

VORTICAL ACCELERATOR OF ATOMIC PARTICLES

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1. Abstract

The Large Hadron Collider (LHC) is a linear collider. The LHC consists of a 27-kilometre ring of superconducting magnets with a number of accelerating structures to boost the energy of the particles along the way. Inside the accelerator, two high-energy particle beams travel at close to the speed of light before they are made to collide. The beams travel in opposite directions in separate beam pipes – two tubes kept at ultrahigh vacuum. Note that all experiments in that collider are subject to gravity and to thereby associated defects in superconducting. Moreover, the collision of particles is artificially induced in that collider, while in our accelerator they won't collide but would naturally propel themselves at high kinetic energy due to inherent **repulsion** and thereby created gravitational wave to then split in duality. Gravity has indeed a **repulsive force** with **vortical repulsion effect** as in illustrations of our accelerator model on p. 2.

The first theory of repulsive gravity was a quantum theory published by Kowitt. In this modified Dirac theory, Kowitt postulated that the positron is not a hole in the sea of electrons-with-negative-energy as in usual Dirac hole theory, but instead is a hole in the sea of electrons-with-negative-energy-and-positive-gravitational-mass: this yields a modified C-inversion, by which the positron has positive energy but negative gravitational mass. Repulsive gravity is then described by adding extra terms ($m_g\Phi_g$ and m_gA_g) to the wave equation. The idea is that the wave function of a positron moving in the gravitational field of a matter particle evolves such that in time it becomes more probable to find the positron further away from the matter particle.

Kowitt, M. (1996). "Gravitational repulsion and Dirac antimatter". International Journal of Theoretical Physics. 35 (3): 605–631. doi:10.1007/BF02082828.

To summarize, our concept device and technology enable to create a vortical flow spiral accelerator as occurs in spiral galaxies like M101. Note that our vortical particles accelerator has nothing to do with common cyclotron or synchrotron.

2. Technology

In contrast to LHS linear ring collider, our accelerator consists of superimposed tori in a pyramid-like structure (**fig. 1, 1 (a), Ill. 1**) where the anti-gravity is achieved due to the vortical acceleration of particles via longitudinal axis in spiral-like vertical propagation of energy within that structure and device (**fig. 1, 1(a), ill. 1, 1(a), 2, 3**).

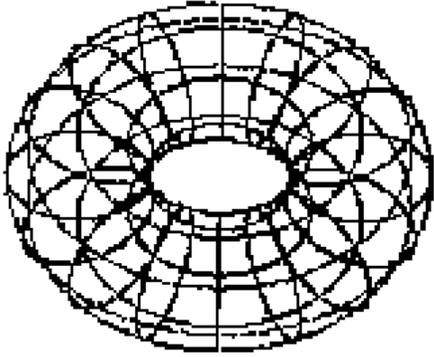


Fig.1

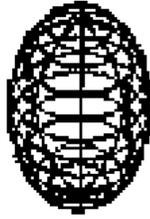
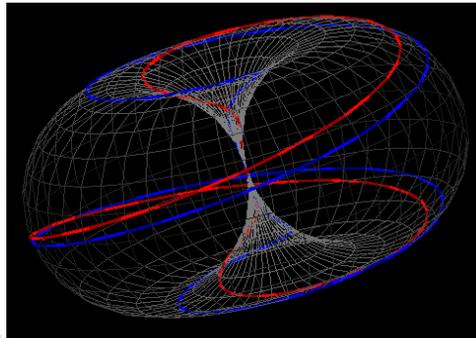


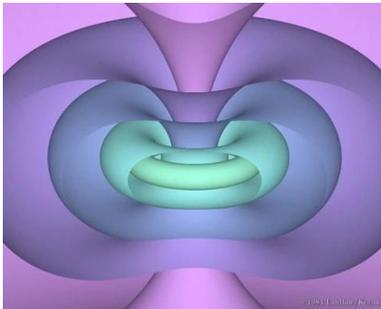
Fig. 1 (a)



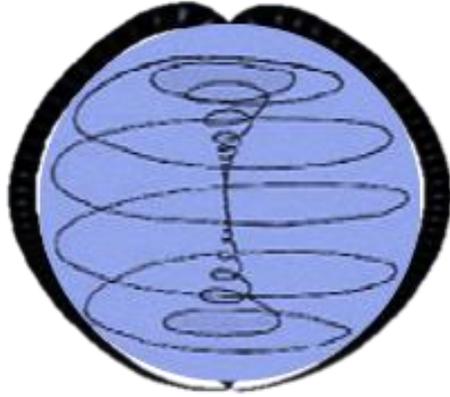
Ill. 1



Ill. 1 (a)



Ill. 2



III. 3

Note that the gravity acts on earth not upwards but downwards that enables a helicopter, for example, to lift-off due to Coriolis force. So due to the beam of particles spiraling upwards in our device and not circuited horizontally as in the LHS artificial ring, the anti-gravity is achieved in our accelerator where the particles generate a gravitational wave (as in the merger of two black holes) to produce a **graviton (ref. 1)** as the force carrier that mediates gravity.

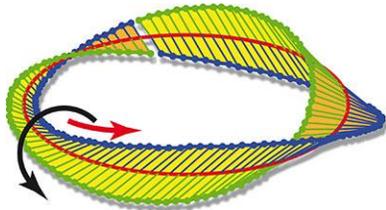
“Graviton is expected to be massless (because the gravitational force appears to have unlimited range) and must be a spin-2 boson. It can be shown that any massless spin-2 field would give rise to a force indistinguishable from gravitation, because a massless spin-2 field must couple to (interact with) the stress–energy tensor in the same way that the gravitational field does; therefore if a massless spin-2 particle were ever discovered, it would be likely to be the **graviton** without further distinction from other massless spin-2 particles. Such a discovery would unite quantum theory with gravity.”

Misner, C. W.; Thorne, K. S.; Wheeler, J. A. (1973). Gravitation. W. H. Freeman. ISBN 0-7167-0344-0.

Lightman, A. P.; Press, W. H.; Price, R. H.; Teukolsky, S. A. (1975). "Problem 12.16". Problem book in Relativity and Gravitation. Princeton University Press. ISBN 0-691-08162-X.

To elaborate: the matter in our device becomes a wave with a small bang and shock wave to produce a matter-antimatter dual entity that would move in a Mobius-like particles strip simultaneously to the past and the future, and could be detected by a present observer at the junction of the Mobius strip. There, twin particles of opposite charge move **parallel** to each other without annihilation but in the duality and accumulation of their joint energy potential to create the curvature of spacetime in relative experiment in the lab. This is a system of **two parallel Josephson junction arrays** coupled by interlayer capacitances where one layer is in the vortex-dominated and the other in the charge-dominated regime.

Light can be twisted into a Mobius strip by green laser beam that is a superposition of two waves with opposing spin. The result is a beam with a polarization that varied across its width. It would be circularly polarized at its centre, but linearly polarized – and with varying orientations of the polarization vector – further out.



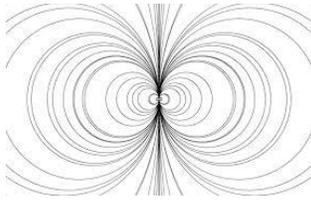
III. 4 Mobius strip

We accordingly envision the acceleration of particles in a quasi-spherical system composed of a large mass of matter emitting gravitational waves. It is known that that reduction of the gravitational mass of the system due to emitting gravitational waves leads to a **repulsive gravitational force** that diminishes with time but never disappears. In general theory of relativity the four-dimensional acceleration of a probe particle is calculated by the equation of the geodesic curve ([Weinberg \(1972\)](#)).

Gravitational repulsion between matter and antimatter is a prediction of general relativity. In this scenario, matter has a positive gravitational charge while antimatter has a (hypothetical) negative gravitational charge. As a result, both matter and antimatter are gravitationally self-attractive, yet mutually repulsive.

3. Conclusion

The spheroidal pushed-in gravity in our vertical accelerator model elaborates on the causality for the mass effect of matter in vortically induced gravitational force. Compare with the Earth and its spheroidal pushed-in gravitational field, where a **spiraling repulsive force** acts on any object as the **spiraling repulsive force** does in our accelerator model. A light beam and quantum field subjected to a spiral repulsive force in a spindle torus gravitational field as in our model, would be impelled to spin with perpetual motion.



Ill. 5. Torus in physics

One of the three standard tori given by the parametric equations

$$x = (c + a \cos v) \cos u \quad (1)$$

$$y = (c + a \cos v) \sin u \quad (2)$$

$$z = a \sin v \quad (3)$$

with $c < a$.

The vortical effect in our accelerator manifests itself in a nested spheroidal force field, and, with reactive centrifugal force generated in the spheroidal encapsulations with pushed-in momentum, it demonstrates the effect of gravity on encapsulated atomic particles.

Thus, our accelerator creates vortically consolidated spheroidal unisonal vortices similar to the vortical motions in the universe. It is coalesced by the vortical spin fusion of quantum vortical motion in our accelerator and its toroidal atomic vortex, whereby the **graviton** can evolve as a torus (ill. 6) and then splits due to its **charge-vortex duality** into two jets (bursts) of hadrons (ill 7, 8) .

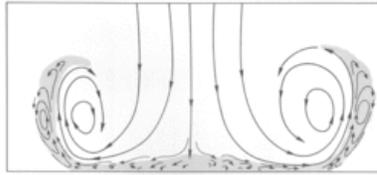
The system in ill. 7, 8 shows symmetry (duality) of the relevant degrees of freedom, i.e. the vortices in one layer and the charges in the other.



III. 6



III. 7



III. 8. Vortex ring of a microburst

Ref. 1

Gravitational Collapse and Equilibrium Conditions of a Toroidal Vortex with Thermal Pressure

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“We found equilibrium conditions for a self-gravitating toroidal vortex by taking into account thermal pressure. These conditions are shown to significantly differ from those for a disk and a sphere. The evolution of a thin vortex turns it into a compact vortex that loses mechanical stability for low masses at a polytropic index $3/4 < \gamma$ but retains stability for sufficiently high masses and densities determined by the velocity circulation in the vortex.”

1. Introduction

“Obviously, the physical stability conditions for a self-gravitating vortex torus fundamentally differ from those for a disk. First of all, the constancy of the circulation $r v \pi^2 = \Gamma$ in the vortex results in the maximum velocity at the smallest (inner) radius of the torus, and the condition imposed by it on the angular velocity Ω results in the absence of epicyclic frequency in the main approximation. Whereas during the rotation of a disk or a sphere, the detaching particles escape from the equator (to form an additional disk in the case of a sphere), **the particles in a toroidal vortex detach at the minimum radius and escape to form a one-sided jet** even in the absence of a magnetic fields (Bliokh and Kontorovich 2003; Shatskii and Kardashev 2002; Ansorg *et al*, 2002).“

“In addition to the detachment due to particle collisions in the vortex torus, which is facilitated by the self-intersecting trajectories in the effective potential of the vortex (Bliokh and Kontorovich, 2003), the particles can be effectively accelerated along the torus axis by the induction field in the case of a magnetized torus (Shatskii and Kardashev, 2002).”

“The discovery of obscuring tori (Antonucci 1993) and their direct observation both in galactic (Risaliti *et al*, 2003) and stellar objects (see Bogovalov and Khangulyan (2002) for references) makes the problem of studying **gravitating toroidal vortices particularly relevant**. As far as we know, until recently, this problem has not been considered (for references, see Bliokh and Kontorovich (2003), who made the first attempt). In this paper, we extend our results (Bliokh and Kontorovich, 2003) to finite temperatures and take into account the effects of thermal pressure.”