Extracting Gravitational Energy From The Homogeneous Isotropic Universe

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Abstract

The kinetic energy of a local system of objects placed in a curved spacetime is gained by the subsequent acceleration of the object following the more contracted region of spacetime. Normally this happens near massive gravitating stars. However, the gravitational dipole moment has been shown to be capable of self creating asymmetrically distorted spacetime in its vicinity, thereby, capable of being accelerated indefinitely following the successive self created loophole of the spacetime. Localization of this kinetic energy may be possible by designing a system that uses the artificially created gravitational dipole moments to rotate the main axis. A mechanical constraint is derived for the extraction of unlimited gravitational energy from such system.

Keyword(s): gravitational energy; curved spacetime; general relativity; dipole gravity; rotating hemisphere

PACS number(s): 03.30.+p, 04.30.+x

It has been discussed in the previous paper that a longitudinal axially asymmetric rotating object violates Newtons first and third laws of motion. In this system, the angular degree of freedom of motion is coupled to that of the linear one since the angular momentum produces the anomalous displacement of the center of mass along the direction of the rotation axis. This is a totally unexpected phenomenon from the view point of Newtonian mechanics. The translational gauge symmetry in the quantized version of general relativity is spontaneously broken for the rotating hemispherical system since the usual constant phase factor that shifts the coordinate system without affecting the energy content of the system is no longer the constant in such cases. It has to carry the information about the kinetic energy of the rotor which depends on the time derivative of the angular orientation $d\theta/dt$ as well as the exact geometrical shape of the rotor to know the exact effective center of mass of the object at any given moment of time. The result of this breaking of symmetry is the non conservation of energy and linear momentum which are the direct consequences of Newton's first and third laws of motion. As is well known, all of the six degrees of freedom of motion(3 translational and 3 rotational) of an object must be independent from each other in Newtonian mechanics. And its validity has never been challenged in general relativity either. Any one of the degrees of freedom of motion should not affect any other degrees of freedom of motion, which seems not the case for the mentioned system. It seems that the spacetime has lesser degree of freedom in such systems since the linear degree of freedom of motion is somehow intermingled with the time dimension through the angular frequency of rotation of the rotor. This new physical phenomenon has the potential to affect QM and EM and especially the Thermodynamics since the kinetic theory of gas has never scrutinized the longitudinal axially asymmetric type of gas like methane in the light of this new principle. The measured values of C_v and γ have revealed that there is no consistent law governing them[1] for the methane derivative gases like CH_3Cl, CH_2Cl_2, $CHCl_3$, CCl_4 which are of the tetrahedral shape that can have the longitudinal axially asymmetric rotational modes. Thus,the C_v and γ of the above gases may need to be recalculated in the light of the present theory and compared with the previous experimental data.

In general, linear displacement of an object occurs typically in mechanics in three cases. First, the coordinate translation, second the constant rectilinear motion with respect to the stationary coordinate system and third due to the accelerated motion of an object. The coordinate translation does not really describe the motion of an object. Its only a shift of the reference point. The second case is the typical rectilinear motion described by Newtons first law of motion. The third case occurs when the object is subjected to a time rated change of the external action where the acting force is given by $d(mv)/dt$. In the first two cases, external energy is not required to change the orientation of the object. In the third case, the displacement is a function of the external force and the mass of the object. In case the object is subjected to a uniform external force, the displacement is the second order function of time. And in most of the other similar cases, Newtons second and third law of motion can effectively deal with the mechanics of the system where the energy and momentum of the total system are conserved.

There is yet another kind of displacement of an object which depends on the internal energy of the system. The idealized, perfectly rigid rotating hemispherical rotor which is an example case of longitudinal axially asymmetric rotor has been considered extensively in the previous paper which generates the shift of the center of mass perpendicular to the plane of rotation. The length element defined as the "anomalous center of mass shift" arising from the energy dependent center of mass has the following peculiar characteristics. 1. It is related to an internal energy of the system. 2. The larger the shift of the center of mass, the greater the stored energy. 3. It can be returned to zero upon releasing the related internal energy. As can be expected, this anomalous center of mass shift is independent of the coordinate system. Since the breaking of Newtons first law motion indicates the possibility of spontaneous linear movement of the object, it is expected that this local system will gain energy as it moves along.

The possibility of extracting vacuum energy by using the attractive Casimir force between metal layers has been proposed by Forward[2] in 1984. More recently, Cole and Puthoff[3] have again raised the possibility of energy extraction from the vacuum. While the Casimir force is the manifestation of the electromagnetic zero point fields, the vacuum as contractible spacetime seems to have other interesting properties in energetics purely from the relativistic point of view.

The dipole gravitational moment represents a new physical entity that defies Newton's first and third laws of motion in which the local energy is not conserved, which is similar to the case of a local system of objects placed in a non flat spacetime in general relativity[4][5][6][7]. It is physically conceivable that the gravitational dipole moment given by

$$\int T^{oo} x'_j \, d^3x' = M \delta \bar{r}_c$$

where T^{oo} is the total mass energy density of the rotating source and $\delta \bar{r}_c$ the anomalous center of mass shift vector, would interact with the gravitational potential field pervading the universe and be directionally accelerated in the same way that an electric dipole moment would be propelled toward certain direction depending on its original position and orientation in a sparsely populated electrostatic charges in a non conducting spherical shell. Calculation of the actual amount of force using the distance and matter distribution in the real universe by integration is hampered by the fact that not only the universe is not in the three dimensional manifold but also that there is no confirmed data for the exact amount of total mass in the universe. Instead, one may be able to calculate the total mass of the universe using the measured linear force in the three dimensional approximation.

As discussed in the previous paper, if we choose the proposition that the center of the centripetal force tries to stay at the rest state center of mass due to the inertial resistance while the centrifugal force exerts force centering around the shifted center of mass, the net result is that there remains non zero vertical component of force in the hemispherical system with respect to the rest of the universe. Then the linear force can be calculated to be, by using the triangular law,

$$F_{linear} = F_{centrifugal}(\frac{\delta r_c}{\sqrt{2/3}R})$$

where δr_c is the anomalous shift of the center of mass and $\sqrt{2/3}R$ the effective radius where the total mass is imagined to be concentrated while giving the same inertia as that of the hemisphere for $R\omega << c$. And subsequently,

$$F_{linear} = \frac{\pi m \omega^4 R^3}{48\sqrt{\frac{2}{3}}c^2}$$

for $R\omega << c$, where R is the radius of the hemispherical shell, m the mass and ω the angular frequency of the rotor respectively.

Once the rotational motion of an idealized perfectly rigid object which is axisymmetric yet longitudinal axially asymmetric is proven to be capable of creating a locally asymmetric spacetime distortion and the corresponding force is given by the above expression where the force depends on the fourth power of the angular frequency ω, the next step of using this force to rotate the wheel(on the axis of which a generator may be attached to produce electricity) is straight forward.

It must be noted at this point that there exists one important, well known, mechanical constraint in this process. The dipole rotor has to overcome the resisting force acting against changing the direction of its own angular momentum in the process of performing the work to rotate the main axis. Since overcoming this resisting force would require energy to be drawn from the system, the energy generated by the dipole rotor must be greater than the energy required to change its own angular momentum plus all other forms of energy loss for positive energy production.

To determine the mechanical constraint for positive energy production following the above discussion, consider a device which has the shape of a large scale classic wind speedometer with four arms of equal length attached perpendicular to the main axis horizontally stretched 90 degree to each other. The axis of four rotating hemispheres are attached at the end of each arms perpendicular to both the main axis and the arms respectively.

Consider an infinitesimal distance $dS = rd\theta$ traveled by the dipole rotor attached at the end of the arms of the device due to the force exerted on itself. Assuming that all other moving components in the device are massless except one dipole rotor which is activated and massive, the amount of work exercised on the wheel during the infinitesimal travel is given by

$$\overline{F} \cdot d\overline{S} = \frac{\pi m \omega^4 R^3}{48\sqrt{\frac{2}{3}}c^2} r d\theta$$

where R and ω are the radius and the angular frequency of the hemispherical rotor respectively and r the length and $d\theta$ the infinitesimal angular rotation of the arms. The energy spent to change the angular orientation of the dipole moment is given approximately for $R\omega << c$ by

$$\tau d\theta = \frac{dL}{dt} d\theta = |\overline{\Omega} \times \overline{L}| d\theta = \Omega L d\theta = \Omega \frac{2}{3} m R^2 \omega d\theta$$

where Ω is the angular frequency of the main axis in the system. Even with the assumption that all the frictional energy loss can be eliminated completely, this is the fundamental low limit of the energy loss required to make up by the force exerted on the dipole. The output energy must be greater than this fundamental energy loss, so that the condition

$$\frac{\pi m \omega^4 R^3}{48\sqrt{\frac{2}{3}}c^2} r d\theta \geq \Omega \frac{2}{3} m R^2 \omega d\theta$$

must be satisfied, which gives

$$\frac{\omega^3 Rr}{8.3c^2} \geq \Omega$$

for the idealized perfectly rigid rotating hemispherical shell for $R\omega/c << 1$. This clearly demonstrates that this localized ideal system is capable of producing positive energy. The Ω sets the maximum available angular frequency for given R, r and ω. In the normal stabilized energy production mode, the Ω would slow down and maintain the smaller value than the one given by the above condition depending on how much energy is drawn from the system. The total amount of energy produced depends on the sixth power of the angular frequency ω and on the second power of r and R respectively.

It is possible that the energy created here now may be lost somewhere some other time in the universe in such a way that the total mass energy of the entire universe remains always constant, although it's an uncomfortable conjecture that may never be proved. Still, on the surface, the energy can be obtained only when the homogeneous isotropic universe is assumed to be filled with matter, exerting long range gravitational interactions, not in the universe which is totally void.

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