

Compressed Orbits and the Secret Behind $E = mc^2$

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Abstract: *On the astronomical scale, the potential energy in a closed orbit is due to the gravitational force of attraction. These are uncompressed orbits. The gravitational force is opposed by a centrifugal force acting internally from within the system. This article will now consider the nature of the potential energy in a system of multiple orbits that are pressing against each other with centrifugal force while striving to dilate. Centrifugal potential energy will be shown to lie at the root of the famous equation $E = mc^2$.*

Uncompressed Orbits

I. Planetary orbits are uncompressed orbits because they are closed by virtue of an internal pull force. The eccentric orbit of a comet serves as an excellent illustration.

At aphelion the Sun's gravity pulls the comet downwards, and in doing so, kinetic energy is induced. The significant aspect of kinetic energy in the context is its transverse component. The derivative of the transverse component with respect to radial distance indicates the presence of a centrifugal force. As well as opposing gravity, this centrifugal force follows an inverse cube law in radial distance, and as such, it increases at a greater rate than gravity which obeys an inverse square law. The two different inverse power laws create a reversal threshold and ultimately the comet rebounds at a point of closest approach known as perihelion. The situation then reverses and the cycle repeats. The total energy in an uncompressed orbit is the sum of the kinetic energy and the potential energy. Gravitational potential energy is a measure of the ability of the gravitational force to generate kinetic energy, and so the total energy is conserved.

Compressed Orbits

II. Centrifugal force is induced between any two bodies in mutual transverse motion. When this principle is extrapolated between any pair of bodies in a multi-body system, then we can have a situation in which orbits are forcibly closed, not by an internal attractive force, but rather by the external centrifugal pressure generated by neighbouring orbits that are striving to dilate [1]. This is a **compressed orbit**. In a compressed orbit the potential energy then becomes the centrifugal potential energy due to the external orbits that are hemming the compressed orbit in. Since centrifugal potential energy is the same thing as transverse kinetic energy, then the total energy of a body in a compressed orbit

is twice its kinetic energy. See Section IV of “*The Double Helix Theory of the Magnetic Field*” [2].

Physical Interpretation

III. It is proposed that space is densely packed with tiny aethereal vortices that are pressing against each other with centrifugal force while striving to dilate [3], [4]. Each of these tiny vortices contains both a sink (an electron) and a source (a positron) [2], [5]. It is further proposed that the atoms and molecules of ponderable matter constitute more complex vortices. When a body linearly accelerates, the shear interaction between the constituent molecules and the background electron-positron sea (The Electric Sea) leads to angular acceleration of the constituent molecules and the electron-positron dipoles, and this has the effect of screwing pure pressurized aether out of the positive particles. Kinetic energy is therefore a pressure which is induced either by acceleration or when a fine-grained angular acceleration wave emitted from one body delivers kinetic energy into another body during a collision [6]. When this happens, the other body then linearly accelerates.

It is proposed that gravity is tensile aether on the large scale, flowing into the sinks in all matter, and that in doing so it superimposes on the local flow around and within the tiny aether vortices that fill all of space. Due to their dipolarity, these tiny vortices are caused to precess hence inducing centrifugal pressure to act at right angles to the gravitational field lines. The sea of tiny aether vortices also absorbs any vorticity in the gravitational field, hence ensuring that gravitational fields are predominantly irrotational. In an uncompressed orbit, the sea of tiny vortices is entrained within each gravitational field. The tension that exists at the interface between two gravitational fields, so as to cause attraction, is undermined by centrifugal pressure coming from the tiny vortices. The greater the shear velocity between the two gravitational fields, the greater will be the centrifugal pressure that tends to push the two bodies apart.

Centrifugal pressure is the basis of all intrinsic energy in atomic and molecular matter and also in the electron-positron sea. It is the *rest mass* energy mc^2 where c is the circumferential speed of the molecular orbit. In the case of the electron-positron sea, it is proposed that c will be the speed of light, and hence each dipole will have a stored centrifugal potential energy of 1.02MeV. When a gamma photon, itself constituting propagated centrifugal pressure, supplies an additional 1.02MeV on top of this, the electron and positron in the dipole can then overcome the external centrifugal pressure and break out of their lattice bonds, leading to electron-positron pair production [7].

Kinetic energy in atomic and molecular matter is an additional $\frac{1}{2}mv^2$ on top of the rest mass energy, where v is the translational speed of the body. The total energy is therefore equal to $mc^2(1 + v^2/2c^2)$, assuming mass to be constant. Using the binomial expansion, and only providing that v^2/c^2 is small, this is approximately equivalent to saying that the total energy equals $E/\sqrt{1 - v^2/c^2}$, where E is the rest mass energy. There is no basis in general though to assume that c is equal to the speed of light, as this likely only occurs in the special case of the electron-positron sea itself [8]. The fact that these relationships superficially resemble equations associated with Einstein's special theory of relativity is only because in both cases the equations are similar to the equations of the Doppler shift.

When gravity acts on a dipole, it causes both an angular acceleration and a linear acceleration. Therefore, when gravity acts on a body that is comprised of atomic and molecular matter, the intrinsic energy will be increased first by an induced precession in the molecules. This fine-grained precession will not show up externally but it could show up within the mechanism of an atomic clock. It's like a latent kinetic energy based on the inflow speed of the aether. When the body starts to linearly accelerate, the interaction with the surrounding electric sea induces more intrinsic energy. The latter is the observed kinetic energy.

Resistance to Motion

IV. The fact that the background electric sea constitutes a sea of tiny vortices means that the velocity induced resistive force that would be encountered by bodies in motion will be deflected at right angles to the direction of motion. This can be observed in the case of the electromagnetic force $\mathbf{F} = q\mathbf{v} \times \mathbf{B}$ and also in the case of the inertial forces. With the latter, a Coriolis force causes a right angle deflection on a radial motion, while a centrifugal force causes a right angle deflection on a transverse motion. These forces are simply the fine-grained centrifugal pressure emanating from the tiny background vortices acting differentially on either side of a moving body, transverse to its motion. The asymmetry can be explained on the principle that when a particle moves between two orbits that are both rotating in the same direction, the mutual transverse speed between that particle and the particles in the orbits will be different on either side of the motion, and hence the induced centrifugal force on either side of the motion will be different. The particle will therefore be deflected at right angles to its direction of motion.

References

- [1] Tombe, F.D., **“Centrifugal Force Between Two Orbital Systems”** (2017)
<http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/247>
- [2] Tombe, F.D., **“The Double Helix Theory of the Magnetic Field”** (2006)
Galilean Electrodynamics, Volume 24, Number 2, p.34, (March/April 2013)
<http://gsjournal.net/Science-Journals/Research%20Papers-Mathematical%20Physics/Download/6371>
- [3] Whittaker, E.T., **“A History of the Theories of Aether and Electricity”**, Chapter 4, pages 100-102, (1910)
“All space, according to the younger Bernoulli, is permeated by a fluid aether, containing an immense number of excessively small whirlpools. The elasticity which the aether appears to possess, and in virtue of which it is able to transmit vibrations, is really due to the presence of these whirlpools; for, owing to centrifugal force, each whirlpool is continually striving to dilate, and so presses against the neighbouring whirlpools.”
- [4] Clerk-Maxwell, J., **“On Physical Lines of Force”**, Philosophical Magazine, Volume XXI, Fourth Series, London, (1861)
http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf
- [5] Tombe, F.D., **“The Electron-Positron Sea”** (2014)
<http://gsjournal.net/Science-Journals/Research%20Papers-Quantum%20Theory%20/%20Particle%20Physics/Download/5507>
- [6] Tombe, F.D., **“Newton’s Cradle Disproves Einstein’s Theories of Relativity”** (2014)
<http://gsjournal.net/Science-Journals/Essays-Mechanics%20/%20Electrodynamics/Download/5737>
- [7] Simhony, M., **“The Electron-Positron Lattice Space, Cause of Relativity and Quantum Effects”**, Physics Section 5, The Hebrew University, Jerusalem (1990)
<http://web.archive.org/web/20040606235138/www.word1.co.il/physics/mass.htm>
- [8] Tombe, F.D., **“The 1856 Weber-Kohlrausch Experiment”** (2015)
<http://gsjournal.net/Science-Journals/Research%20Papers-Mathematical%20Physics/Download/6314>