Generalised Quantum-Electrodynamics (GQED): a new theory of quantum gravity.

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Abstract

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Primary and Secondary electron densities

The primary electron density can be defined as ‘all appearances of the electron as a point particle within the Van der Waals radius [] of the atom to which it belongs’. The secondary electron density can be defined as ‘all the appearances of the electron at a point beyond the Van der Waals radius’. The two terms added together produce the electron volume probability density:

$$\psi(r)^2 = \rho_1 + \rho_2 \quad (eq. 1)$$

Each of the two terms ρ_1 and ρ_2 can be further-defined in more explicitly mathematical terms in the following way, as described above:

$$\rho_1 = \left(\sum \beta^-{}_{x \leq C}\right)_y \quad (eq. 2)$$

Here I use the term C to denote circumference, as this makes these definitions more amenable to being scaled-up to larger objects with many atoms. This means that the primary electron density, for a given object (y) is the sum of the electrons at a position less than or equal to the circumference of that object. The secondary electron density can be defined in the following way:

$$\rho_2 = \left(\sum \beta^-{}_{x \geq C}\right)_y \quad (eq. 3)$$

So, literally the opposite of the first expression.

Ignoring for the moment the exponential functions that govern electron densities, as I will later detail exactly why I believe these stand as barriers to unification as well as giving philosophical reasons why I believe their use in the first place is unjustified in relation to electron densities, and why they retain their predictive power despite this. For now, however, I will be using the idea of the secondary electron density of large-scale objects to stand as analogous to the gravitational field and assume that the electron is the force-carrying particle for gravity. The way to calculate the number of electrons appearing around a given body over a given period of time is to use the following equation:

$$\left(\frac{t}{dt}\right) \times \left(\frac{\left(N \cdot avg(n_a)\right)}{(4.17 \times 10^{42})}\right) = \frac{n_{\beta^-(\rho_{2)}}}{t} \quad (eq. 4)$$

This means that you take the average atomic number of the body to be studied ($N \cdot avg$) multiply this by the number of atoms (n_a) and then divide this by the ratio between the force of gravity and the force of electrostatic repulsion before again multiplying by the time you're studying (t) over the time differential (dt). This equation can be applied to a single hydrogen atom or to a galaxy, or a universe; as such, I thought an apposite place to start would be closer to the quantum realm, so the calculation for a single hydrogen atom is, using a time-independent variation of the equation:

$$\left(\frac{(1(1)}{4.17 \times 10^{42}}\right) = 2.398 \times 10^{-43} \quad (eq. 5)$$

This is equal to the bare probability of finding the electron from a hydrogen atom at any point beyond the Van der Waals radius of the atom. I will also use this number as the time differential in following equations for reasons that I'll elaborate on later; this time is also supposed to be equal to the amount of time an electron remains in a given position. To find the number of electrons appearing in the secondary electron density (gravitational field) of the earth for a period of one second it's necessary to use the time-dependent version of the equation (eq. 3):

$$\left(\frac{1}{2.398 \times 10^{-43}}\right) \times \left(\frac{(16(5.56 \times 10^{49})}{(4.17 \times 10^{42})}\right) = 8.9 \times 10^{50} \frac{\beta^-}{s} \quad (eq. 6)$$

So, this provides a sufficiently large number of electrons to account for the phenomenon of gravity, there are enough electrons here to keep all the air molecules and atoms in the atmosphere in place, as well as the moon and other satellites. These calculations can also be applied to the quantum scales. The reason why I selected the time differential that I have is because it produces a probability that the electron will appear for a given time beyond the Van der Waals radius, and that this also represents the average amount of time an electron remains in a given position. I believe that in quantum mechanics there is a very fundamental relationship between probabilities and time which is elucidated by these calculations.

Explaining the effects of General Relativity using this model.

The most interesting thing about this model is that it can be used to explain the phenomena of general relativity without leaving the door open for paradoxes, such as the possibility of faster than light travel using a warp drive. It can provide explanations of the effects of special relativity such as length contraction and time dilation; it can also explain the effect of general relativity, that is, beyond gravity itself, it can explain gravitational lensing, the perihelion precession of Mercury (and the precession of the Moon), the red/blueshift of light, the cosmological constant and the reflective capacity of stars. I will go through the explanations in order:

Length contraction and time dilation.

Seeing as all massive objects, in this model, produce a secondary electron density all objects passing through those secondary densities experience time dilation. This is because the negative charge of the electrons in the secondary density surrounds the electrons within all the moving parts of object travelling within it and, as the moving object approaches the speed of light, an increasingly large number of electrons continues to surround those moving parts (of a clock say (even an atomic clock)) and the electrostatic force of repulsion causes them to slow down. Seeing as time is simply a measure of motion this is analogous to time dilation, and provides an answer to one of the many fundamental problems with time in the grand unification theories. Length-contraction happens for the same reasons, as objects accelerate towards the speed of light they become surrounded by an increasingly large number of electrons, the forces generated by these electrons builds up also, and would crush any object travelling through them down, ultimately, to the size of a subatomic particle. There aren't many experimental tests of length contraction so it may be just as easy to expect that the object would be ripped apart instead of having its length contracted, however, experiments with heavy ions would seem to imply length contraction in accordance with the laws of special relativity and as such may disprove my hypothesis.

Gravitational lensing.

For this I will once again have to invite you to imagine a body surrounded by an invisible cloud of electrons. When light enters within the vicinity of such an object it meets with and is absorbed by these electrons. The electrons then, instantaneously, emit another photon at a thirty-degree angle (in accordance with QED) and are subsequently absorbed by another electron, this electron then emits another photon again at a thirty-degree angle and it goes along until it meets another electron. Because this effect is only observed occurring around galaxies it is suggestive that a sufficiently large electron density is necessary to produce this effect. What happens is, that a certain number of photons are emitted at the other side of the galaxy in a pattern which on large scales appears to be curved but which, on the scales of quantum mechanics, is in fact jagged; it only appears to be curved due to the enormous numbers of photons involved in observed gravitational lensing around galaxies. The densities of the galaxies also play a role in whether gravitational lensing is likely to occur, and this is already well understood; in this theory density also plays a crucial role in the formation of the structure of the secondary electron density. The secondary electron density of a spiral galaxy like the Milky Way is a lot more diffuse and therefore the probability that an event of gravitational lensing will occur is less likely.

The Perihelion Precession of Mercury.

In this theory, the precession of Mercury is not caused by fluctuations in the space-time continuum in the area between Mercury and the sun. Instead it is caused by the fact that Mercury has no angular momentum and is therefore more liable to be under the influence of the gravity of the other planets in the solar system. Because, in this model, it is surrounded by electrons and because the sun is also there would be a degree of resistance generated between the two electron densities and as such Mercury would stick to an elliptical orbit. Seeing as it does not rotate this degree of resistance is far less and as such it can be influenced by the gravity of the other planets, the gas giants mostly. There are several reasons for thinking that this might be a good idea; the first is that the moon has a similar precession in its orbit which is decidedly not caused by fluctuations in spacetime and is caused by the influence of the other planets; the second reason is that, if the sun were continually giving off what are, in essence, gravitational waves of sufficient magnitude to move a planet on its orbit then it’s likely that we’d be able to detect them here on Earth. LIGO would be picking up a plethora of signals from the sun of far greater magnitude than from black hole collisions. Tidally-locked bodies, with a secondary electron density, can be said to produce less of this electrostatic resistance (caused by electron from one body bumping into electrons from the other) and exhibit precessions in their orbits.

The Redshift.

A bit more background is required for this one. To imagine this, you need to consider the fact that all objects in the universe have a secondary density of electrons surrounding them and that, therefore, for a given portion of space it must be understood that it is populated by electrons from proximate stars, planets, the rest of the galaxy and the rest of the universe; this means that it would be hard, if not impossible, to calculate with any certainty the number of electrons that, at any time, occupy a given portion of space. For objects moving away in deep space the photons emitted from those objects encounter electrons within the intergalactic recesses that are comparatively starved of incoming radiation, meaning they’re of a comparatively lower energy. This means that they tend to absorb photons of a higher energy, photons more towards the blue end of the visible spectrum, and emit photons closer to the red end of the spectrum due to the principle of energy conservation. The reverse is naturally true for objects moving towards us. Just to clarify, and to provide an answer as to why the photons don’t just go scattering off somewhere it’s necessary to understand just how many secondary electrons a photon is likely to encounter, even in small areas (on Earth) I would predict that there would be electrons per cubic metre of the order of 10^27 of thereabouts, much more than the number of photons per same unit volume. So, light still *appears* to travel in straight lines in the vacuum of space but in fact is moving in a jagged pattern through it which only looks like a straight line.

The reflective capacity of stars.

Seeing as I’ve already explained how it is possible for gravitational lensing to occur in the context of this model it should be relatively straight-forward to explain this one. Because all stars are surrounded by a secondary electron density, and because these electrons are constantly emitting photons, this would account for their reflective capacity. Photons come in and new photons of a slightly energy level are emitted and this can be detected as ‘reflection’.

The cosmological constant and Hawking radiation.

This theory allows for an interpretation of both the dynamical and static Casimir effects using only the photons emitted by secondary density electrons and refutes the idea of virtual particle-anti-particle pairs forming and annihilating one another. Very simply, the plates are pushed together by photons being emitted on either side, and, since the larger wavelengths can’t escape from the electrons appearing between the two plates the distance between the plates contracts. The negative side-effect of this that the cosmological constant would likely be very small and insufficient to explain dark energy, but more on that later. As for Hawking radiation, very simply, secondary electrons appear briefly outside the event horizon of the black hole and emit a photon, they can then appear again (most likely in the primary density of the atom to which they belong) and absorb another photon, then in the unlikely event that they once more appear beyond the event horizon they emit another photon. Over enormous amounts of time this leads to the black hole evaporating.

Dark matter and dark energy.

Dark Matter

In reference to my point about the perihelion precession of Mercury and the fact that non-rotating bodies do not encounter the same level of electrostatic resistance as rotating bodies it can be assumed, using the theory of secondary electron densities, and that given most bodies in spiral galaxies rotate, that their cohesion is due in part to this resistance generated alongside the attractive force of gravity. The way I deduced this was from the fact that in general relativity only the force of attraction is accounted for. Fritz Zwicky and Vera Rubin later framed the argument for dark matter not as a criticism of general relativity, although it might have been, but postulated the existence of new standard model particles to explain the phenomenon. Due to the resistance generated between rotating bodies there is no need to speculate about the existence of new particles, no WIMP’s or MACHO’s, and the fact that stars rotate faster at the extremities of galaxies can be explained, in part, by the steep drop-off of the secondary electron density of the supermassive black holes thought to be at the centre of all galaxies.

Dark energy

The first postulate of my argument about dark energy is that photons have mass. I think there are a variety of good reasons for thinking that they do have mass, although the only objection I have yet managed to find to this idea is that it would break gauge invariance; if you read Stueckelberg on massive electrodynamics you will find that this isn't necessarily the case. The second proposition is that these massive photons can form classical superposition's with one another in intergalactic space, between galaxy clusters, which break leading to expansion. I can't lay claim to the idea that massive photons are responsible for the phenomenon of dark energy, as others already have, but I believe the idea of superposition's is mine. There's a lot more of it on the internet.

Tbc.

$$P(\beta^- \ \rightarrow \ \rho_2) = \left(\frac{1}{4.17 \times 10^{42}}\right) \approx 2.5 \times 10^{-43}$$

$$P(\beta^- \rightarrow \rho_1) = \left(\frac{1}{2.5 \times 10^{-43}}\right) = 4 \times 10^{42}$$

Redshift:

$$P(REDSHIFT)_A = \frac{V}{n_\gamma} n_{e^-V} - v(x)$$

$$\rho(x,y,z) = \frac{1}{V} \sum_h \sum_k \sum_l \left|F_{hkl}\right| e^{2\pi i \Phi_{hkl}} \ e^{-2\pi i (hx+ky+lz)}$$

Here we have the conventional electron density equation, one that fully agrees with experiment. The first term that I'd like to draw attention to is the structure factor, notices that it employs an exponential function with respect to its phase components, this is a description of scattered x-rays and is used to give dimensions to the electron density my means of Fourier analysis. I don't have any contention with this other than the belief that electrons in the lab may behave very differently to electrons in the wild, and it's electrons in the wild that I'm interested in in this theory. Of course, the exponential function holds to a great deal of precision when the atom is being bombarded with x-rays; however, in the wild this isn't the case and even under experimental conditions changing this function in alignment with the sort of analysis I was doing earlier doesn't upset this picture, nor the gradient of the charge density to any degree that can be made apparent through observation. This is another example of physicists selecting their tools from mathematics, the best that are available to them, and going in search of a precision that may even be too deep to ever truly attain. For this reason, my calculations of the electron densities stick with rough approximations of these large numbers of electrons and don’t go looking to the Planck scale and inaccessible energy scales for unification.