accelerate them (through openings observable as coronal holes) to produce the proton dominated winds.

### **Cometary sunward side X-Rays**

**Standard cosmology:** In 1996 by accident the ESA discovered X-rays to the sunward side of near earth comet Hyakutake. Later other comets such as Hale Bopp showed the same. Unfortunately, NASA used its dominance of the press and publications to propose an “ion exchange” concept which later was shown to be inconsistent with the data.

**Restructuring:** In my 1979 publication I predicted that, based on my Plasma Discharge Comet Model, one of the primary tests to show that comets were not dirty snowballs was that x-rays would be discovered to the sunward side of comet nuclei. This is important because there are many X-ray signatures in intergalactic space that fit the same criteria and the only other explanation allowed has been due to black holes. This is a topic that alone could take a long paper to describe but is mentioned here for future work. It is worth mentioning here an event that should have had X-rays in comets discovered 10 years earlier. Since NASA was not participating in the 1986 Halley comet fly by with a spacecraft, a group of plasma physicists led by James Farquhar with the then aging ISEE-III satellite (solar wind observing satellite) decided to move it to encounter a short period comet Giacobini-Zinner. The maneuver involved a long trip with “sling shot” effect passages by Earth and Venus and ultimately to have a fly-by of the comet. Anticipating an “ice ball” the satellite was renamed ICE-III. Being a solar observatory satellite it was equipped with an X-ray detector. Upon learning this I contacted Dr Farquhar and stated that I had predicted that comets would exhibit X-rays to the sunward side and that the X-ray observations would disprove the “Dirty Snowball Comet Model” and prove my “Plasma Discharge Comet Model”. They were short of battery power for the mission and had to decide which systems would be shut down. The X-ray detector was one chosen to be shut down. I again contacted Dr Farquhar who in turn requested information from the NASA Goddard comet experts who told him that comets were dirty snowballs and there would not be any X-rays. I contacted the PIs of the ISEE-III X-ray detector, and they were powerless. The mission proceeded without the detector.

If it had been turned on (even for a short burst), the X-rays would have been detected. It would potentially have been a Nobel Prize level discovery in 1986 with a theoretical prediction and experimental verification. When X-rays were finally discovered by accident in 1996, I attended AGU meetings presenting my work alongside the Goddard teams who did more than their part to make sure my work never saw the light of day. On this issue, many years later the Hyakutake data was re-examined by a group of physicists from Europe and confirmed that they were not from ion exchange but in fact Bremsstrahlung X-rays as per my prediction. This is given here as part of the historical record.

### **History of discovery; Small but important data**

When my career took me to Cornell University, Ithaca, NY in 1979 as a faculty member in the Physics and later Mathematics Departments, "Chapman Physics" dominated the western foundations of astrophysics as it was believed that outer space could not contain electric fields. Despite Hans Alven receiving a Nobel Prize for work on atmospheric and space electrical effects, it was ignored in western research. It turns out that he had observations but did not realize the origin nor extent of what was going on. Like Einstein, Tesla, Russian scientists and many others who probed into the areas of electromagnetism in outer space, none were able to put together a comprehensive theoretical structure that explained the origin and nature of the phenomenon. There were only bits and pieces of data and no theoretical structure.

Simply put, according to Chapman Physics, in the free plasma environment of outer space, any free charge would quickly be neutralized and shielded and therefore had no possible theoretical base. My research taught me some of the more subtle aspects of electric fields and how they could form, what they looked like and the observable effects. This led to the discovery of the source of these subtle sources and effects including the basis of this paper The Induced Electric Dipole Red Shift. While this was occurring, unfortunately, others made unsubstantiated claims that somehow electric fields would create wild motions in the planets and that since we did not witness these, it only further substantiated the Chapman stance of no electric fields.

There was no place to insert an opinion from solid theoretical foundations that I had been pursuing. As it turned out, the effects were subtle and only affected very small objects in the free plasma vacuum environment of outer space and I learned that the factor that determined the effects depended on charge to mass ratios, so anything larger than a golf ball was not affected. Larger objects like planets could be involved but they had such a low charge to mass ratio that their effects would not affect them. There was a subtle twist in that large objects like planets, comet nuclei and moons could be affected but not directly. The process involved the fact that even though they had low charge to mass ratios (so that their motion was not affected by electric fields) their overall space charge resulting from the discharge of the solar capacitor was substantial. The positively charged matter in the plasma (ionized molecules and small dust particles) was attracted and it was the "tail drag" that over long periods of time that affected the larger objects. This is being mentioned because it is an additional effect that may be attributed to the motion of the planet Mercury (in addition to or in place of the General Relativistic precession which is also in need of an additional factor). Comets, due to their elliptical orbits were cutting through the gradient of the electric fields and therefore created a larger discharge (and therefore space charge accumulation) causing the tail drag. The small comets did not have enough gravitational mass to collect the materials whereas larger comet nuclei did. The overall effects of tail drag are called "Eccentricity Damping" and "Orbital Circularization". In summary, my work actually clarified the Chapman Physics mantra, however, it was precisely the rapid movements of plasma that caused the observable electrical effects. In spite of the clarification, any reference to the electric phenomenon in outer space was prohibited and that was the end of the argument with no questions asked.

In private and over the past decades, I continued my research adding many new observations to the theoretical structure. I attended American Geophysical Union meetings as an independent scientist, gave invited talks within the US Military physics

community and Los Alamos National Laboratories to name a few presenting my work. There was a dichotomy in acceptance. The Tier 1 science arenas (what I call military science) was more that accepting of me and my work, whereas the Tier 2 (University peer review journal world) was less than accommodating.

At the time when I was at Cornell in 1979, the science world was wide open in that I had access to the data sets as noted above. There was a host of famous physicists that included Edward Salpeter, Hans Bethe and many others. The greatest aspect of being there was that for the first time in human history, data from the Pioneer, Voyager and other spacecraft were coming in on a daily basis with sometimes 2 or 3 data sessions per day where the raw data was presented, and scientists saw for the first time. I was able to set in on these. Unfortunately, NASA has since closed all data to all but the Principle Investigators on current day space probes. My attendance continued for the years I was at Cornell, and I saw huge amounts of data that did not support the standard theories (what I later came to term “The Axioms of Astronomy”). As I sat and watched the data coming in, I started seeing my theoretical work in the data sets which included many odd occurrences that could not be explained by gravity alone. I also observed that the resident scientists there did not see any of this and continued to seek standard explanations, much of which was published in the Science and Nature articles that always followed. I also saw that many of the anomalies were left by the wayside, and a good deal of the related data was never mentioned in the Science and Nature publications that followed each flyby. If it did not fit the standard theoretical basis, it was literally swept under the rug.

The first discoveries that I made came from data that occurred as Voyager arrived at Jupiter based on a number of observations. The first was a situation totally unexpected dealing with the Marconi Oscillators that provided the carrier frequency for the radio transmissions of data. As they approached Jupiter their frequencies red shifted. This was “explained” as due to General Relativity, but Jupiter was too small to account for such an effect.

I waited until the same space craft arrived at Saturn and my prediction was correct, that at Saturn the Marconi oscillator frequencies shifter more than at Jupiter in spite of the fact that Saturn had a smaller mass than Jupiter. A second effect occurred that actually was mentioned in a Science journal publication by lead scientist Brad Smith stating that there was a proton wind coming up from the surface of Jupiter. Jupiter had a positively dominant “solar” wind.

The following are topics that will be presented in a future paper. The sole purpose of this paper is to present the outline of the restructuring of astrophysics, noting that this material in its entirety was available in 1979.

### **Additional topics list for future discussion**

**IEDRS in laboratory experiments:** Laser beam pointed over the tip of a tesla coil bending of light shows the beam stretching downward (as the tesla coil voltage goes between plus and minus volage), the IEDRS is always attractive, and so the beam stretches downward. This is an easy experiment making sure the tesla coil has a small head (like nail head) to maximize the non-uniform electric field. Also, using a tandem van de Graaff accelerator has a linear electric field down the central tube and a radial non uniform electric field, so a light source can be compared (similar to Michelson Morley Experiment).

Arp galaxies and quasars and why attached quasars have higher red shifts (discharging the capacitor and have higher fusion and higher non-uniform electric fields).

Electric Highways to the Stars.. Electric currents down the galactic arms and the pinch effect using space craft with non-inertial electromagnetic propulsion systems to ride the electric currents between the stars. (I have 2 magnetic propulsion system designs).

Describe significance of “Continuing Galactic Formation” and “Saturn Sweeper Moons” papers as being the first 2 to be published what they were really saying (editor Zdenek Kopal was personally editing and sending straight to publish and the reprisal and discussion of his letter to me regarding the “axioms of astronomy”)

Core fusion and Russian experiments with X-rays showing the core is cooler. Other discussions with Russian Scientists who were interested in my work because it explained tornados on the Sun, the Tunguska atmospheric explosion and atmospheric lightning above the clouds. Other collaboration dealt with control of cyclonic storms in earth's troposphere using discharging of the vertical electric field via lasers.

Shoemaker Levy 9 (water comets changed to SO<sub>2</sub> comets as they entered region near Jupiter in July 1994) plus explosions before they hit. The Russian scientists measured the energy by observing X-rays bouncing off the moons of Jupiter (since the hits occurred on the back side of Jupiter). The explosions were on the level of huge nuclear explosions and not reminiscent of a fluffy snowball burrowing into the atmosphere. They declared the Dirty Snowball Comet Model disproven, and my Plasma Discharge Comet Model correct (24 years before the European Space Agency Rosetta mission).

Philae lander Rosetta mission landed on the nucleus of comet 67/P found no ice, water, snow and no water detected within 10 km of nucleus. In 2018 ESA declared the Dirty Snowball Comet Model incorrect.

Location of Voyager spacecraft is different than predicted by Newtonian gravitation and there are numerous electrical effects that could explain this including the induced electric dipole force on the metal in the spacecraft or possibly drag from slight space sheath charging with the tail drag over long periods of time.