Gravitational Shockwave Weapons

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Detonation velocities, greater than that generated by high explosives (~10^4m/s), can be achieved by using the gravitational technology recently discovered. This possibility leads to the conception of powerful shockwave weapons. Here, we show the design of a portable gravitational shockwave weapon, which can produce detonation velocities greater than 10^5m/s, and detonation pressures greater than 10^{10}N/m^2 .

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1. Introduction

The most important single property of an explosive is the *detonation velocity*. It is the speed at which the detonation wave travels through the explosive. Typical detonation velocities in solid explosives often range beyond 3,000 m/s to 10,300 m/s [1].

At the front of the detonation zone, an energy pulse or "shockwave" is generated and transmitted to the adjacent region. The shockwave travels outward as a compression wave, moving at or near detonation velocity. When the intensity of the shockwave exceeds the compression strength of the materials they are destroyed. If the mass of the body is too large the wave energy is simply absorbed by the body [2].

The pressure produced in the explosion zone is called *Detonation Pressure*. It expresses the intensity of the generated shockwave. A high detonation pressure is necessary when blasting hard, dense bodies. Detonation pressures of high explosives are in the range from 10^6N/m^2 to over 10^7 N/m^2 [3].

Here, we show the design of a portable shockwave weapon, which uses the *Gravitational Shielding Effect* (BR Patent Number: PI0805046-5, July 31, 2008) *in order to produce detonations velocities greater than 100,000m/s*, and detonation pressures greater than 10^{10}N/m^2. It is important to remember that an aluminum-nitrate truck bomb has a relatively low detonation velocity of 3,500 m/s (sound speed is 343.2m/s)*. High explosives such as TNT has a detonation velocity of 6,900m/s; Military explosives used to destroy strong concrete and steel structures have a detonation velocity of 7,000 to 8,000 m/s [3].

2. Theory

The contemporary greatest challenge of the Theoretical Physics was to prove that, Gravity is a *quantum* phenomenon. The quantization of gravity showed that the *gravitational mass* m_g and *inertial mass* m_i are correlated by means of the following factor [4]:

$$\chi = \frac{m_g}{m_{i0}} = \left\{ 1 - 2\left[\sqrt{1 + \left(\frac{\Delta p}{m_{i0}c} \right)^2} - 1 \right] \right\} \tag{1}$$

where m_{i0} is the *rest* inertial mass of the particle and Δp is the variation in the particle's *kinetic momentum*; c is the speed of light.

When Δp is produced by the absorption of a photon with wavelength λ, it is expressed by $\Delta p = h/\lambda$. In this case, Eq. (1) becomes

$$\frac{m_g}{m_{i0}} = \left\{ 1 - 2\left[\sqrt{1 + \left(\frac{h/m_{i0}c}{\lambda} \right)^2} - 1 \right] \right\}$$

$$= \left\{ 1 - 2\left[\sqrt{1 + \left(\frac{\lambda_0}{\lambda} \right)^2} - 1 \right] \right\} \tag{2}$$

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* When a shockwave is created by high explosives it will always travel at high supersonic velocity from its point of origin.

where $\lambda_0 = h/m_{i0}c$ is the *De Broglie wavelength* for the particle with *rest* inertial mass m_{i0}.

It was shown that there is an additional effect - *Gravitational Shielding* effect - produced by a substance whose gravitational mass was reduced or made negative [5]. This effect shows that just *beyond* the substance the gravity acceleration g_1 will be reduced at the same proportion $\chi_1 = m_g/m_{i0}$, i.e., $g_1 = \chi_1 g$, (g is the gravity acceleration *before* the substance). Consequently, *after a second gravitational shielding*, the gravity will be given by $g_2 = \chi_2 g_1 = \chi_1 \chi_2 g$, where χ_2 is the value of the ratio m_g/m_{i0} for the *second* gravitational shielding. In a generalized way, we can write that after the *nth* gravitational shielding the gravity, g_n, will be given by

$$g_n = \chi_1 \chi_2 \chi_3 \dots \chi_n g \qquad (3)$$

This possibility shows that, by means of a battery of gravitational shieldings, we can make particles acquire enormous accelerations. In practice, this can lead to the conception of powerful particles accelerators, kinetic weapons or weapons of shockwaves.

From Electrodynamics we know that when an electromagnetic wave with frequency f and velocity c incides on a material with relative permittivity ε_r, relative magnetic permeability μ_r and electrical conductivity σ, its *velocity is reduced* to $v = c/n_r$ where n_r is the index of refraction of the material, given by [6]

$$n_r = \frac{c}{v} = \sqrt{\frac{\varepsilon_r \mu_r}{2}\left(\sqrt{1 + (\sigma/\omega\varepsilon)^2} + 1\right)} \qquad (4)$$

If $\sigma >> \omega\varepsilon$, $\omega = 2\pi f$, Eq. (4) reduces to

$$n_r = \sqrt{\frac{\mu_r \sigma}{4\pi\varepsilon_0 f}} \qquad (5)$$

Thus, the wavelength of the incident radiation (See Fig. 1) becomes

$$\lambda_{\text{mod}} = \frac{v}{f} = \frac{c/f}{n_r} = \frac{\lambda}{n_r} = \sqrt{\frac{4\pi}{\mu f \sigma}} \qquad (6)$$

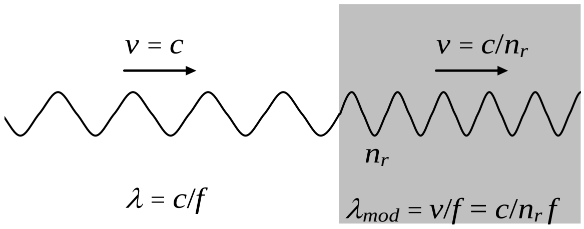

Fig. 1 – *Modified Electromagnetic Wave.* The wavelength of the electromagnetic wave can be strongly reduced, but its frequency remains the same.

If a lamina with thickness equal to ξ contains n molecules/m^3, then the number of molecules per area unit is $n\xi$. Thus, if the electromagnetic radiation with frequency f incides on an area S of the lamina it reaches $nS\xi$ molecules. If it incides on the *total area of the lamina*, S_f, then the total number of molecules reached by the radiation is $N = nS_f\xi$. The number of molecules per unit of volume, n, is given by

$$n = \frac{N_0 \rho}{A} \qquad (7)$$

where $N_0 = 6.02 \times 10^{26}\, molecules/kmole$ is the Avogadro's number; ρ is the matter density of the lamina (in *kg/m^3*) and A is the molar mass.

When an electromagnetic wave incides on the lamina, it strikes on N_f front molecules, where $N_f \cong (n S_f)\phi_m$, ϕ_m is the "diameter" of the molecule. Thus, the electromagnetic wave incides effectively on an area $S = N_f S_m$, where $S_m = \frac{1}{4}\pi\phi_m^2$ is the cross section area of one molecule. After these collisions, it carries out $n_{collisions}$ with the other molecules (See Fig.2).

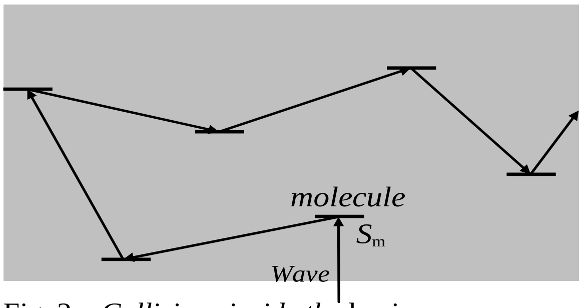

Fig. 2 – *Collisions inside the* lamina.

Thus, the total number of collisions in the volume $S\xi$ is

$$N_{collisions} = N_f + n_{collisions} = n S\phi_m + \left(n S\xi - n_m S\phi_m\right) = \\ = n_m S\xi \qquad (8)$$

The power density, D, of the radiation on the lamina can be expressed by

$$D = \frac{P}{S} = \frac{P}{N_f S_m} \qquad (9)$$

We can express the *total mean number of collisions in each molecule*, n_1, by means of the following equation

$$n_1 = \frac{n_{total\ \ photons} N_{collisions}}{N} \qquad (10)$$

Since in each collision a *momentum* h/λ is transferred to the molecule, then the *total momentum* transferred to the lamina will be $\Delta p = \left(n_1 N\right) h/\lambda$. Therefore, in accordance with Eq. (1), we can write that

$$\frac{m_{g(l)}}{m_{i0(l)}} = \left\{1 - 2\left[\sqrt{1 + \left[\left(n_1 N\right)\frac{\lambda_0}{\lambda}\right]^2} - 1\right]\right\} = \\ = \left\{1 - 2\left[\sqrt{1 + \left[n_{total\ photons} N_{collisions} \frac{\lambda_0}{\lambda}\right]^2} - 1\right]\right\} \qquad (11)$$

Since Eq. (8) gives $N_{collisions} = n\ S\xi$, we get

$$n_{total\ \ photons} N_{collisions} = \left(\frac{P}{hf^2}\right)\left(n\ S\xi\right) \qquad (12)$$

Substitution of Eq. (12) into Eq. (11) yields

$$\frac{m_{g(l)}}{m_{i0(l)}} = \left\{1 - 2\left[\sqrt{1 + \left[\left(\frac{P}{hf^2}\right)\left(n\ S\xi\right)\frac{\lambda_0}{\lambda}\right]^2} - 1\right]\right\} \qquad (13)$$

Substitution of P given by Eq. (9) into Eq. (13) gives

$$\frac{m_{g(l)}}{m_{i0(l)}} = \left\{1 - 2\left[\sqrt{1 + \left[\left(\frac{N_f S_m D}{f^2}\right)\left(\frac{n\ S\xi}{m_{i0(l)} c}\right)\frac{1}{\lambda}\right]^2} - 1\right]\right\} \qquad (14)$$

Substitution of $N_f \cong \left(n\ S_f\right)\phi_m$ and $S = N_f S_m$ into Eq. (14) results

$$\frac{m_{g(l)}}{m_{i0(l)}} = \left\{1 - 2\left[\sqrt{1 + \left[\left(\frac{n^3 S_f^2 S_m^2 \phi_m^2 \xi D}{m_{i0(l)} c f^2}\right)\frac{1}{\lambda}\right]^2} - 1\right]\right\} \qquad (15)$$

where $m_{i0(l)} = \rho_{(l)} V_{(l)}$.

Now, considering that the lamina is inside a ELF electromagnetic field with E and B, then we can write that [7]

$$D = \frac{n_{r(l)} E^2}{2\mu_0 c} \qquad (16)$$

Substitution of Eq. (16) into Eq. (15) gives

$$\frac{m_{g(l)}}{m_{i0(l)}} = \left\{1 - 2\left[\sqrt{1 + \left[\left(\frac{n_{r(l)} n^3 S_f^2 S_m^2 \phi_m^2 \xi E^2}{2\mu_0 m_{i0(l)} c^2 f^2}\right)\frac{1}{\lambda}\right]^2} - 1\right]\right\} \qquad (17)$$

Now assuming that the lamina is a *cylindrical air lamina* (diameter = α ; thickness = ξ) where $n_{r(l)} \cong 1$; $n = N_0 \rho_{(l)} / A = 2.6 \times 10^{25}\ molecules\ / m^3$;

$\phi_m = 1.55\times 10^{-10} m; S_m = \pi\phi_m^2/4 = 1.88\times 10^{-20} m^2$, then, Eq. (17) reduces to

$$\frac{m_{g(l)}}{m_{i0(l)}} = \left\{1-2\left[\sqrt{1+\left[6.6\times 10^5\left(\frac{S_f^2\xi}{m_{i0(l)}f^2}\right)\frac{E^2}{\lambda}\right]^2}-1\right]\right\} \quad (18)$$

An *atomized water spray* is created by forcing the water through an orifice. The energy required to overcome the pressure drop is supplied by the *spraying pressure* at each detonation. Spraying pressure depends on feed characteristics and desired *particle size*. If *atomizing water* is injected into the air lamina, then the area S_f to be considered is the *surface area* of the *atomizing water*, which can be obtained by multiplying the *specific surface area*(SSA) *of the atomizing water* (which is given by $SSA = A/\rho_w V = 3/\rho_w r_d$) *by the total mass of the atomizing water* ($m_{i0(w)} = \rho_w V_{water\ droplets} N_d$). Assuming that the *atomizing water* is composed of monodisperse particles with $10\mu m$ radius $\left(r_d = 1\times 10^{-5} m\right)$, and that the *atomizing water* has $N_p \approx 10^8 droplets/m^3$ [8] then we obtain $SSA = 3/\rho_w r_d = 300 m^2/kg$ and $m_{i0(w)} = \rho_w V_{water\ droplets} N_d \approx 10^{-5} kg$. Thus, we get

$$S_f = (SSA) m_{i0(w)} \approx 10^{-3} m^2 \quad (18)$$

Substitution of $S_f \approx 10^{-3} m^2$ and $m_{i0(l)} = \rho_{air} S_\alpha \xi = 1.2 S_\alpha \xi$ into Eq. (18) gives

$$\frac{m_{g(l)}}{m_{i0(l)}} = \left\{1-2\left[\sqrt{1+\sim\frac{E^4}{S_\alpha^2 f^4 \lambda^2}}-1\right]\right\} \quad (19)$$

The injection of atomized water increases the electrical conductivity of the mean, making it greater than the conductivity of water $(\sigma >> 0.005 S/m)$. Under these conditions, the value of λ, given by Eq. (6), becomes

$$\lambda = \lambda_{mod} = \sqrt{\frac{4\pi}{\mu_0 f \sigma}} \quad (20)$$

where f is the frequency of the ELF electromagnetic field.

Substitution of Eq. (20) into Eq. (19) yields

$$\chi = \frac{m_{g(l)}}{m_{i0(l)}} = \left\{1-2\left[\sqrt{1+\sim 10^{-7}\frac{\sigma E^4}{S_\alpha^2 f^3}}-1\right]\right\} \quad (21)$$

Note that $E = E_m \sin\omega t$. The average value for E^2 is equal to $\frac{1}{2}E_m^2$ because E varies sinusoidaly (E_m is the maximum value for E). On the other hand, $E_{rms} = E_m/\sqrt{2}$. Consequently we can change E^4 by E_{rms}^4, and the equation above can be rewritten as follows

$$\chi = \frac{m_{g(l)}}{m_{i0(l)}} = \left\{1-2\left[\sqrt{1+\sim 10^{-7}\frac{\sigma E_{rms}^4}{S_\alpha^2 f^3}}-1\right]\right\} \quad (22)$$

Now consider the weapon showed in Fig. 3 $(\alpha = 12.7mm)$. When an ELF electromagnetic field with frequency $f = 10Hz$ is activated, an electric field E_{rms} passes through the 7 cylindrical air laminas. Then, according to Eq. (22) the value of χ (for $\sigma >> 0.005 S/m$) at each lamina is

$$\chi >> \left\{1-2\left[\sqrt{1+\sim 10^{-9} E_{rms}^4}-1\right]\right\} \quad (23)$$

For example, if $E_{rms} \cong 10^4 V/m$ we get

$$\chi >> -10^3 \quad (24)$$

Therefore, according to Eq. (3) the gravitational acceleration produced by the gravitational mass $M_g = 4.23kg$, just after the 7th cylindrical air lamina $(r_7 = 150mm)$, will be given by

$$g_7 = \chi^7 g = -\chi^7 \frac{GM_g}{r_7^2} >> +10^{13} m/s^2 \qquad (25)$$

This is the acceleration acquired by the air molecules that are just after the 7th cylindrical air lamina. Obviously, this produces enormous pressure in the air after the 7th cylindrical air lamina, in a similar way that pressure produced by a detonation. The detonation velocity after the 7th cylindrical air lamina is

$$v_d = \sqrt{2g_7(\Delta r)} >> 10^5 m/s \qquad (26)$$

Consequently, the detonation pressure is

$$p = 2\rho_{air} v_d^2 >> 10^{10} N/m^2 \qquad (27)$$

These values show how powerful can be the gravitational shockwaves weapons. The maxima resistance of the most resistant steels is of the order of 10^{11}N/m^2 (*Graphene* ~10^{12}N/m^2). Since the gravitational shockwave weapons can be designed to produce detonation pressures of these magnitudes, we can conclude that it can destroy anything.

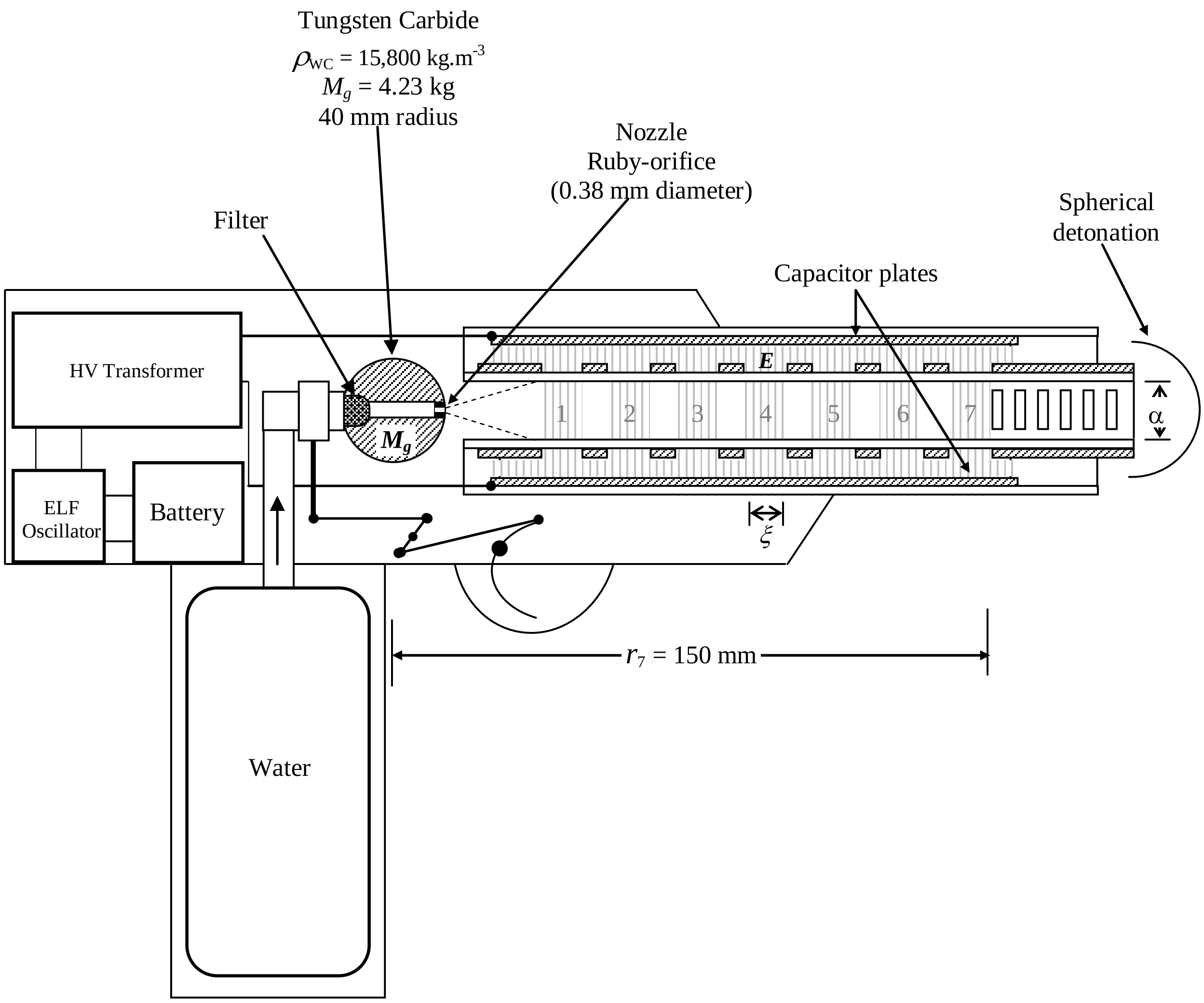

Fig. 3 – *Portable Weapon of Gravitational Shockwaves*

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