

PREFACE

INTRODUCTION

It is now possible to deflect gravitational action away from an object so that the object is partially levitated. That effect makes it possible to extract energy from the gravitational field without requiring fuel, which makes the generation of *gravito-electric* power technologically feasible.

Such plants would be similar to hydro-electric plants and would have their advantages of not needing fuel and not polluting the environment. However, gravito-electric plants could be much smaller than hydro-electric plants; their location would not be restricted to suitable water elevations, and the plants and their produced energy would be much less expensive.

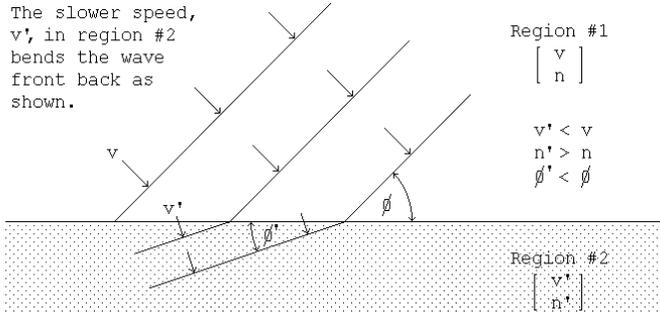
Further, the action of deflection of gravitation results in a reaction on the deflecting mechanism, a reaction that results in the deflecting mechanism being accelerated in direction away from the source of the original un-deflected gravitation and in proportion to the amount of deflection

That effect makes a *gravitational deflection spacecraft* drive and a similar *drive for planet surface flying vehicles* technologically feasible. Such drives would require no fuel, the energy coming from the gravitational field. In addition, because the effect is one of delivering acceleration, not force as in the case of rockets and aircraft, the spacecraft and vehicles can be as large as needed

SUMMARY DEVELOPMENT

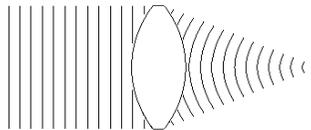
Light normally travels in a straight direction. But, when some effect slows a portion of the light wave front the direction of the light

is deflected. In the figure below, the shaded area propagates the arriving light at a slower velocity, v' , than the original velocity, v , [its index of refraction, n' , is greater] so that the direction of the wave front is deflected from its original direction.



*Deflection of Light's Direction
 by Slowing of Part of Its Wave Front*

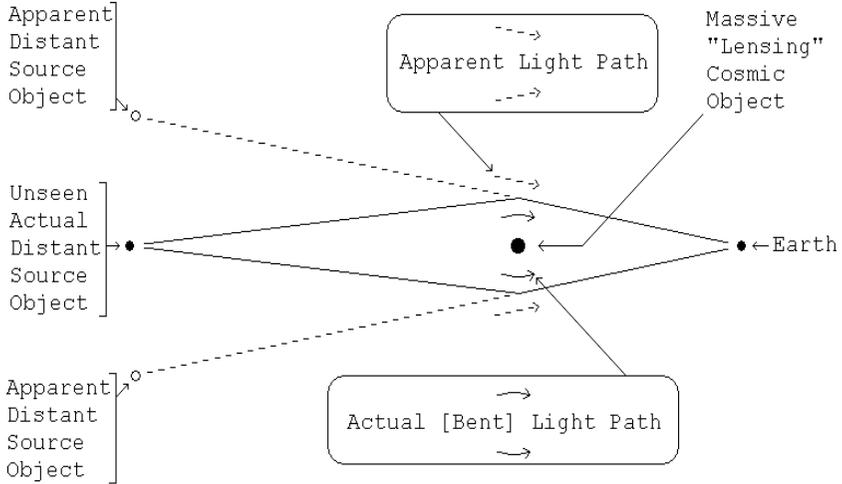
A slowing of part of its wave front is the mechanism of all bending or deflecting of light. In an optical lens, shown below, light propagates more slowly in the lens material than when outside the lens. The amount of slowing in different parts of the lens is set by the thickness of the lens at each part. In the figure the light passing through the center of the lens is slowed more than that passing near the edges of the lens. The result is the curving of the light wave front.



The Bending of Light's Wave Front by an Optical Lens

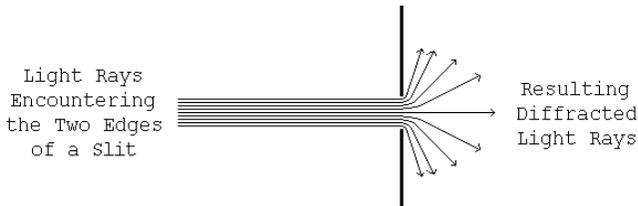
“Gravitational lensing”, shown on the following page, is an astronomically observed effect in which light from a cosmic object too far distant to be directly observed from Earth becomes observable because a large cosmic mass [the “lens”], located between Earth observers and that distant object, deflects the light from the distant

object as if focusing it, somewhat concentrating its light toward Earth enough for it to be observed from Earth. The light rays are so bent because the lensing object slows more the portion of the wave front that is nearer to it than it slows the farther away portion of the wave front.



Gravitational Lensing Bending of Light Rays

The same effect occurs on a much smaller scale in the diffraction of light at the two edges of a slit cut in a flat thin piece of opaque material as shown below. The bending is greater near the edges of the slit because the slowing is greater there. The effect of the denser material in which the slit is cut slows the portion of the wave front that is nearer to it more than the portion of the wave front in the middle.



Diffraction at a Slit Causing Bending of Light Rays

In both of these cases, gravitational lensing and slit diffraction, the direction of the wave front is changed because part of the wave front is slowed relative to the rest of it. In the case of gravitational lensing the part of the wave front nearer to the “massive lensing cosmic object” is slowed more. In the case of diffraction at a slit the part of the wave front nearer to the solid, opaque material in which the slit is cut is slowed more.

But, neither of the cases, gravitational lensing and slit diffraction, involves the wave front passing from traveling through one substance to another as in the original illustration, above. The wave front in the gravitational lensing case is traveling only through cosmic space. The wave front in the slit diffraction case is traveling only through air. There is no substance change to produce the slowing. What is it that slows part of the wave front thus producing the deflection ?

In the case of gravitational lensing the answer is that the effect is caused by gravitation. There is no other physical effect available. But how does gravitation produce slowing of part of the incoming wave front so as to deflect it ? Gravitation, at least as it is generally known and experienced, causes acceleration, not slowing.

Field: *Electro-Magnetic (Light) and Gravitational (Gravity)*

- Light

Given two particles [e.g. electrons or protons] that have electric charges, the particles being separated and with the usual electric [Coulomb] force between them, if one of the charged particles is moved the change can produce no effect on the other charge until a time equal to the distance between them divided by the speed of light, c , has elapsed.

For that time delay to happen there must be something flowing from one charge to the other at speed c [a fundamental constant of the universe] and each charge must be the source of such a flow.

That electric effect is radially outward from each charge,

therefore every charge must be propagating such a flow radially outward in all directions from itself, which flow must be the "electric field".

When such a charge moves with varying speed it propagates a pattern called electromagnetic field outward into space. Light is that pattern, that field traveling in space. Since light's source is a charged particle that, whether the particle is moving or not, is continuously emitting its radially outward flow that carries the affect of its charge, then light's electromagnetic field is a pattern of variations in that flow due to the charge's varying speed.

- Gravity

Given two masses, i.e. particles [e.g. electrons or protons] that have mass, being separated and with the usual gravitational force [attraction] between them, if one of the masses is moved the change can produce no effect on the other mass until a time equal to the distance between them divided by the speed of light, c , has elapsed.

For that time delay to happen there must be something flowing from one mass to the other at speed c and each particle, each mass must be the source of such a flow.

That gravitational effect is radially outward from each mass, therefore every mass must be propagating such a flow radially outward in all directions from itself, which flow must be the "gravitational field".

- That Flow

We therefore find that the fundamental particles of atoms, which have electric charge and gravitational mass must have something flowing outward continuously from them and:

· Either the particles each have two separate outward flows, one for electric and electro-magnetic field and another for gravitation,

or

· They each have one common universal outward flow that acts to produce all of the effects: electric field, electromagnetic field [light] and gravitational field [gravity].

There is clearly no contest between the alternatives. It would be absurd for there to be two separate, but simultaneous, independent outward flows, for the two different purposes. And, the single universal outward flow from atoms means that gravitational field can have an affect on light, on electro-magnetic field because they both are the same medium – the universal outward flow.

Gravitational Slowing / Deflection of Light

Because that universal outward flow originates at each particle and flows radially outward in all directions its density or concentration decreases inversely as the square of distance from the source of the flow. At a large distance from the source the wave front of a very small portion of the total spherical outward flow is essentially flat – a “plane flow”.

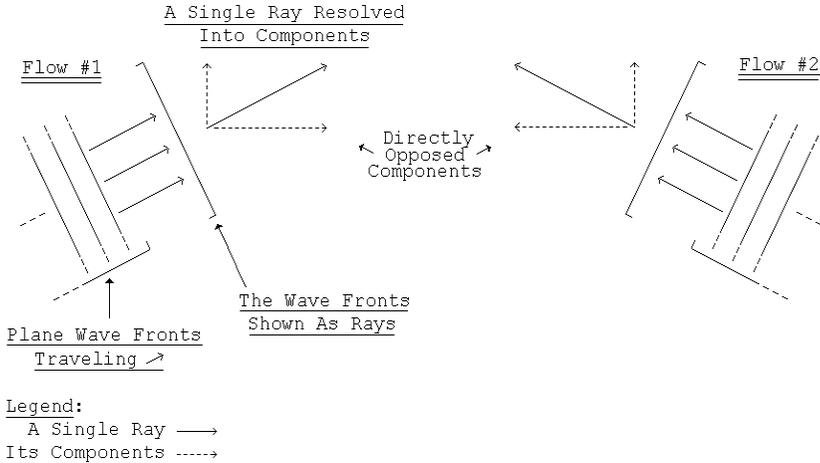
Two such universal flows directly encountering each other “head on” [flowing exactly toward each other] interfere with the other, that is each slows the flow of the other. The effect is proportional to the density or concentration of each flow.

When two such flows encounter each other but not directly “head on” then each flow can be analyzed into two components: one directly opposed to the other’s flow and one at right angles to that direction per the figure on the following page.

Picturing Flow #1 of that figure as that from a “lensing” gravitational mass and Flow #2 as that of the light from a distant object, then the figure depicts how the flow of the “lens” slows part of the wave front of the flow of the propagating light. The slowing is greater for rays of light that pass close to the lens and is less for those farther out. Thus the wave front of the light is deflected, bent by the “lens”.

That same effect, on a vastly reduced scale, produces the deflection, the bending of the light direction that is seen in slit

diffraction. In the diffraction effect the role of the “massive lensing cosmic object” is performed by the individual atoms making up the opaque thin material in which the slit is cut.



The Encounter of Two Flows

Thus gravitation produces deflection of the flow that carries light. That flow is identical to the flow that carries gravitation. Thus the gravitational flow from one mass can produce deflection of the gravitational flow from another mass.

Therefore, a properly configured material structure can deflect gravitation away from its natural action, reducing the natural gravitation effect on objects above the deflecting structure.

Gravitation Deflector Design

The task, then, is to more thoroughly analyze, develop, and quantify this effect so that practical implementation can be designed.

That is the role of the remainder of this analysis as developed in the following sections.

A result is that the desired effect, deflection of gravitation, can be produced by using the structure of a cubic crystal such as those

from which slices or wafers are cut for the making of electronic “chips”.

The deflection of gravitation makes possible *gravito-electric power generation*, analogous to hydro-electric power generation, but with the advantages of:

- non-need of fuel and non-pollution of the environment;
- the location being anywhere, not restricted to suitable water elevations;
- the plants and produced energy much less expensive;
- and the problem of global warming resolved.

[Patent Pending (*P*), February 27, 2008, USPTO #12072302.]

Further, the action of deflection of gravitation results in a reaction on the deflecting mechanism, a reaction that results in the deflecting mechanism being accelerated in direction away from the source of the original un-deflected gravitation and in proportion to the amount of deflection

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[Patent Pending (*P*), January 13, 2011, USPTO #13/199,867.]