

PREFACE – SUMMARY DEVELOPMENT

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, which makes the generation of *gravito-electric* power technologically feasible.

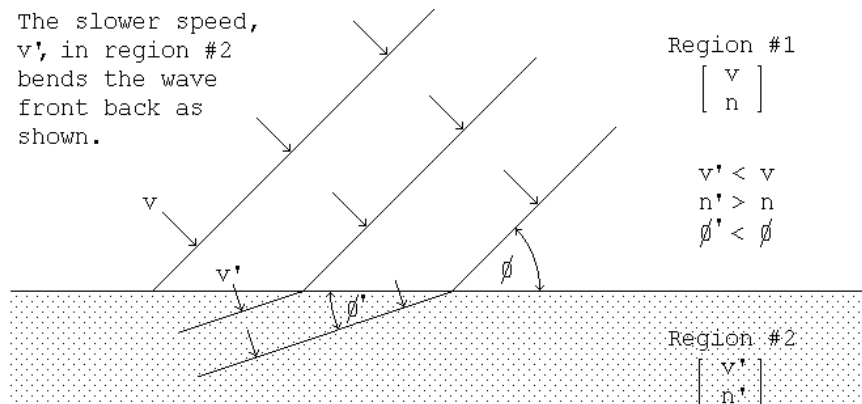
Such plants would be similar to hydro-electric plants and would have their advantages of not needing fuel and not polluting the environment. However, gravito-electric plants, while large, could also be much smaller; their location would not be restricted to suitable water elevations, and the plants and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

With suitable design such plants could power all-electric: ships, aircraft, and land vehicles. Gravito-electric power can be made available now and would essentially solve the problems: global warming to the extent it is caused by fossil fuel use; limited, expensive, and rapidly exhausting fossil fuels sources; and the dangers and hazards of nuclear power plants.

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

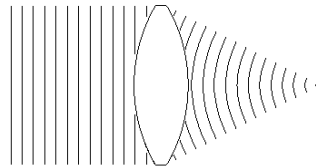
SUMMARY DEVELOPMENT

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.



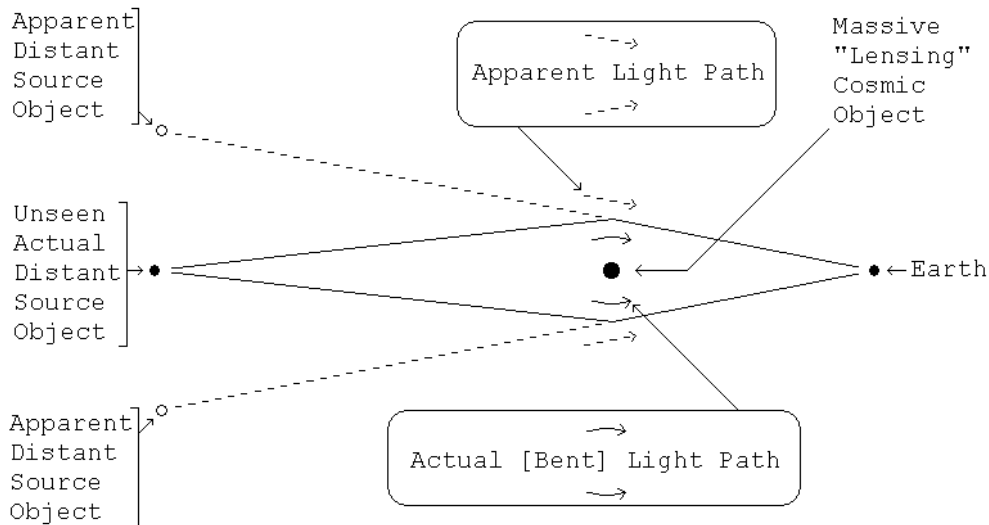
*Deflection of Light's Direction
by Slowing of Part of Its Wave Front*

A slowing of part of its wave front is the mechanism of all bending or deflecting of light. In an optical lens, as in the figure below, light propagates more slowly in the lens material than outside the lens. The amount of slowing in different parts of the lens depends on 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.



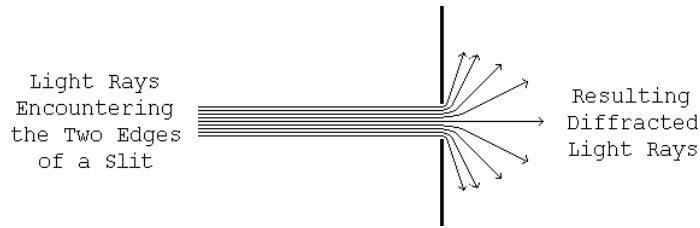
The Bending of Light's Wave Front by an Optical Lens

“Gravitational lensing”, shown below, 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 on the following page. 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 of the slit.



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, of matter, which have both 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 the effects of electric charge and another for gravitation, or
- They each have one common universal outward flow that acts to produce all of the effects: electric and 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, carrying both the electric and electromagnetic field and the gravitational field, 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 each 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

While at rest at height h [as on a shelf] the total mass of the object is the same as its rest mass. The object has no actual “potential energy”. It is merely in a situation where it could acquire energy, acquire it by falling in the gravitational field. Falling, the mass of the object increases as its velocity increases, reflecting its gradually acquired kinetic energy.

Since, until it falls, the object does not have the energy that it will acquire when it falls in the gravitational field the energy that it acquires must come from the gravitational field.

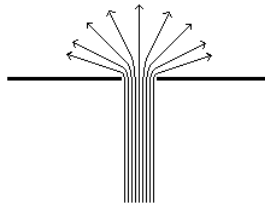
The energy of gravitational field appears in and is the flow radially outward from gravitational mass. That flow creates potential energy, creates the situation where kinetic energy could be acquired, at any gravitational mass that it encounters. It does so continuously, regardless of the number or amount of masses encountered and regardless of their distance from the source of the flow, only varying with the amount of the flow [which varies with the magnitude of the source mass and varies inversely as the square of the distance from it]. Thus the flow is a flow of the potential for energy, realized at any encounter with another gravitational mass in an amount proportional to the amount of flow doing the encountering.

But, for the flow to be a movement of something away from the source mass, the source mass must be a supply, a reservoir, of what is flowing so as to supply the flow. That is the case, and the original supply of the flow, of gravitational potential energy, came into existence at the “Big Bang” beginning of the universe.

If that immense reservoir of energy could be tapped by tapping some of its appearance in its outward flow, which is the gravitational field, it could supply all of civilization’s energy needs cheaply, cleanly, and permanently without [for practical human / Earth purposes] being used up.

It can be so tapped by deflecting part of a small local region’s gravitation so as to produce an imbalance in a rotary device above it [analogously to a water wheel], which device is connected to and drives an electric generator. The figure below [the slit diffraction figure from above but now rotated 90°] illustrates such deflection using a single slit. Multiple such slits parallel to each other would spread the deflection left and right in the figure. Additional multiple such slits at right angles to the first ones would spread the deflection over a significant area.

Resulting Deflected Rays of
Flow of Light / Gravitation



Rays of Flow of Light / Gravitation
Encountering the two Edges of a Slit

Basic Element of a Gravitational Deflector

The edges of the slit in the above figure are actually rows of atoms. A cubic crystal, such as of Silicon, consists of such rows of atoms, multiple rows and rows at right angles, all equally spaced – a naturally occurring configuration of the set of slits required for deflection of gravitation.

The concept is analogous to hydro-electric power generation, but instead of needing the Sun to provide an elevated supply of water falling in the gravitational field this gravito-electric power directly taps the energy supply of the flowing gravitational field.

Since the original “Big Bang” the outward flow has been very gradually depleting the original supply. That process, an original quantity gradually depleted by flow away of some of the original quantity is an exponential decay process and the rate of the decay is governed by its time constant. In the case of the overall universal decay, appearing among other places in the outward flow from every gravitating mass, the time constant is about $\tau = 3.57532 \cdot 10^{17} \text{ sec}$ ($\approx 11.3373 \cdot 10^9 \text{ years}$).

See the references, below, for the detailed development of mass, field, gravitation, the flow, the exponential decay and the time constant.

Gravitation Deflector Design

The task, then, is to more thoroughly analyze, develop, and quantify this deflection-of-gravitation effect so that practical implementation can be designed. That is the role of the book

Gravitics – The Physics of the Behavior and Control of Gravitation²

per the reference below.

References

- [1] R. Ellman, *The Origin and Its Meaning*, The-Origin Foundation, Inc., <http://www.The-Origin.org>, 1996.
- [2] R. Ellman, *Gravitics – The Physics of the Behavior and Control of Gravitation*, The-Origin Foundation, Inc. <http://www.The-Origin.org>, 2008.