On the Generation of High-Energy Gamma Rays Near Sunspots During the Transition from Solar Minimum to Maximum

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Abstract: It has been recently discovered by Linden and others that high-energy gamma rays (>100 GeV in some cases) are being generated from the solar disk near the location of sunspots as the solar cycle progresses from solar minimum to solar maximum, corresponding with the movement of sunspots from the equator to the poles. It is postulated that the generation of the gamma rays are due to the interaction and intermodulation of multiple magnetic fields near and under sunspots, which from the Wave Structure of Matter, will result in the conversion the static magnetic fields into high-energy gamma rays based on the moving wave structure of the electron, which in turn makes up the magnetic field.
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I. Introduction

From 2008 to 2019, researchers studying the Sun through solar minimum to maximum have found evidence 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 [1]. These high-energy gamma rays have been tracked near the sunspots as they move from the equator during solar minimum to the poles during solar maximum, strongly suggesting a relationship between their generation and the mechanisms involved in sunspot creation. As the magnetic field activity is generally stronger right below the surface of the sunspot which exists partly due to the cooling effect of the field, it would make sense that this is an area where intermodulation of the fields is a plausible explanation for the generation of gamma rays.

The concept of a wave structure of matter was originally developed by Milo Wolff to remove the confusion around wave-particle duality, with the particle side of side of experimental data being shown as a composite wave structure that mimics all particle interactions without having to explain away the messy singularity of point particles. Similar to dropping a rock into a small pond and seeing the reflected standing waves interact with the generated waves to produce a composite wave that retains the original displacement of the rock, point particles can be modeled the same way by assuming a particle's incoming wave is generated from a remote particles outgoing wave that is a result of a spin process on the same particles in-wave. Then the electron is seen as a wave structure and the magnetic field is really the Doppler-shifted wave-structure of a moving electron, based on the compressed wave in front of the moving wave structure and the rarefied wave behind the movement of the wave structure [2][3]. The wave structure of matter postulates that the in and out waves propagate proportional to $1/r$, thus the intermodulation (multiplication) of two out-waves produces a photon of $1/r^2$, which is what we observe as the inverse square law for photon radiation.

Based on the speed of the out-going wave structure of the electron, the Doppler shift is applied to the original wave frequency (the Compton frequency of mc^2/h

for a static electron wave structure) with the result being a varying frequency of the wave depending up on where this measurement is taken within the wave structure and whether it is moving towards or away from the observer (Figure 1).

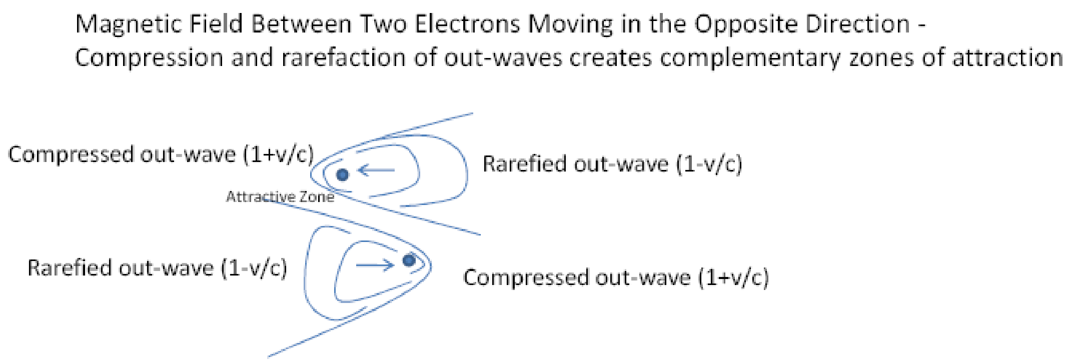

Figure 1. Magnetic Field Model Based On Doppler-Shifted Standing Waves

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:

$B_1 = A_1 \mathrm{Sin}(f_1 t)$ where $f_1 = \left(\frac{c}{c \pm v_s}\right) f_0$, f_0 = Compton frequency of electron

$B_2 = A_2 \mathrm{Sin}(f_2 t)$ where $f_2 = \left(\frac{c}{c \pm v_s}\right) f_0$, f_0 = Compton frequency of electron

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

And depending upon the velocity of the electrons, the relative angle of the interacting fields and the direction of emissions (in this case towards earth so that the sign in the denominator is negative which increases the frequency), the denominator can assume a very small value and a variety of sum and difference frequencies starting from the Compton frequency of the electron can be produced. This result is where we can infer the existence of a gap of frequency ranges as measured by the Linden's team when they examined the spectrum of the gamma ray range from the solar disk. There is a curious gap at 10^{25} Hz in the spectrum that is 1000 times higher than the Compton frequency of the electron, this could be a condition where the emission due to the interacting fields is off-axis.

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 $1.21315511835\times10^{-12}$ m.

The results show that with the movement and rotation of the magnetic fields as they approach the iron core, the intermodulation of the magnetic fields results in gamma ray generation that is 50% above background levels. 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 [4].

As the solar cycle progresses, there is a necessity in collecting as much data as possible while the high-energy gamma rays are being emitted. To facilitate a better understanding of this process, the author has encouraged plasma physicists who are currently working on Tokamak experiments to attempt to duplicate similar conditions in reactors with the goal of providing more data outside of the time frame of the solar cycle were high-energy emissions are minimal. There are opportunities for duplicating these conditions, either in Tokamak or through the experiments already performed (http://vixra.org/abs/1810.0382) that will lead to a more thorough understanding of the high-energy emission phenomena observed on the solar disk [4].

II. Conclusions

The solar gamma rays observed emanating from sunspots during the transition from solar minimum to solar maximum can be explained by the intermodulation of the magnetic fields associated with the sunspot activity. Magnetic fields are wave structures as postulated by the Wave Structure of Matter as the electron is a standing wave structure and the electron motion Doppler shifts this wave structure, which is the nature of the magnetic field and its associated polarity. An experiment has been performed which validates this concept by modulating these fields to produce gamma rays of significant energy above background levels.

References

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