The Generation of Gamma Ray Bursts by the Intermodulation of Static Magnetic Fields

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Abstract: It is shown that by introducing two static magnetic fields into the same iron core which drives the core into its saturation region, that the non-linear response of the core inter-modulates the magnetic fields and produces gamma rays. This is consistent with the Wave Structure of Matter model which shows that a static magnetic field is a free-space wave with a Compton wavelength equal to that of the electron. The intermodulation of these free-space waves produces sum and difference products, generating gamma rays in the energy range that is measurable by a common Geiger counter.

Keywords: Maxwell's equations, magnetic fields, Wave Structure of Matter

I. Introduction

The concept of magnetic monopoles has intrigued physicists ever since the development of Maxwell's equations. Gauss' law for magnetic fields clearly shows from the divergence of the magnetic field that there is symmetry and therefore there should be no magnetic monopoles. But what if there existed magnetic monopoles in pairs up until a certain energy that breaks this symmetry? To date, there are no indications from the LHC or other high-energy experiments that the symmetry of the magnetic field is broken at any energy. Therefore we are left to conclude that magnetic monopoles do not exist. This is still not much of a satisfying answer and we endeavor in this paper to show experimentally what has been suggested in previous papers, that the magnetic field is really the Doppler-shifted wave-structure of the electron, with the compressed wave in front of the moving wave structure and the rarefied wave behind the movement of the wave structure [1][2][3].

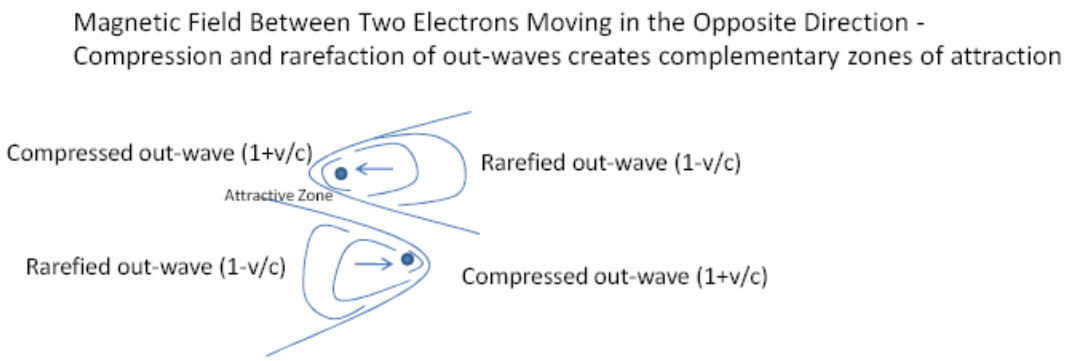

Figure 1. Magnetic Field Model Based On Doppler-Shifted Standing Waves

From this model in Figure 1, it is easy to see that the compressed and rarefied waves must always exist together and therefore there would never be a magnetic monopole. It can be seen that if the waves from these two poles are modulated together, the traditional sum and difference products will occur:

$B_1 = A_1 Sin(f_1 t)$ where $f_1 = f_0(1+ v/c)$, f_0 = Compton frequency of electron

$B_2 = A_2 Sin(f_2 t)$ where $f_2 = f_0(1- v/c)$, f_0 = Compton frequency of electron

Intermodulation Product = $B_1 \times B_2 = 0.5A_1A_2[Sin[(\mathbf{f_2 + f_1})t] + Sin[(\mathbf{f_2 - f_1})t]$

And depending upon the velocity of the electrons and the relative angle of the interacting fields, a variety of sum and difference frequencies starting from the Compton frequency of the electron can be produced.

The Fermi gamma ray telescope has provided precedence for the interaction of intense magnetic fields on the Sun producing gamma rays that are 50 GeV or higher, observed through the sunspot cycle where the gamma ray bursts follow the location of the sunspots [4][5]. It is interesting to note that the gamma ray bursts on the Sun follow the magnetic field where the surface temperature is cooler, indicating that the interaction of the fields occurs within a part of the Sun's atmosphere where intermodulation of the fields is a plausible explanation for the generation of gamma rays. The gamma rays are generated during solar minimum when the gamma ray activity would be expected to be minimal and the gamma rays follow the sun spots, ruling out cosmic showers which are homogenously distributed to the surface of the Sun. The intermodulation of the Sun's magnetic fields adds additional evidence to the results of the experiments in this paper.

To verify the existence of these high-frequency space waves, an experiment was designed to inter-modulate them in order to produce photons, the observable evidence of free-space waves. By introducing two strong magnetic fields into a small iron core, the saturation region of the core is quickly reached and the wave-structure of the fields inter-modulate, producing sum and difference frequencies of the Compton wavelength of the electron that are in the wavelength range of gamma rays. The rarefied wave of one magnetic field inter-modulates with the rarefied wave of the other magnetic field to produce a sum frequency that is twice the frequency (half the wavelength) of the Compton wavelength of the electron, or $1.21315511835 \times 10^{-12}$ m.

II. Experimental Setup

The experimental setup consists of two sets of 3 stacked, 1/2 x 1/4 Inch Neodymium Rare Earth Disc Magnets N48. Each magnet is rated at 5020 Gauss with the following specifications [6]:

Size: 0.5 x 0.25 in (Diameter x Thickness)
Metric Size: 12.7 x 6.35 mm
Grade: N48
Pull Force: 12.43 lb
Coating: Nickel-Copper-Nickel (Ni-Cu-Ni)
Magnetization: Axially
Material: Neodymium (NdFeB)
Tolerance: +/- 0.004 in
Max Operating Temperature: 176 F
Surface Field: 5,020 Gauss

The magnets are initially stacked with 3 in a set and two sets are used to create two distinct magnetic fields that saturate the iron core of an audio transformer. The audio transformer is an 8 Ohm primary to 1000 Ohm secondary with an iron core laminate that brackets the windings. An equivalent part number is Xicon 42TL013-RC.

The Geiger counter used for the experiment is a Radex RD1503 with its scale set to 120 microREMs/hour. All measurements are made after 2 minutes of averaging after the start of an event (when the magnets are placed on the iron core).

III. Procedure

The Geiger counter is placed on a white piece of cardboard with the magnets and iron core removed from the environment and a background measurement is taken showing 11 microREMs/hour after 10 minutes of averaging:

The transformer core is then placed 7 inches from the Geiger counter and two sets of magnets are placed further away from the iron core (so as not to saturate

it) to demonstrate that the Geiger counter was not affected by these additions:

The two sets of three magnets are then simultaneously attached to the iron core in its position at 7 inches from the Geiger counter (the magnets are at right angles to each other to take advantage of the small portion of iron in between them which will saturate with the fields interacting in close proximity). The movement of the magnets generates the gamma rays, the sliding of one magnet along the transformer core to move it close to the magnet resting on the other side of the core provides adjustable field intensity in the core and allows for maximum generation of the signal when the non-linear part of the saturation curve is reached. The final resting position of the magnets when they are next to each other corresponds to complete saturation of the core where no dynamic response is expected:

After 3 minutes of averaging, the count rises to 19 microREMs/hour and stays there for approximately 5 minutes (measurement in August of 2018):

The counter reading then resumes to its previous background level of 11 microREMs/hour. This experiment has been repeated several times over a period of months with consistent results. The following measurements have been reported again in December of 2018 with the same results as in August (interestingly with lower magnetic fields but the same reading):

A video of the demonstration is available at this link:

https://drive.google.com/file/d/1Hzqdox9VzjxmR1uW24TZAikpoCI7ThZR/view?usp=drivesdk

The movement of the magnets towards the iron core creates a dynamic response on the portion of the hysteresis curve that is non-linear but not completely saturated. During this short time as the magnets are approaching the iron core, the field inter-modulates in the non-linear region (that is still not complete saturation). When the magnets are static in their final position, the iron core is in complete saturation and no more gamma rays are generated.

IV. Conclusions

The Wave Structure of Matter postulates that the electron is a standing wave structure and that the electrons motion Doppler shifts this wave structure which is the nature of the magnetic field and its associated polarity (as an electron moving towards an observer will generate a field that appears blue shifted and the electron moving away from an observer will generate a field that appears red-shifted). The experiment performed validates this concept by inter-modulating these fields to produce photons of the same wavelength as the wave structure (approximately the Compton wavelength of the electron within the gamma ray spectrum). The generation of gamma rays by static magnetic fields and an iron core to introduce modulation is a novel concept that may be find utilization in proximity sensing and medical imaging using collimated gamma rays.

References

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