Electromagnetic Gravity? Examination of the Electric Universe Theory

Raymond HV Gallucci, PhD, PE
8956 Amelung St., Frederick, Maryland, 21704
e-mails: gallucci@localnet.com, r_gallucci@verizon.net

The Electric Universe (EU) theory postulates that gravity is just another manifestation of electromagnetism, albeit at an almost inconceivably lower force ($\sim 10^{-39}$ as strong). This paper examines the EU conjecture about an electromagnetic basis for gravity based on simplified mathematical analysis for an idealized arrangement of three hydrogen atoms. Results suggest that the possibility of an electromagnetically-induced distortion of a hydrogen atom to create an atomic dipole is at least plausible.

1. Introduction

The Electric Universe (EU) theory postulates that gravity is just another manifestation of electromagnetism, albeit at an almost inconceivably lower force ($\sim 10^{-39}$ as strong): [1]

> "Gravity is due to radially oriented electrostatic dipoles inside the Earth's protons, neutrons and electrons. The force between any two aligned electrostatic dipoles varies inversely as the fourth power of the distance between them and the combined force of similarly aligned electrostatic dipoles over a given surface is squared. The result is that the dipole-dipole force, which varies inversely as the fourth power between co-linear dipoles, becomes the familiar inverse square force of gravity for extended bodies. The gravitational and inertial response of matter can be seen to be due to an identical cause. The puzzling extreme weakness of gravity (one thousand trillion trillion trillion times less than the electrostatic force) is a measure of the minute distortion of subatomic particles in a gravitational field. Celestial bodies are born electrically polarized from a plasma z-pinch or by core expulsion from a larger body. The 2,000-fold difference in mass of the proton and neutron in the nucleus versus the electron means that gravity will maintain charge polarization by offsetting the nucleus within each atom (as shown). The mass of a body is an electrical variable — just like a proton in a particle accelerator. Therefore, the so-called gravitational constant — 'G' with the peculiar dimension $[L]^3/[M][T]^2$, is a variable! That is why 'G' is so difficult to pin down."

Perusing the arrangement depicted in Fig. 1, I decided to try to examine the EU conjecture about an electromagnetic basis for gravity.

2. Electric Forces between Hydrogen Atoms

To enable a fairly simplified analysis, I constructed the geometry for three hydrogen atoms as shown in Fig. 2. Three hydrogen atoms of radius R are aligned and equally spaced, 3R from center to center. We are interested in the distortion on the leftmost (reference) atom due to its two neighbors, i.e., the net electrical force from each neighbor's proton (grey circle) and electron (dotted orbit) on the reference proton and electron (open circle). On average, the electron spends half its time in each hemisphere in each neighbor, with the average position being along the alignment at a distance 0.6366R (shown by triangles) in three dimensions.[1] Both the reference proton and electron will be subject to six forces, attractive when of opposite charge, repulsive when of same charge. The vector sum of these six forces will constitute the net electrical force on the reference proton and electron and indicate the degree of distortion imposed on the reference atom from its two neighbors. Based on symmetry, the center atom should experience no distortion, being affected equally by its two neighbors, while the rightmost atom should experience the exact opposite distortion to the reference atom, again based on symmetry. From trigonometry, $d = (R^2 + [3R - 0.6366R]^2 - 2[3 - 0.6366]R^2 \cos[\pi - \theta])^{0.5}$ and $\phi = \sin^{-1}([R/d] \sin[\pi - \theta])$. These values will change depending upon which position is being analyzed. Note that the electron(s) is assumed to spend half the time in positions 1, 3, 4 and 6 relative to the proton(s) in positions 2 and 5.

2.1 Effect on Reference Electron

After one performs all the calculations to derive the net force on the reference electron (a vector, so direction must also be addressed), the results can be plotted as shown in Fig. 3. They are presented in terms of the 'near' (closer hemisphere to the middle atom) and 'far' sides (farther hemisphere from the middle atom) for the electron as it circles the proton. To simplify the presentation, the results are presented as 'scaled' by $4\pi\varepsilon_0/q^2$, i.e., $(4\pi\varepsilon_0/q^2)$(Force) with R = 1 (q is the equal charge on the electron and proton).

For θ = 0, we have the reference electron at the farthest and nearest positions to its neighbor atoms. Here the difference between the net forces is maximum, nearly 0.1 on the scaled metric (or ~2 [200%] relative to the average of their values). This is also the only position where the directions of the two force vectors are exactly aligned. The difference decreases as the electron positions get closer, until they are equal at $\theta = 90^o$, where the 'near' and 'far' side positions coincide. Observe that the difference between the net force directions peaks around $\theta = 45^o$. The key observation is that over the entire orbit of the reference electron, the net force from the neighboring atoms is repulsive. This means that the electrons in the neighboring atoms 'push' more on the reference electron than the protons in the neighboring atoms 'pull.' As a result, there should be some displacement of the electron orbit (and distortion, given the asymmetry between the forces acting on the two hemispheres) away from the neighboring atoms (and, as shown below,

---

1 Rather than view the electron "cloud" alleged to surround the proton as a static spherical shell, for which the centroid of a hemisphere would be located at 0.5R [2], it seems more appropriate to recognize that the electron rotates about the proton at a constant speed. As a result, its average position in a hemisphere is actually that of its simple harmonic motion along the axis between the protons. As an approximation, consider the electron starting at the top of the circle in Figure 2 and completing one quarter of a revoultion. For the first half of the quarter revoultion, the midpoint of its simple harmonic projection along the axis can be approximated as $(0.5)(\sin[0] + \sin[\pi/4]) = \sqrt{2}/4$, or 0.354. For the second half, the midpoint occurs at approximately $(0.5)(\sin[\pi/4] + \sin[\pi/2]) = \sqrt{2}/4 + ½$, or 0.854. Therefore, an approximate midpoint for the entire quarter revoultion is $(0.5)(\sqrt{2}/4 + \sqrt{2}/4 + ½) = \sqrt{2}/4 + 1/4$, or 0.604. The next quarter revolution just mirrors this. The more exact solution yields 0.6366.

opposite to the direction in which the reference proton is 'pulled'). Fig. 4, which assumes a scaled radius of 0.1 for the hydrogen atom to provide enough resolution to see the distortion, illustrates the effect on the orbit of the reference electron. The 'near' (right) side experiences greater 'push' than the 'far' side (left), accounting for the distortion, but the entire orbit experiences a shift away from the neighbor atoms (to the left – See Fig. 2).

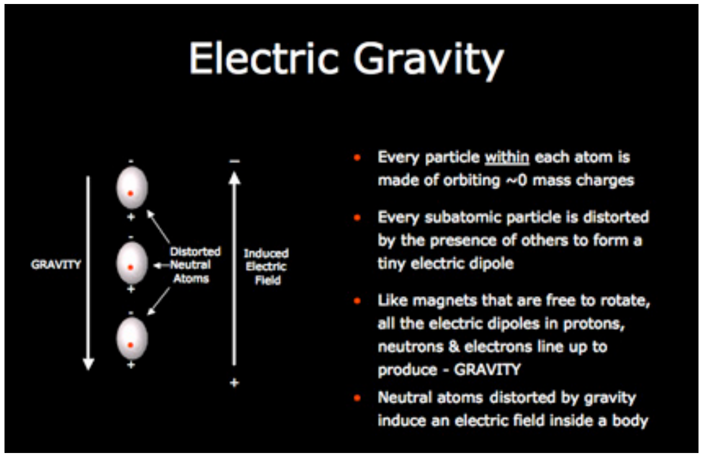


FIGURE 1. Explanation of Gravity by the Electric Universe Theory [1]

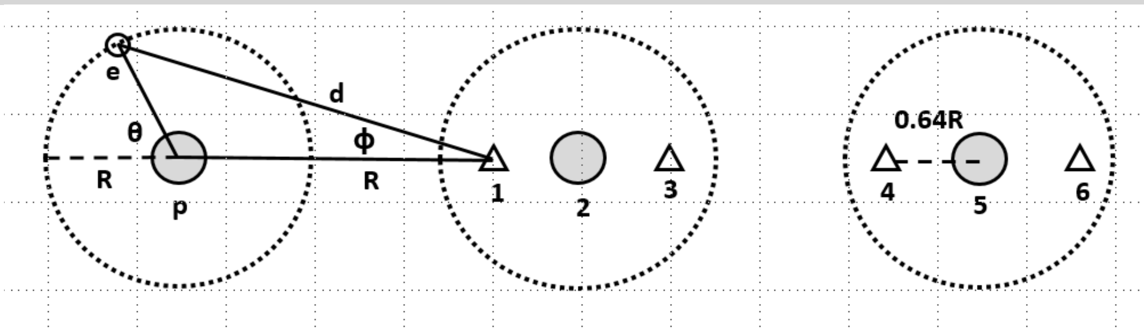


FIGURE 2. Geometric Arrangement of Three Hydrogen Atoms

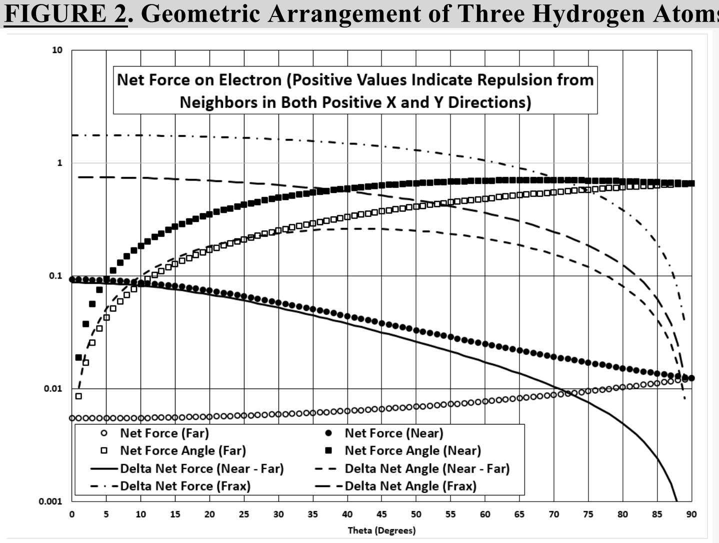


FIGURE 3. Net Force on Electron

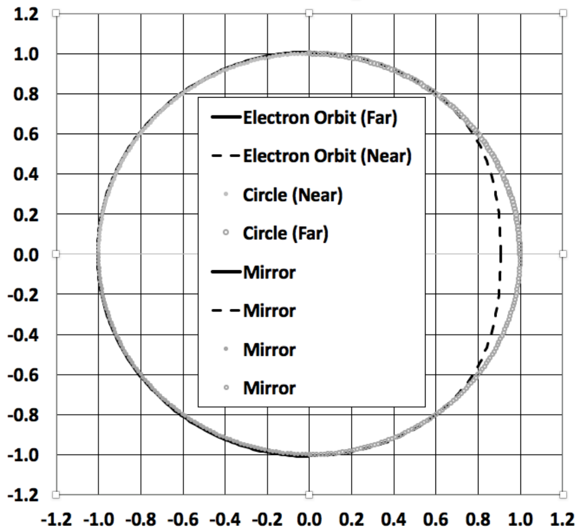
2.2 Effect on Reference Proton

The calculations for the reference proton are much simpler, since it is 'stationary.' The net force from its neighbor atoms, on the scaled metric, is a 'pull' (attraction) of 0.01717, exceeding the 'push' on the reference electron over the entire far side of its orbit, but remaining less than that over most of the near side of its orbit, with the amount by which the exceedance over most of the near side exceeds that over the far side being greater. As a result, while the reference electron has its orbit 'pushed' away from the neighbor atoms, the reference proton experiences a 'pull' toward them. The reference hydrogen atom no longer is symmetric with a circular electron orbit about a centered proton, thereby suggesting the creation of an electric dipole as postulated by the EU theory.

3. An Electric Dipole?

To try and estimate the actual degree of distortion, one needs to postulate an 'effective' time over which the orbiting electrons of the neighbor atoms act upon the reference atom with the effective net forces. For this calculation, we assume the following constants:

Radius of H atom = Bohr radius = 5.292×10^{-11} m
Electron charge = Proton charge = 1.602×10^{-19} C
Coulomb constant = $1/4\pi\varepsilon_0 = 8.988 \times 10^{9}$ N-m^2/C^2
Electron mass = 9.109×10^{-31} kg
Proton mass = 1.672×10^{-27} kg



<u>FIGURE 4</u>. Distortion of Electron Orbit due to Neighbor Atoms

If we assume the reference electron orbits its proton at 1/100th the speed of light,[2] it will complete one orbit in $2\pi(5.292 \times 10^{-11}$ m)/([2.998×10^{8} m/s]/100]) = 1.109×10^{-16} s. Addressing only the locations where the net repulsive forces on the reference electron are maximum per hemisphere, i.e., delta-force (scaled) = 0.08744 at $\theta = 0$, the calculated difference between the forces is (0.08744)(8.988×10^{9} N-m^2/C^2)(1.602×10^{-19} C)^2/(5.292×10^{-11} m)^2 = 7.202×10^{-9} N.[3] Since force (f) = mass (m) x acceleration (a), and displacement (x) over a time interval (t) from a reference position = at^2/2, the estimated displacement for the electron orbit becomes ft^2/2m = (7.202×10^{-9} N)(1.109×10^{-16} s)^2/(2[9.109×10^{-31} kg]) = 4.863×10^{-11} m, or essentially equivalent to the Bohr radius. A parallel calculation for the reference proton yields [(0.01717)(8.988×10^{9} N-m^2/C^2)(1.602×10^{-19} C)^2/(5.292×10^{-11} m)^2](1.109×10^{-16} s)^2/(2[1.672×10^{-27} kg]) = 5.202×10^{-15} m, or ~ 0.01% relative to the Bohr radius, i.e., ~ 10,000 times smaller. This is consistent with the EU theory that the proton shift, due to its nearly 2,000-times greater mass, is dwarfed by that on the electron. Therefore, while these shifts, even on the atomic scale of hydrogen, are miniscule, if not negligible, they apparently are sufficient to create an electric dipole out of a hydrogen atom in the presence of neighboring atoms, so long as there are more to one 'side' than the other.

4. Conclusion

This exercise attempted to interject some mathematics, greatly simplified, into the paradigm of the EU theory that gravity can be attributed to an electromagnetic effect, albeit almost inconceivably smaller, due to the distortion of atoms by their neighbors into electric dipoles. While we have not attempted to address the mathematics that would be involved in explaining the 10^{39} factor difference between the respective strengths of these forces, the possibility of an electromagnetically-induced distortion to create an atomic dipole appears at least plausible.

5. References

1. *http://www.holoscience.com/wp/electric-gravity-in-an-electric-universe/*, "Electric Gravity in an Electric Universe."
2. *https://physics.stackexchange.com/questions/175570/find-the-center-of-mass-of-a-hemispherical-shell*, "Find the Center of Mass of a Hemispherical Shell."
3. *http://www.sjsu.edu/faculty/watkins/electronrevolve.htm*, "The Rate of Revolution of an Electron about an Atomic Nucleus,"
4. *https://www.physlink.com/education/askexperts/ae113.cfm*, "Are the electrons spinning around the nucleus of an atom travelling faster than the speed of sound?"
5. K. Hughes, <u>The Binary Universe: A Theory of Time</u>, Hughes Publishing, Hampshire, England, 2014.

---

[2] "How high is the tangential velocity of the electron relative to the speed of light? … v = 1.37E+07 m/s … Relative to the speed of light this is v/c = 0.04576 [about 1/22nd of the speed of light]" [3] "… In the simplest case of a hydrogen atom with a single electron spinning around a single proton, the electron moves at about 1/137th of the speed of light." [4] "In the case of the electron, its time rate will be measurably slower due to the extreme tangential speed of the electron being around 1/150th of the speed of light" [5]. For this analysis, it is assumed the electron speed is 1/100th that of light.

[3] For the distance dimension, we assume the Bohr radius for both the reference electron and proton to calculate the force difference.

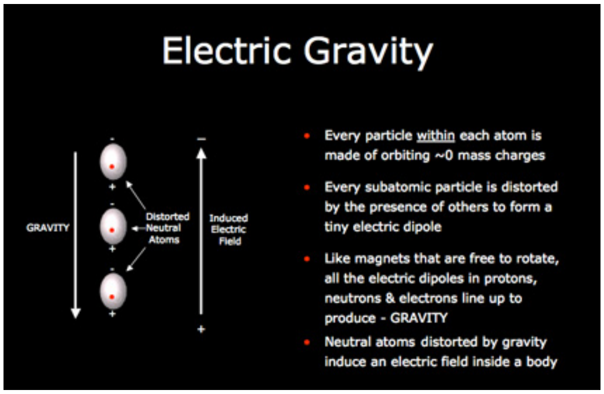
ELECTROMAGNETIC GRAVITY? EXAMINATION OF THE ELECTRIC UNIVERSE THEORY

Dr. Raymond HV Gallucci, P.E.

BACKGROUND

- Given the 39 orders of magnitude between the strengths of the electromagnetic and gravitational forces, is it even conceivable that these two could somehow be related?
- Electric Universe Theory (EUT) says “Yes,” and my goal is to show the mathematical plausibility of this based on the EUT model for gravity as a manifestation of electromagnetism

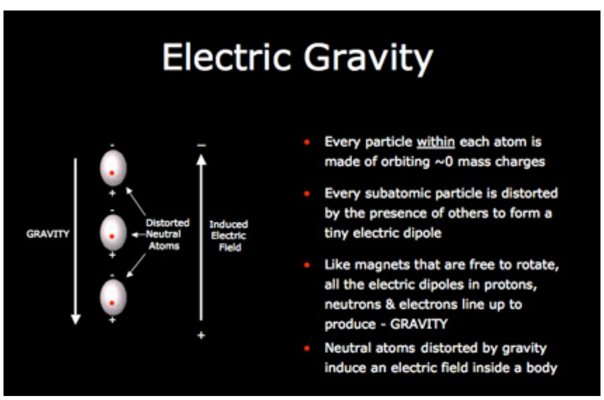
ELECTRIC UNIVERSE THEORY



http://www.holoscience.com/wp/electric-gravity-in-an-electric-universe/, "Electric Gravity in an Electric Universe"

"Gravity is due to radially oriented electrostatic dipoles inside the Earth's protons, neutrons and electrons. The force between any two aligned electrostatic dipoles varies inversely as the fourth power of the distance between them and the combined force of similarly aligned electrostatic dipoles over a given surface is squared. The result is that the dipole-dipole force, which varies inversely as the fourth power between co-linear dipoles, becomes the familiar inverse square force of gravity for extended bodies. The gravitational and inertial response of matter can be seen to be due to an identical cause. The puzzling extreme weakness of gravity (one thousand trillion trillion trillion [10^3 x $(10^{12})^3 = 10^{39}$] times less than the electrostatic force) is a measure of the minute distortion of subatomic particles in a gravitational field."

ELECTRIC UNIVERSE THEORY (cont.)

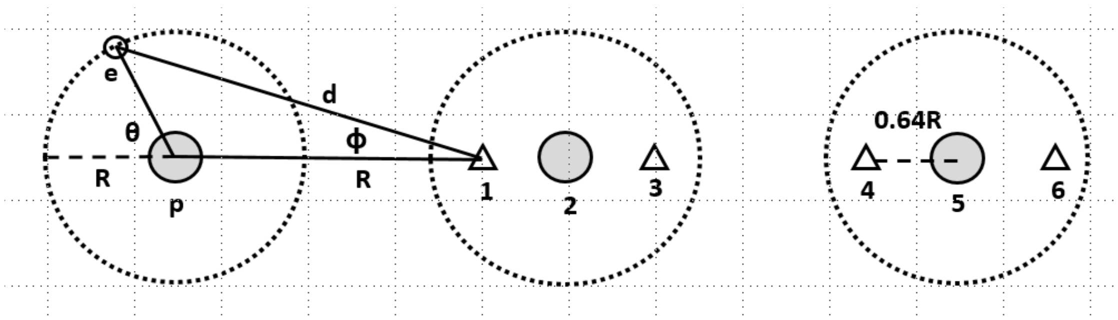


http://www.holoscience.com/wp/electric-gravity-in-an-electric-universe/, "Electric Gravity in an Electric Universe"

"Celestial bodies are born electrically polarized from a plasma z-pinch or by core expulsion from a larger body. The 2,000-fold difference in mass of the proton and neutron in the nucleus versus the electron means that gravity will maintain charge polarization by offsetting the nucleus within each atom (as shown). The mass of a body is an electrical variable — just like a proton in a particle accelerator. Therefore, the so-called gravitational constant — 'G' with the peculiar dimension $[L]^3/[M][T]^2$, is a variable! That is why 'G' is so difficult to pin down."

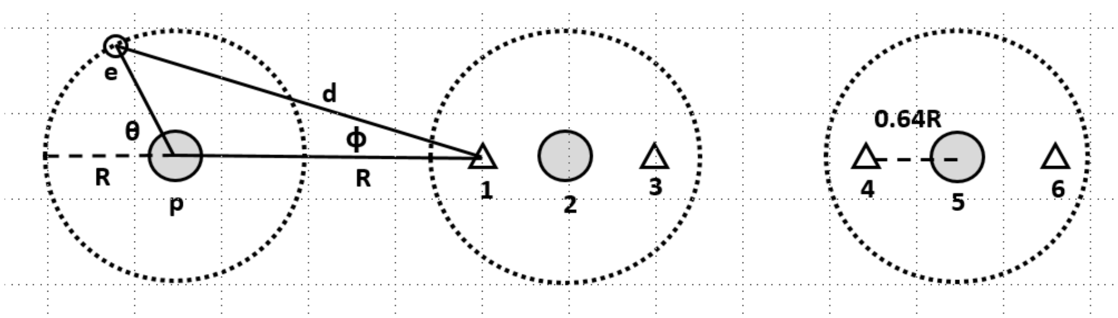
Turning the arrangement depicted here horizontal, I decided to try to examine the EUT about an electromagnetic basis for gravity.

ELECTRIC FORCES BETWEEN HYDROGEN ATOMS



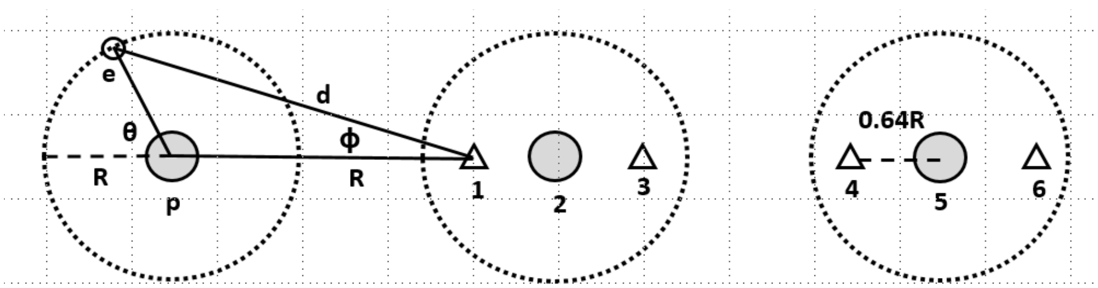
Three hydrogen atoms of radius R are aligned and equally spaced, 3R from center to center. We are interested in the distortion on the leftmost (reference) atom due to its two neighbors, i.e., the net electrical force from each neighbor's proton (grey circle) and electron (dotted orbit) on the reference proton and electron (open circle). On average, the electron spends half its time in each hemisphere in each neighbor, with the average position being along the alignment at a distance 0.6366R (shown by triangles).

ELECTRIC FORCES BETWEEN H ATOMS (cont.)



Both the reference proton and electron will be subject to six forces, attractive when of opposite charge, repulsive when of same charge. The vector sum of these six forces will constitute the net electrical force on the reference proton and electron and indicate the degree of distortion imposed on the reference atom from its two neighbors. Based on symmetry, the center atom should experience no distortion, being affected equally by its two neighbors, while the rightmost atom should experience the exact opposite distortion to the reference atom, again based on symmetry.

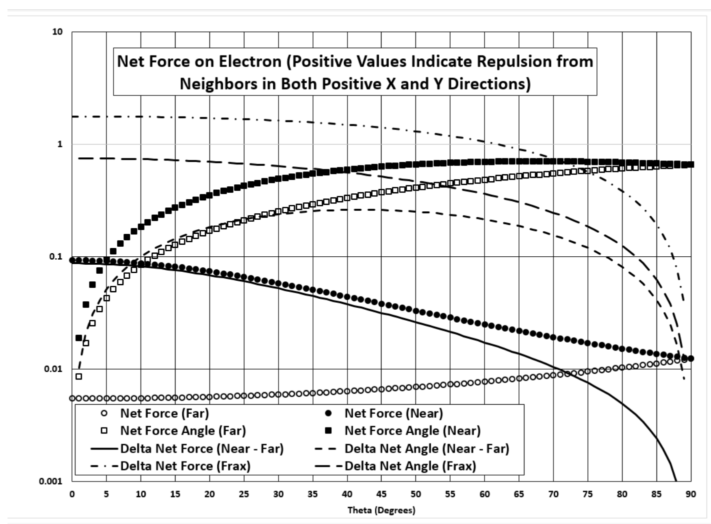
ELECTRIC FORCES BETWEEN H ATOMS (cont.)



From trigonometry, $d = \sqrt{R^2 + (3R - 0.6366R)^2 - 2(3 - 0.6366)R^2\cos(\pi - \theta)}$ and $\phi = \sin^{-1}([R/d]\sin[\pi - \theta])$. These values will change depending upon which position is being analyzed. Note that the electron(s) is assumed to spend half the time in positions 1, 3, 4 and 6 relative to the proton(s) in positions 2 and 5.

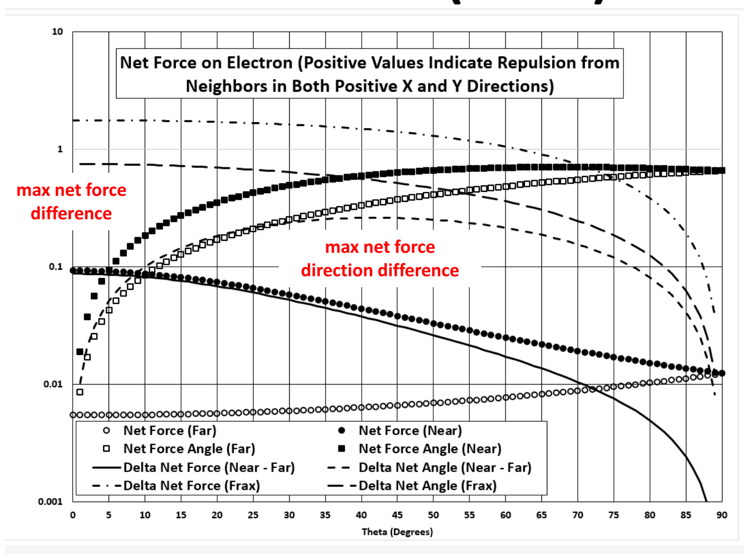
EFFECT ON REFERENCE ELECTRON

After one performs all the calculations to derive the net force on the reference electron (a vector, so direction must also be addressed), the results can be plotted as shown. They are presented in terms of the 'near' (closer hemisphere to the middle atom) and 'far' sides (farther hemisphere from the middle atom) for the electron as it circles the proton. To simplify the presentation, the results are presented as 'scaled' by $4\pi\varepsilon_0/q^2$, i.e., $(4\pi\varepsilon_0/q^2)$(Force) with R = 1 (q is the equal charge on the electron and proton).



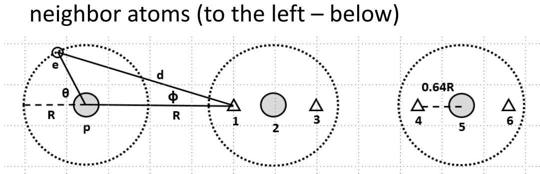
EFFECT ON REFERENCE ELECTRON (cont.)

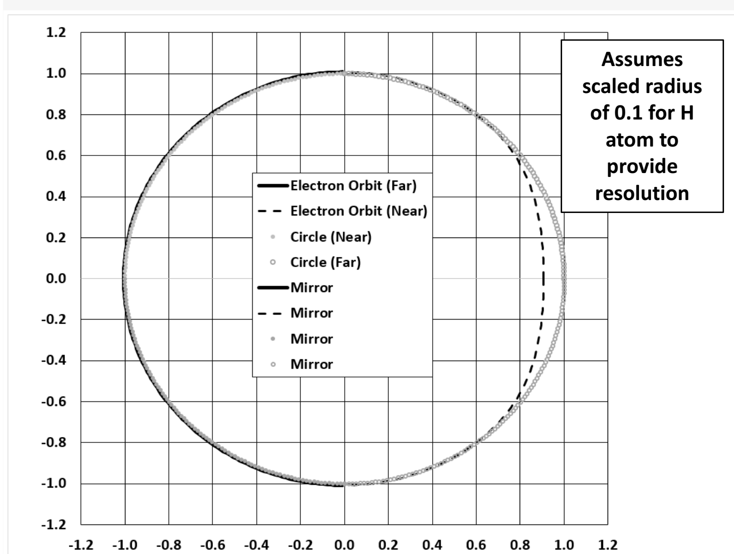
For θ = 0, we have the reference electron at the farthest and nearest positions to its neighbor atoms. Here the difference between the net forces (solid line) is maximum. This is also the only position where the directions of the two force vectors are exactly aligned. The difference decreases as the electron positions get closer, until they are equal at θ = 90^o, where the 'near' and 'far' side positions coincide. Observe that the difference between the net force directions peaks around θ = 45^o (dotted line). **<u>The key observation is that over the entire orbit of the reference electron, the net force from the neighboring atoms is repulsive. This means that the electrons in the neighboring atoms 'push' more on the reference electron than the protons in the neighboring atoms 'pull.'</u>**



DISTORTION OF ELECTRON ORBIT

As a result, there should be some displacement of the electron orbit (and distortion, given the asymmetry between the forces acting on the two hemispheres) away from the neighboring atoms (and opposite to the direction in which the reference proton is 'pulled'). The figure illustrates the effect on the orbit of the reference electron. The 'near' (right) side experiences greater 'push' than the 'far' side (left), accounting for the distortion, but the entire orbit experiences a shift away from the neighbor atoms (to the left – below)





EFFECT ON REFERENCE PROTON

- The reference proton are much simpler, since it is 'stationary.'
  - Net force from its neighbor atoms, on the scaled metric, is a 'pull' (attraction) of 0.01717, exceeding the 'push' on the reference electron over the entire far side of its orbit, but remaining less than that over most of the near side of its orbit, with the amount by which the exceedance over most of the near side exceeds that over the far side being greater.
  - While the reference electron has its orbit 'pushed' away from the neighbor atoms, the reference proton experiences a 'pull' toward them.
  - The reference hydrogen atom no longer is symmetric with a circular electron orbit about a centered proton, thereby suggesting the creation of an electric dipole as postulated by the EUT.

AN ELECTRIC DIPOLE?

- To try and estimate the actual degree of distortion, one needs to postulate an 'effective' time over which the orbiting electrons of the neighbor atoms act upon the reference atom with the effective net forces. Assume:
  - Radius of H atom = Bohr radius = 5.292×10^{-11} m (also assumed for distance dimension)
  - Electron charge = Proton charge = 1.602×10^{-19} C
  - Coulomb constant = $1/4\pi\varepsilon_0 = 8.988 \times 10^9$ N-m^2/C^2
  - Electron mass = 9.109×10^{-31} kg
  - Proton mass = 1.672×10^{-27} kg
- Assume the reference electron orbits its proton at 1/100th the speed of light to complete one orbit in $2\pi(5.292 \times 10^{-11}\text{ m})/(2.998 \times 10^{6}\text{ m/s}) = 1.109 \times 10^{-16}$ s. For the locations where the net repulsive forces on the reference electron are maximum per hemisphere, i.e., delta-force (scaled) = 0.08744 at $\theta = 0$, the calculated difference between the forces is $(0.08744)(8.988 \times 10^9\text{ N-m}^2/\text{C}^2)(1.602 \times 10^{-19}\text{ C})^2/(5.292 \times 10^{-11}\text{ m})^2 = 7.202 \times 10^{-9}$ N.

AN ELECTRIC DIPOLE? (cont.)

- Since force (f) = mass (m) x acceleration (a), and displacement (x) over a time interval (t) = at^2/2, displacement for the electron orbit is $ft^2/2m = (7.202\ x\ 10^{-9}\ N)(1.109\ x\ 10^{-16}\ s)2/(2[9.109\ x\ 10^{-31}\ kg]) = 4.863\ x\ 10^{-11}\ m$, or essentially equivalent to the Bohr radius.
  - Parallel calculation for reference proton yields $[(0.01717)(8.988\ x\ 109\ N - m^2/C^2)(1.602\ x\ 10^{-19}\ C)2/(5.292\ x\ 10^{-11}\ m)2](1.109\ x\ 10^{-16}\ s)2/(2[1.672\ x\ 10^{-27}\ kg]) = 5.202\ x\ 10^{-15}\ m$, or ~0.01% relative to the Bohr radius, i.e., ~10,000 times smaller, consistent with the EU theory that the proton shift, due to ~2,000-times greater mass, is dwarfed by that on the electron.
  - Therefore, while **these shifts**, even on the atomic scale of hydrogen, are miniscule, if not negligible, they **suffice to create an electric dipole out of a hydrogen atom**.

CONCLUSION

- After interjecting some mathematics, greatly simplified, into the EUT that gravity can be attributed to an electromagnetic effect, albeit almost inconceivably smaller, due to the distortion of atoms by their neighbors into electric dipoles, the possibility of an electromagnetically-induced distortion to create an atomic dipole appears plausible.