

## The Cause of Centrifugal Force

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**Abstract.** It is widely believed that centrifugal force does not exist. It will now be shown that centrifugal force does exist and that it is caused by a build up of aether pressure that in turn results from congestion in the gravity sinks. This congestion is in turn caused by vorticity in the aether, which is in turn caused by moving particles cutting at right angles across aether flow.

### Centrifugal Force

I. A very real outward radial acceleration  $r\omega^2$  occurs between any two particles that possess a mutual tangential speed relative to the background stars. The expression  $r\omega^2$  is the well known centrifugal acceleration with  $r$  referring to the distance between the two particles and  $\omega$  referring to the angular speed of the line that connects them. In the absence of any radially inward centripetal force, these two particles will undergo straight line motion which can be considered as the ultimate case of the infinitely eccentric hyperbola. When radially inward centripetal force becomes involved, the paths will become curved.

If we extrapolate this concept to the situation that exists between two adjacent rotating electron-positron dipoles that are aligned in their mutual equatorial plane, it follows that we should expect an actual physical repulsion to occur between the dipoles if the mutual tangential speeds are high enough. This is the dynamical principle behind James Clerk-Maxwell's

theory of magnetic repulsion. See part I of his 1861 paper ‘On Physical Lines of Force’ at,

[http://vacuum-physics.com/Maxwell/maxwell\\_oplf.pdf](http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf)

and also ‘The Double Helix Theory of the Magnetic Field’ at,

<http://www.wbabin.net/science/tombe.pdf>

This leads us to suspect that centrifugal force must be tied up with aether pressure.

Gravity can be explained as the tension associated with aether that is flowing into sinks. Let us now propose that the mutual tangential motion of two sinks induces a vorticity  $\mathbf{H}$  in the aether field momentum  $\mathbf{A}$  that has the effect of congesting the sinks and causing a build up of aether pressure. In other words, centrifugal force arises when a particle cuts at right angles across aether flow.

This establishes a link between tangential kinetic energy and aether pressure. If we substitute the Keplerian areal velocity constant into the expression for tangential kinetic energy, we will obtain an inverse square law position dependent centrifugal potential energy term. If we combine this potential energy with gravitational potential energy, we will obtain a graph that is identical in shape to the graph for the potential energy that is associated with inter-atomic bonding. This graph implies mutual repulsion at short range and mutual attraction at long range.

From the inverse square law centrifugal potential energy term, we can deduce that centrifugal force is an inverse cube law repulsive force that is associated with aether pressure and equivalent to tangential or rotational kinetic energy.

## **The Centrifuge**

**II.** In a centrifuge, a centripetal force acts radially inwards. This centripetal force prevents the solution from following its inertial path and constrains it to move in circular motion. However, Archimedes’ principle means that the

centripetal force that is transmitted radially inwards through the solution will not be sufficient to retain the more dense particles of the solution in circular motion. As such, the more dense particles will accelerate radially outwards to the edge wall of the centrifuge, and only then will they be constrained to move in circular motion.

It is often argued that since this phenomenon can be explained without having to involve the concept of centrifugal force, then it follows that centrifugal force does not exist. However, the inward centripetal force that constrains the particles to move in circular motion does not cause any net inward radial acceleration. There must therefore be a balancing radial force acting outwards.

The centripetal force is in fact reacting to the centrifugal weight that has been induced as a result of the mutual tangential speed of the particles with respect to the rotation axis of the centrifuge. The rotation axis lies at the centre of mass of the system.

## **Coriolis Force**

**III.** It is a common mistake to believe that Coriolis force is the apparent tangential superimposition that is observed on a motion as viewed from a rotating frame of reference. In actual fact, the Coriolis force is a real perpendicular deflection and not a superimposition. It doesn't involve any change of magnitude of a velocity.

Coriolis force arises as a consequence of moving through a vortex. The rotating space has the effect of changing the direction of the motion.

Gravity is all about aether inflow into sinks, normally considered on the large scale. Kepler's law of areal velocity tells us that there is no vorticity in the gravitational field. This is because the vorticity has been absorbed by the tiny rotating electron-positron dipoles that densely permeate space and cause the magnetic field. This absorption of the vorticity explains why large scale spinning objects don't mutually repel each other and it implies that centrifugal force in the large scale planetary orbits is acting on the picoscopic scale in the shear lines in the electron-positron sea and causing a repulsive hovercraft effect that eliminates friction.

The absorption of vorticity by the electric sea also explains why Coriolis force occurs in the magnetic field in the form of the  $\mathbf{E} = \mathbf{v} \times \mathbf{H}$  component of the Lorentz force, where the magnetic field vector  $\mathbf{H}$  is a measure of vorticity.

In the absence of aether vorticity, a resultant Coriolis force can only exist if a radial motion is constrained to rotate. One example of this would be the case of water flowing through a radial pipe that is fixed on a rotating turntable. The rotating space will induce a Coriolis weight to act tangentially against the side of the pipe. In a case of uniform circular motion, the torque coming from the turntable will be equal and opposite to the induced Coriolis force. In order to decide which of the two forces is the action and which is the reaction, we need to decide whether the turntable is rotating relative to space or whether space is rotating relative to the turntable. It would be normal to consider the turntable to be rotating and so the induced Coriolis force is more accurately a reactive Coriolis force that is reacting to an applied torque.

A Coriolis force does actually occur in a Keplerian orbit but only in relation to the radial component of the motion. There is no constrained radial motion and so there is no resultant physically real Coriolis force in operation. The Coriolis force that acts on the radial component of the motion is always exactly cancelled by an equal and opposite angular  $\partial \mathbf{A} / \partial t$  force.

Another example of Coriolis force that occurs in the absence of vorticity is that of a spinning gyroscope on a pivot that is toppling over under the force of gravity. A Coriolis force will be induced that deflects the fall sideways.

## **Electromagnetism**

**IV.** Electromagnetism operates on exactly the same aether hydrodynamical principles as gravity, but instead of acting directly between objects, it acts through the double helix structure of the electron-positron sea. Gravity acts on a body as whole which is why all objects accelerate at the same rate in a gravitational field, as was first demonstrated by Galileo at Pisa. On the other hand, in an electrostatic or an electromagnetic field, the electric or magnetic force only acts on a part of an object. This means that under the action of an

electric or a magnetic force, the mass of the object will induce an impedance which will be inversely proportional to the resulting acceleration.

In electromagnetic induction and in electromagnetic radiation, a net aether pressure will be transmitted through the tiny aethereal vortices that comprise the electron-positron sea, hence causing them to angularly accelerate. That is why in electromagnetic radiation, the electric field vector  $\mathbf{E}$  is equal to the angular  $-\partial\mathbf{A}/\partial t$  force.

## **Magnetic and Electric Force**

V. Magnetic repulsion is caused by fine-grain centrifugal pressure in the electron-positron sea. The centrifugal force obeys an inverse cube law, but that doesn't necessarily mean that this law will carry through to the large scale on summation over all the vortices. At any rate, we know that magnetic repulsion does not obey an inverse square law, and as such magnetic levitation can occur in a gravitational field without breaching Earnshaw's Theorem.

All magnetic repulsion on the large scale is caused by fine-grain centrifugal force that arises when the electron-positron dipoles are aligned in their mutual equatorial planes. Magnetization of electron-positron dipoles results in an increase in their rotational kinetic energy, and hence in their centrifugal potential energy.

Magnetic and electrostatic attraction is caused by the inverse square law Coulomb force acting between the electrons and positrons in the electron-positron sea. In the former case, the attraction arises along the axis of the double helix alignment, whereas in the latter case the attraction arises through the self restoring elasticity in the electron-positron dipoles that occurs during linear polarization (stretching).

The inverse square law aspect of the Coulomb force will not necessarily extrapolate to the large scale.

Electrostatic repulsion is most likely to be caused by pure aether pressure that is associated with linear polarization of the electron-positron dipoles and it will likely not obey the inverse square law.

## Electron Pair Production

**VI.** With **A** referring to aether momentum, the magnetic potential energy expression  $\mathbf{A} \cdot \mathbf{v}$  implies that the rotational kinetic energy of an electron-positron dipole must be equal to  $mv^2$  where  $m$  is the resultant mass of the dipole and  $v$  is the mutual tangential speed. In a previous article entitled ‘ $E=mc^2$  and Maxwell’s Fifth Equation’ at,

<http://www.wbabin.net/science/tombe14.pdf>

it was assumed that  $m$  was the mass of each individual particle within the dipole. This assumption however had no bearing on the final result. An electron has a slightly greater negative mass than a positron has positive mass. A gamma photon with a wavelength in the order of picometers can liberate an electron and a positron from their mutual orbits. The liberated electron and positron will have the same mass to charge ratio as the electron-positron dipole as a whole and the individual electron may indeed be indistinguishable from the electron-positron dipole.

The so called current electrons in a wire and the electrons measured by Millikan’s oil drop experiment were almost certainly electron-positron dipoles because single electrons would be highly unstable and liable to combine into electron-positron pairs or double electron pairs. Besides that, single electrons could not be linearly polarized, and that is an essential aspect of capacitor theory and equilibrium in the electric circuit.

The physical size of the electron-positron dipole is almost certainly going to be very closely related to the wavelength of the gamma rays that can split it into its two constituent components as per the 1932 Carl Anderson experiment. We can safely assume that the diameter of electron-positron dipoles will be in the order of picometers.

## Centrifugal Force and Positrons

**VII.** The theory of centrifugal force in this article applies exclusively to scenarios in which sink particles are dominant. The underlying principle is that vorticity causes the sinks to get congested and this in turn causes a build

up in pressure due to the inflowing aether. This theory depends entirely on the existence of an ongoing gravity inflow and the presence of the background stars.

On the other hand, when it comes to source particles (positive charges) such as the positron, it is inconceivable to think that there could be no such thing as centrifugal force. Centrifugal force is part of the geometry of space. It applies to imaginary point particles and imaginary point origins independently of whether we are dealing with sinks or sources.

Two source particles will mutually repel each other anyway, irrespective of centrifugal force. But if mutual tangential motion is to add an additional repulsive centrifugal force on top of this, then the only conclusion that we can come to is that where vorticity congests a sink, it actually widens a source and increases the outflow.

In general, in the absence of vorticity,

- (i) Two negative charges will attract.
- (ii) Two positive charges will repel.
- (iii) A negative charge and a positive charge will attract or repel depending upon which is the stronger.
- (iv) Two resinous charges on the larger scale will repel.
- (v) Two vitreous charges on the larger scale will repel.
- (vi) A vitreous charge and a resinous charge will attract.

If we now add vorticity, this will cause an additional centrifugal repulsive effect. In a magnetic field, this repulsive effect is magnetic repulsion.

The conclusion is that both centrifugal force and Coriolis force are caused by aether vorticity. The vorticity has the dual effect of congesting the gravity sinks leading to a back pressure that is centrifugal force, and also of curving space and causing moving particles to be deflected from their straight line path. The latter effect is the Coriolis force.