Power from Gravity Fluctuations

by

James O. Beaumont

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Abstract

The problem of deriving useful energy from the gravitational field is considered and two different approaches are proposed.

It is contended that the general skepticism surrounding this problem is due to mathematical formulations which apparently demonstrate the impossibility of such an operation but which in reality fail to allow for the actual nature of the gravitational field about us. When the time varying aspect of the gravitational potential is considered, it can be shown that at least two different experiments should be capable of deriving useful energy from the gravitational field. In addition, the finite velocity of propagation of gravity may be utilized to improve the efficiency of the operation.

The designated topics for these Essays on Gravity fall into two distinct classes -- those which shield or counteract gravity but may not be capable of performing useful work and those which derive power directly from gravity. It is the purpose of this paper to demonstrate how this latter may be achieved.

Before attempting to show how it is possible to derive energy from gravity, it is well to recognise that there is general skepticism and disbelief surrounding this area and to explore the basis for this skepticism in order to avoid standard pitfalls. The arguments against gravity power may generally be summarized as follows:

Arguments against gravity

The energy delivered to a system is measured by the line integral of the vector product of the force and the displacement. In the case of a gravity field the force on the system is the product of the system mass and the gravitational intensity. When this integral is evaluated over any arbitrary displacement the net energy change is merely the product of the system mass by the difference in potential of the endpoints. This is just an awkward way of stating the familiar fact that a body can do work while falling through a gravitational field and must have work done to it to raise it to a higher potential. Since the net value of this integral is zero when evaluated around any closed contour it may be seen that only falling systems can do work and a cyclic stationary system cannot be an energy source.

The preceding is valid within its limitations but applies only to conservative static fields. As soon as the possibility of a time dependent field potential is admitted, the value of a closed contour integral is no longer zero and it may be seen that a cyclical system may indeed deliver useful energy provided only that it operates at an appropriate frequency and in correct phase relationship with

the field variations. It may be objected that this is of only academic interest due to the fact that we apparently live in a static gravitational field and even if it were time dependent we should have no way of maintaining our system in the proper time relationship to provide power output. It is the purpose of the remainder of this paper to demonstrate that neither of these objections is valid and that we can indeed derive work from gravity.

First of all, although there is a large static component of gravitational force present everywhere on the surface of the earth, it appears that there are also significant varying components which can provide the energy we are seeking. Of course, everyone is familiar with the slow variations due to the position of the moon, which give rise to tidal action; in fact the various tidal electric power projects are a specific example of one means of exploiting this time variation of gravity. Note that the tidal water rises during the period of low net gravity and falls during the period of greater gravitational potential, thus resulting in a net power output. While this is indeed an example of how to derive power from gravity it is an old familiar method, just as is any other hydro-power scheme, and not really in the spirit of this essay; it is presented herein only to be illustrative and introductory to what is to follow.

It is here proposed that there are significant fluctuations of gravity over a wide spectrum of frequencies, ranging from the ultra low frequencies due to astronomical bodies to the very high radio frequencies whose source is not yet clearly determined. There has been much written on the subject of the velocity of propogation of gravity waves but as yet there has not been any significant determination

made of this velocity. In the days before relativity theory had been enunciated, it was generally believed that the propagation of gravity effects was instantaneous. Later, as the concept of simultaneity at distant points became better understood it was assumed, for no apparent reason, that gravity phenomena propagated at the same velocity as light. It appears that a more reasonable estimate of the velocity of gravity propogation may be 2,000 kilometers per second or two-thirds of one percent of the velocity of light. This value is based on the velocity of the "mysterious emanation" from the sun which correlates terrestrial magnetic storms with sun spots and solar flares which precede the storms by approximately twenty-four hours. No satisfactory theory has yet been advanced to explain the nature of this emanation. There are good reasons for believing that it cannot be either particles nor electro-magnetic radiation. It does however appear possible that it may be a high frequency gravitational perturbation due to the violent mass motions accompanying the solar flare. Upon reaching the earth, these gravity fluctuations act upon the mass of charged particles, accelerating the particles and thereby giving rise to the apparent electro-magnetic nature of these storms.

Since most of the instruments employed in the measurement of gravitational intensity are devices of long time constant in order to obtain accuracy, it is usually only possible to observe the average potential over a long time and the high frequency fluctuations go unnoticed. If however, one should construct a device in which charged particles are suspended between electrical conductors, as in the famous Millikan oil-drop experiment, a rapid variation in the gravity field will cause the particles to accelerate first toward one electrode and then toward the other. The effect of this oscillating

charge will be to induce a current flow in an external circuit, thus providing us with a gravity-operated alternating current generator. It also seems probable, with the rapid advance in the understanding of solid state and semi-conductor devices, that there may evolve much more efficient structures than the one described for generating electrical energy from gravity fluctuations. In fact it is not unreasonable to assume that similar high frequency gravity fluctuations are the actual cause of Brownian movement and "thermal" noise in electrical circuits.

If it seems strange to think of the direct interaction of gravity forces with atomic sized particles, one need only recall the Tolman-Stewart experiment in which a potential was developed between the center and periphery of a spinning copper disk due to the action of the centrifugal force (which is indistinguishable from a gravity force) on the electrons of the disk. There should also be many non-electrical methods for deriving direct mechanical energy from these fluctuations, depending upon their amplitude and frequency.

In conclusion it appears that although energy cannot be continuously derived from a static field, we do in fact live in a time-varying gravitational field and can make use of this variation to do work. Further, due to the relatively low speed of propogation of gravity fields it is possible to obtain advance information as to the nature of imminent fluctuations and so arrange our apparatus as to take maximum advantage of them.