Unified Field Theory of (nuclear, atomic, molecular, gravitational) Orbitals as Anti-photon 'Orbitons'

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In this essay I propose an alternate interpretation whereby particles may be linked, not by the 4 forces, but by orbitals; that nuclear, atomic, molecular and gravitational orbital wave-functions are actually physical entities, photons albeit of inverse phase (anti-photons or orbitons) that are trapped to form standing waves. For example, gravitational orbits would be the sum of these gravitational orbitals (orbitons), the moon is not orbiting the earth, rather it is being propelled by these orbital momenta. Likewise there is no empty space within the atom or nucleus, instead particles are 'quantumly entangled' via these physical anti-photon orbital links. As orbitals have different energy densities, movement between orbitals requires a change in mass density (buoyancy). As such, if we move the IPK 1kg reference bar to a different location (with a different g), then we will change its orbital mass. The fundamental unit of orbital energy, whether nuclear, atomic, molecular or gravitational reduces to $E_{\text{orbit}} = E_{\text{Planck}}/(2.\alpha)$.

1 Introduction

This is an outline of an orbital model where, instead of the 4 forces linking particles, there are orbitals, referred to here as nuclear, atomic, molecular and gravitational. These orbitals are physical entities and appear to be anti-photons, photons albeit of inverse phase (i.e.: $E_{\text{photon}} + E_{\text{anti-photon}} = E_{\text{zero}}$). At the atomic level they may be described by atomic and molecular orbital theories, although they are physical waves rather than mathematical wave-functions and their dimensions are not space and velocity but time and velocity. We could label these anti-photon orbitals as orbitons to differentiate from the common conception of both anti-photons and atomic orbitals.

Consequently, there is no empty space within the atom and the electron is linked to the nucleus, not by an electrostatic force, but by a physical standing wave (aka particle in a box) orbital (orbiton).

Furthermore, what we typically consider as a gravitational orbit around the earth is actually the sum of many gravitational orbitals, standing waves around the earth that derive from molecular orbits. As such, the term orbit itself is misleading for it suggests an object traveling through an empty medium around another object according to an abstract force. In this model, the moon does not orbit the earth, rather the moon is pulled along its orbit path by the momentum of these gravitational orbitals; they are both the track and the locomotive.

As these orbitals curve around the earth, the motion of the moon is the sum of their vector momentum. Consequently, if they are unaligned, the moon will fall to the earth with a constant acceleration. If they are all perfectly aligned, the moon will follow them at orbital velocity. We call these 2 states potential energy (unaligned) and kinetic energy (aligned). The actual motion observed is a measure of the degree of the alignment (and the orbital mix).

This however leads to the curious observation that, as these orbitals are standing waves, the frequency and so energy of a gravitational orbital around the moon is higher ($E=\hbar\nu$) than that of a corresponding gravitational orbital around the larger earth, ie: the smaller the object, the shorter the wavelength (circumference), and so the lower the frequency.

As the energy density of an orbital is less than the density of space ($E_{\text{orbital}} < E_{\text{zero}}$), we may anticipate a corresponding 'mass-deficit'. And so, the mass of an object on the surface of earth may be less than the mass of that object in space ($v=0$).

As such, movement between orbitals is a function of orbital 'buoyancy', for example, a submarine may travel across the ocean at a fixed depth (i.e. 1000m) via propeller motion (motion within the 1000m orbital), but to change this equilibrium depth (the orbital itself), it must change its mass density (add or eject ballast). And so, while it is this gravitational momentum which keeps the satellite following its orbit, it is this 'buoyancy' mass-deficit which keeps the satellite (and us) from floating off into space.

1 kg is defined as the mass of the International Prototype of the Kilogram (IPK), a platinum alloy cylinder stored near Paris. If this bar were orbiting the earth, it would gain 'relativistic' mass according to its (motion through space) velocity (mass > 1kg).

Likewise, if we place this bar on top of the Eiffel tower, it is now in a higher orbital (higher density gradient) and so its mass may also be greater (mass > 1kg).

To lift the bar from Paris into space, we must add velocity (momentum) to compensate for the 'mass' density difference. We find that the velocity (momentum) required is equal to escape velocity. In other words, although gravitational orbital momentum may be responsible for the orbit of a satellite around the earth, it is this mass buoyancy which prevents the satellite from leaving that orbit (or us from floating off into space).

And so, if we move this bar from its vault in Paris to the top of the Eiffel tower, we may have a new 'kg'. Experiments to determine the gravitation constant G will give different results depending on whether conducted on the 1st floor or the
top floor of the physics dept. We may require both a constant \( \nu \) and a constant \( g \) to define our mass. In this respect, orbital mass resembles classical weight.

The third component of a gravitational orbital is the rotation of the orbital itself, not only is the earth orbiting the sun, but that earth-sun orbit itself is also rotating like a disc. This is noticeable with elliptical orbits.

At the atomic level, when an incoming photon strikes an electron in an atom for example, it does not cause the electron to jump between orbitals, rather the original orbital (anti-photon) is deleted and then replaced with the new orbital (anti-photon) via a simple wave addition and subtraction. Photons are the means by which information is exchanged. Nevertheless, for certain simple orbits, the Bohr model was extremely accurate and still no one knows why.

The electron itself doesn’t move, however its orbit boundary has been changed.

I postulated in an earlier paper [4] that what we refer to as the electron is actually a dimensionless mathematical formula (a formula for a magnetic monopole) that dictates the frequency of Planck events (Planck mass, Planck length etc) over time, much as a subway tunnel separates subway stations. Consequently the electron wave cannot be defined at unit time, much as a single dot cannot define a complete sine wave. Wave-particle duality becomes an analog wave-state (over-time) to digital Planck-mass (Planck energy) Planck-time point-state oscillation with the frequency of the electron determining the frequency of these Planck events.

The same applies to orbitals. The energy of the orbital is a direct function of its frequency and this frequency derives from the classical orbital momentum, spin momentum and orbital rotational momentum of that orbital. The fundamental unit of orbital energy, whether nuclear, atomic, molecular or gravitational reduces to;

\[
E_{\text{orbital}} = \frac{E_{\text{Planck}}}{2\alpha} \tag{1}
\]

2 Bohr model (n orbits):

The Niels Bohr model depicts the atom as a small positively charged nucleus surrounded by electrons that travel in circular orbits around the nucleus—similar in structure to the solar system, but with electrostatic forces providing attraction, rather than gravity.

Although considered incorrect by physicists; it does give correct results for selected systems. It was later replaced with a more useful wave model (depicting the electron and proton as waves). Nevertheless, for certain simple orbits, the Bohr model was extremely accurate and still no one knows why.

The basic Bohr model depicted these orbits as fixed, only certain orbits were allowed (‘particle in a box’). In its most elementary form, it incorporates 4 values: the speed of light \( c \), the Sommerfeld fine structure constant alpha \( \alpha \sim 137.036 \), the principal quantum number \( n \) and the electron wavelength \( \lambda_e \).

3 Electric orbits (standard Bohr model)

Key:

\( \lambda_a = \lambda_p + \lambda_e \) (reduced mass equivalent)
\( R_a = \) Bohr radius
\( v_a = \) orbital velocity
\( a_a = \) acceleration (hypothetical)
\( T_a = \) orbital period

\[
m_{\text{reduced}} = \frac{m_em_p}{m_e + m_p} = \frac{1}{m_e + \frac{1}{m_p}} \tag{2}
\]

\[
\lambda_a = \lambda_e + \lambda_p = \frac{m_pl_p}{m_e} + \frac{m_pl_p}{m_p} = \frac{m_pl_p}{m_{\text{reduced}}} \tag{3}
\]

\[
R_a = \alpha n^2 \lambda_a \tag{4}
\]

\[
v_a = \frac{c}{\alpha n} \tag{5}
\]

\[
a_a = \frac{c^2}{\alpha^2 n^3 \lambda_a} \tag{6}
\]

\[
T_a = \frac{2\pi \alpha^2 n^3 \lambda_a}{c} \tag{7}
\]

\[
E_a = \frac{m_e v^2}{2} \tag{8}
\]

4 Nuclear orbits (Bohr equivalent)

\[
m_{\text{nuc}} = m_p + m_n \tag{9}
\]

\[
\lambda_s = \frac{\lambda_p + \lambda_e}{4} = \frac{l_pm_p}{m_{\text{nuc}}} \tag{10}
\]

\[
r_0 = \sqrt{\alpha} \lambda_s \tag{11}
\]

\[
R_s = \alpha \lambda_s \tag{12}
\]

\[
v_s^2 = \frac{c^2}{\alpha} \tag{13}
\]

\[
E = \frac{m_{\text{nuc}} v^2_s}{2} \tag{14}
\]

1. Gravitational binding energy (\( \mu \)):

The gravitational binding energy is the energy required to pull apart an object consisting of loose material and held together only by gravity.

\[
\mu = \frac{3GM^2}{5R} \tag{15}
\]
Gravitational orbitals (Bohr equivalent)

The density of nucleons in a nucleus:

\[ n = \frac{3}{4\pi r_0^3} \]  

\[ E_f = \frac{\hbar^2}{4\pi^2 m_{\text{nuc}}} \left( \frac{3\pi^2 n}{2} \right)^{2/3} \]  

\[ E_f = \frac{m_{\text{nuc}} c^2}{\alpha} \left( \frac{9\pi}{8} \right)^{2/3} \]  

\[ E_f = m_{\text{nuc}} v_s^2 2.32 = 31.5 \text{MeV} \]  

5 Gravitational orbitals (Bohr equivalent)

1. Gravitational wavelength = Schwarzschild radius \( r_S \)

2. Gravitational potential energy between 2 orbits

\[ \delta \mu_{\text{GPE}} = \frac{GMm}{r_1} - \frac{GMm}{r_2} \]  

where \( r = \) radius...

\[ r_1 = \alpha n_1^2 \lambda_g \]  

\[ r_2 = \alpha n_2^2 \lambda_g \]
Orbitals as Anti-photon 'Orbitons'

As Planck units...

\[
\frac{G M m}{r_n} = \frac{\hbar c}{m_p} \cdot M_m \cdot \frac{1}{\alpha n^2 \lambda_{M+m}} \tag{40}
\]

\[
= \frac{\hbar c}{2\pi n^2 \lambda_{M+m}} \cdot \frac{M_m}{m_p^2} \tag{41}
\]

Rydberg (gravity)... [3]

\[R = \frac{1}{2\pi} \left( \frac{1}{n_1^2} - \frac{1}{n_2^2} \right) = \frac{1}{2\pi \alpha \lambda_{M+m}} \left( \frac{1}{n_1^2} - \frac{1}{n_2^2} \right) \tag{42}\]

\[f = \frac{Rc}{n_1^2} \cdot \frac{M_m}{m_p^2} \tag{43}\]

\[E_{tot} = h f \cdot \frac{M_m}{m_p^2} \tag{44}\]

\[N_{graviton} = \frac{M_m}{m_p^2} \tag{45}\]

\[E_{graviton} = h Rc \left( \frac{1}{n_1^2} - \frac{1}{n_f^2} \right) \tag{46}\]

\[E_{tot} = E_{graviton} \cdot N_{graviton} \tag{47}\]

Example (see on-line calculator [3]):

- Earth mass \( M = 5.97 \times 10^{24} \text{kg} \)
- Satellite mass \( m = 1 \text{kg} \)
- Earth surface \( n = 2290 \ (r = 6374 \text{km}) \)
- Geosynchronous orbit \( n = 5890 \ (r = 42169 \text{km}) \)

\[f_{graviton} = n_{2290} \text{ orbit} - n_{5890} \text{ orbit} \]

\[f_{graviton} = 7.485 - 1.132 = 6.354 \text{Hz} \]

\[E_{graviton} = 0.412 \times 10^{-32} \text{J} \]

\[N_{gravitons} = M_m/m_p^2 = 0.126 \times 10^{41} \]

\[E_{total} = E_{graviton} \cdot N_{gravitons} = 5.3 \times 10^{8} \text{(J/Kg)} \]

3. Gravitational time dilation

Gravitational time dilation is the difference of elapsed time in regions with different gravitational potential. The lower the gravitational potential (the closer the clock is to the source of gravitation), the more slowly time passes.

\[v_{escape} = \frac{2GM}{r_g \cdot c^2} = \frac{r_S}{r_g} \cdot \frac{v_{escape}^2}{c^2} = \frac{1}{\alpha n^2} \tag{48}\]

\[v_{orbit} = v_g = \frac{v_g^2}{c^2} = \frac{1}{2 an^2} \tag{49}\]

Circular orbits:

\[v_{escape}^2 + v_{orbit}^2 = \frac{1}{2 an^2} \tag{50}\]

Example: \(n=2290 \ (R=6374 \text{km})\):

\[v_{orbit} = \sqrt{\frac{c^2}{2 an^2}} = 7907.75 \text{m/s} \tag{51}\]

\[v_{escape} = \sqrt{\frac{c^2}{an^2}} = 11183.25 \text{m/s} \tag{52}\]

4. The classical tests of relativity

i) Perihelion precession of Mercury’s orbit

semi-minor axis: \( b = a l^3 \lambda_g \)

semi-major axis: \( a = an^2 \lambda_g \)

Radius of curvature:

\[L = \frac{b^2}{a} = \frac{a l^3 \lambda_g}{n^2} \tag{53}\]

\[\frac{3 \lambda_g}{2L} = \frac{3 n^2}{2a l^3} \tag{54}\]

Using \(n=378, l=374\), Mercury orbit = 87.9691 days

\[\frac{3 n^2}{2a l^3} = 1296000 \times 100 \times 365.252/87.9691 = 43.015 \tag{55}\]

precession = 43.015 arc secs (per 100 yrs)

Number of orbits required to complete 1296000 arc secs:

\[N_{orbits} = \frac{2a l^3}{3n^2} = 12509680 \tag{56}\]

If \( l = n \), we find the formula for circular orbits eq.50:

\[\frac{3 n^2}{2a l^3} = \frac{3}{2an^2} \tag{56}\]
Rotational velocity (l=n):
\[ v_{\text{rotate}} = \frac{3c}{\sqrt{(2\alpha)2\alpha n^2}} \quad (57) \]

Rotational period (l=n):
\[ T_{\text{rotate}} = \frac{\sqrt{(2\alpha)4\pi^2n^2\lambda}}{3c} \quad (58) \]
Suggesting that the classical earth-sun orbit, for example, is itself rotating.

ii) Gravitational redshift
\[ z_{\text{approx}} = \frac{GM}{c^2r_g} = \frac{1}{2\alpha n^2} \quad (59) \]

iii) Deflection of light \( r_{\text{star}} = r_g \)
\[ \frac{2r_{\text{star}}}{r_{\text{star}}} = \frac{2}{\alpha n^2} \quad (60) \]

5. Elliptical orbits
As a gravitational orbit is the sum of many individual orbits (eq.43), we need an additional term. The semi-major axis \( R_a \) can be calculated from \( T \) (period of gravitational orbit) [3]:
\[ 3R_a = R_g \left(1 + \frac{2T}{T_g}\right) \quad (61) \]

Semi-major axis for Mercury’s orbit around the Sun [2]:
\[ \mu_{\text{sun}} = 132712440.018 \]
\[ \lambda_{\text{sun}} = 2\mu_{\text{sun}}/c^2 = 2953.25m \]
Mercury: \( \mu_{\text{mercury}} = 22032 \)
\[ T = 87.9691 \text{ days} \times 86400\text{sec} \]
\( a_o = 57 \text{ 909 100km (wikipedia)} \]
\( a_b = 57 \text{ 909 069km (kepler)} \]
\( a_n = 57 \text{ 909 099km (n = 378)} \]
\( v_g = 47.907m/s \text{ (47.87)} \]
Venus: \( \mu_{\text{venus}} = 324859 \)
\[ T = 224.65 \text{ days} \times 86400\text{sec} \]
\( a_o = 108 \text{ 208 000km (wikipedia)} \]
\( a_b = 108 \text{ 192 651km (kepler)} \]
\( a_n = 108 \text{ 192 652km (n = 517)} \]
\( v_g = 35.026m/s \text{ (35.02)} \]
Earth: \( \mu_{\text{earth}} = 398600.4418 \)
\[ T = 365.25636 \text{ days} \times 86400\text{sec} \]
\( a_o = 149 \text{ 597 887km (wikipedia)} \]
\( a_b = 149 \text{ 597 873km (kepler)} \]
\( a_n = 149 \text{ 597 874km (n = 608)} \]
\( v_g = 29.784m/s \text{ (29.78)} \]
Mars: \( \mu_{\text{mars}} = 42828 \)
\[ T = 686.97 \text{ days} \times 86400\text{sec} \]
\( a_o = 227 \text{ 939 100km (wikipedia)} \]
\[ a_k = 227 \text{ 938 851km (kepler)} \]
\( a_n = 227 \text{ 938 946km (n = 750)} \]
\( v_g = 24.145m/s \text{ (24.077)} \]
6. Gravitation formula (\( r_s \) = Schwarzschild radius)
\[ r_s = \frac{2l_p M}{m_p} \quad (62) \]
\[ GM \quad R_g c^2 = \frac{l_p c^2}{m_p M} \frac{1}{an^2r_s c^2} = \frac{1}{2an^2} \quad (63) \]
Gravitational force as a function of Planck force
\[ F_p = \frac{E_p}{l_p} \quad (64) \]
\[ F = \frac{M_o M_p G}{R^2} = \frac{r_s a r_s b F_p}{4R_g^2} = \frac{r_s a r_s b F_p}{4\alpha^2 n^4 l_g} \quad (65) \]
\[ F = \frac{F_p}{16a^2 n^4} \quad (66) \]
\[ F = \frac{r_s a r_s b F_p}{4\alpha^2 n^4 r_s a} \quad (67) \]
\[ F = \frac{2l_p m_b}{m_p} \frac{a g c^2}{2l_p m_p c^2} = m_o a_g \quad (68) \]
and so the force formula reduces to \( F = m_o a_g \)
7. Gravitational energy (\( m_{\text{object}} \ll M_{\text{earth}} \))
\[ E_{\text{graviton}} = h f = \frac{\hbar c}{2\pi r_g} = \frac{m_p c^2 l_p}{r_g} = \frac{m_p c^2 l_p}{\alpha n^2 l_{\text{earth}}} = \frac{m_p^2 c^2}{M} \quad (72) \]
energy per graviton to reach escape velocity
\[ E_{c_\text{e}} = \frac{m_p^2 c^2}{M} \quad (73) \]
earth as black hole; \( n = 1 \), \( E = .325e-6eV \)
earth surface; \( r = 6374.3km, \ m = 2290, \ E = .619e-13eV \)
moon as black hole; \( n = 1 \), \( E = .264e-4eV \)
moon surface; \( r = 1737.1km, \ n = 10735, \ E = .229e-12eV \)
when $M = .1426e18$kg:

$$M = \frac{2am_e^2}{m_e} = .1426e18 \quad (74)$$

$$E_{ce} = \frac{m_e^2v_e^2}{2am_e^2/m_e} = m_e c^2 = 13.6eV \quad (75)$$

The number of orbitals per orbit;

$$N_{earth} = \frac{M_{earth}m}{m_p} = .126e41 \quad (76)$$

$$N_{moon} = \frac{M_{moon}m}{m_p} = .155e39 \quad (77)$$

$E_{tot} = E_{ce} - N$ reduces to

$$E_{tot} = mv_g^2 = \frac{m_e}{2} \quad (78)$$

And so, as noted earlier, escape velocity is not proportional to the mass (of the earth or the moon), but instead to $n$.

$$V_{earth} = \sqrt{\frac{c^2}{\alpha 2290^2}} = 11.183km/s \quad (79)$$

$$V_{moon} = \sqrt{\frac{c^2}{\alpha 10735^2}} = 2.386km/s \quad (80)$$

6 Orbitals:

As the frequency of time is affected by a gravitational field (Gravitational time dilation), it may be that the frequency of mass is also influenced by the presence of an orbital.

1. Atomic orbitals
   a) For classical orbital momentum physics uses the reduced mass of the electron.

   $$E = \frac{mv_e^2}{2} = 13.6057eV \quad (81)$$

   Positronionization energy IE (6.803eV);

   $$E_p = \frac{m_e}{1 + 1} \cdot \frac{v^2}{2} = 6.80285eV \quad (82)$$

   Hydrogen ionization energy IE (13.5984eV);

   $$E_H = \frac{m_e}{1 + \frac{m_e}{m_p}} \cdot \frac{v^2}{2} = 13.59829eV \quad (83)$$

   Although this accuracy seems within experimental precision, transitions within the atom could also be explained by an additional geometrical term which I have labeled $\beta$. For example, additional units of $\alpha$:

$$\beta_p = \sqrt{1 - \frac{5}{2\alpha^2} - \frac{1}{2\alpha^5/\pi}} \ldots \quad (84)$$

$$\beta_H = \sqrt{1 - \frac{20}{\alpha^2} - \frac{1}{\alpha^7/2}} \ldots \quad (85)$$

Ionization energy:

$$E_p = \frac{m_e^2c^4}{4\alpha^2} = 6.802385eV \quad (86)$$

$$E_H = \frac{m_e^2c^4\beta_H}{2\alpha^2} = 13.598414eV \quad (87)$$

1s-2s spectra (R=10973731.568517)

$$P(1s - 2s) = \frac{3Rc\beta_p}{8} \quad (88)$$

$$H(1s - 2s) = \frac{3Rc\beta_H}{4} \quad (89)$$

We could continue to manipulate these numbers to achieve higher precisions... this of course is of dubious value, the point that I wish to make here is that there may be a solution that is electron orientated (i.e.: uses the rest mass and not reduced mass of the electron).

Further examples;

Para-positronium decay (= .79909(17) e10) [8];

$$t_{para} = \sqrt{1 - \frac{\sqrt{2}}{\alpha} \cdot \frac{m_e}{mpd} T_p} = .799094 e10 \quad (90)$$

Ortho-positronium decay (= .70404(13) e7) [7];

$$t_{ortho} = \sqrt{1 - \frac{9\sqrt{2}}{2\alpha} \cdot \frac{2m_e(\pi^2 - 9)}{9mpd^2 E_p}} = .70417 e7 \quad (91)$$

We may then conjecture on a standard electrical parameter $\mu_e$ where $a$ is the semi-major axis of an atomic orbital, such that if $T = T_a$ then $a = R_a$.

$$\mu_e = \frac{\lambda_e c^2}{\alpha} \quad (92)$$

$$a^3 = \frac{\mu_e T^2}{4\pi} \quad (93)$$

$$T = \frac{\beta}{2Re} \quad (94)$$
2. Molecular Orbitals
Molecular orbitals, as the sum of atomic orbitals (i.e.: molecular orbital theory) are also physical orbitals, here we are simply replacing mathematical wave-functions with physical waves.

ref: Homonuclear diatomic molecules (approximate dissociation energies). A geometrical pattern is evident.
Li-Li (1.12eV)
\[ Li - Li = \frac{2m_e v_e^2}{25} = 1.09eV \]  (96)
F-F (1.6eV)
\[ F - F = \frac{3m_e v_e^2}{25} = 1.63eV \]  (97)
B-B (3.0eV)
\[ B - B = \frac{2m_e v_e^2}{9} = 3.02eV \]  (98)
H-H (4.52eV)
\[ H - H = \frac{m_e v_e^2}{3} = 4.54eV \]  (99)
O-O (5.2eV)
\[ O - O = \frac{3m_e v_e^2}{8} = 5.10eV \]  (100)
Positronium
\[ (+)e - (-)e = \frac{m_e v_e^2}{2} = 6.8eV \]  (101)
N-N (9.8eV)
\[ N - N = \frac{18m_e v_e^2}{25} = 9.8eV \]  (102)

4. Planck energy \( E_p \)
In term of this model, it is more correct to define E in terms of the frequency of Planck energy (and mass in terms of the frequency of Planck mass [4]). For example;
\[ E_{\text{Rydberg}} = E_p \frac{1}{2\alpha^2} \frac{m}{(\alpha)^m_\text{p}} \]  (106)
Suggesting a classical formula for the energy of a photon;
\[ E = E_p \frac{N}{2\alpha^2} \]  (107)
where the second term is the dimensionless frequency of the fundamental unit of orbital energy \( E_o = E_p/(2\alpha) \) and N is the sum of the second term.
Each gravitational orbital is therefore quantized, the final orbit is the sum of all the individual orbitals.
And so the terms binding energy, ionization energy, dissociation energy and escape velocity (energy) converge.

4. Orbitals as anti-photons
According to convention, an incoming photon hits the atom and an electron jumps to a higher orbital. How this instantaneous process occurs and what constitutes empty space in the atom (which is 99.99999999999 percent of the atom) remains a mystery.
Here I have proposed that the orbital is a physical entity, a photon albeit of opposite phase that has been trapped to form a standing wave and which I denote as an anti-photon.
Analysis of the Rydberg formula suggests the incoming photon is actually 2 photons; the first photon corresponds to the present electron orbital, the 2nd photon corresponds to the new orbital. If so, then the orbitals are themselves photons, albeit standing waves of inverse phase (ie: anti-photons) whereby photon+antiphoton = 0.
And so the incoming photon + \( +\lambda \) does not cause the electron to jump between orbitals, rather it deletes the present \( n = i \) orbital and replaces it with the new \( n = f \) orbital.
The Rydberg formula as 2 photons;
\[ (+\lambda) = \frac{R}{n_i^2} - \frac{R}{n_f^2} = (+\lambda_i) - (+\lambda_f) \]  (108)
photon = (+\lambda)
antiphoton (standing wave) orbital = (-\lambda)
photon + antiphoton = (+\lambda) + (-\lambda) = 0
orbital wavelength = \( \lambda_a \)
For an \( n = i \) atomic orbital (-\( \lambda_i \))
\[ (-\lambda_i) = (-) \frac{c}{4\pi \alpha^2 n_i^2 \lambda_a} \]  (109)
Incoming photon (+\( \lambda \)) = (+\( \lambda_i \)) - (+\( \lambda_f \))
\[ (+\lambda) = (+) \frac{c}{4\pi \alpha^2 n_i^2 \lambda_a} - (+) \frac{c}{4\pi \alpha^2 n_f^2 \lambda_a} \]  (110)
Change of orbitals from \( n = i \) to \( n = f \):
\[ (+\lambda_i) - (-\lambda_i) = (+\lambda_f) = (-) \frac{c}{4\pi \alpha^2 n_f^2 \lambda_a} \]  (111)
From this wave addition followed by subtraction, we have simply replaced the $n = i$ orbital with the $n = f$ orbital. The electron has not moved, however the boundary of its orbital has changed.

In molecular orbital theory, the terminology used is bonding and anti-bonding orbitals, nevertheless the principle is the same, i.e.: the molecular bonding orbital is an anti-photon ($E < 0$), the anti-bonding orbital is the inverse photon ($E > 0$). When summed, the molecular bonding and anti-bonding orbitals cancel ($E = 0$).

7 Conclusion:

I have proposed here that interactions between particles occurs, not via a force exchange but instead that particles are connected by physical orbitals. Movement within the orbital occurs according the orbital momentum, movement between orbitals requires a change in momentum, akin to buoyancy. Mass, like weight, is not a fixed concept but is a function of particle frequency and so $h\nu = mc^2$ [9].

Albeit clearly speculative in parts, I argue that the continuity, accuracy and extreme simplicity of this model would suggest that it merit further investigation.

‘Concepts that have proven useful in ordering things easily attain such an authority over us that we forget their Earthly origins and accept them as unalterable facts. The path of scientific advance is often made impassable for a long time through such errors… our conceptions of Physical Reality can never be definitive; we must always be ready to alter them, to alter, that is, the axiomatic basis of physics’ -Albert Einstein

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