

# Solar Science – A Casualty of the Nonlinear EM Frequency Scale

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**Abstract** – All solar science is based upon the premise that the activity of the Sun is not influenced by anything that is outside of the Sun. That premise is based upon the theories presented by Eddington and carried forward to the present. Eddington's knowledge about electromagnetic waves was limited to what was known about them when he developed his theories. It is now known that there are EM waves with periods that exceed one second in duration and their frequencies are being presented as 10s fractions of a second. This means our current EM frequency scale is nonlinear. An error was made some two centuries ago when the duration of the second was selected to present EM frequencies. Solar activity is being incorrectly interpreted because of the nonlinear EM frequency scale scale implies EM waves with frequencies below 1 Hz do not exist. Physical law equations that use frequency directly or indirectly, using the speed of light ( $c$ ), have a validity issue because of the frequency issue.

### Introduction

Electromagnetic (EM) geophysical studies have been using very low EM frequencies, below 1 Hz, transmitters and receivers for several decades. The devices that produce these frequencies are referred to as magnetotelluric transmitters and receivers. The frequencies for these devices are being identified by using a decimal notation, 0.1, 0.01, 0.001, 0.0001 Hz and on. Accepting frequency designations as tens divisions of one reveals that the current EM frequency scale is nonlinear.

One Hz is not the lowest frequency that an EM wave can have based upon how the EM frequency scale was originally established. Some two centuries ago, scientists defined the EM frequency scale by using the duration of the second, the shortest time duration they had instruments to measure with reasonable accuracy. They did not have the capability to determine the longest EM wave and that has consequences.

It must be noted that Arthur S. Eddington was unaware that EM waves, other than light, were traversing the universe.[1] In his 1926 publication, “The Internal Constitution of Stars“, he stated on page 291, “Suggestions have been made that the impact of meteoric matter provides the heat, or that *there is some subtle radiation traversing space* which the star picks up. Whatever the cause of the variability, whether pulsation or rotation, provided only that it is intrinsic in the star, and not forced from the outside, the density must be the leading factor in determining the period.” Contemporary solar scientists that are influenced by Eddington's teachings would not consider that external EM waves could be the cause of our Sun's variability. Eddington stated, “It is now generally agreed that the main source of a star's energy is subatomic. There appears to be no escape from this conclusion; but since the hypothesis presents many difficulties when we study the details it is incumbent on us to examine carefully all alternatives.” Solar scientists do not consider that external EM waves could be transferring their energy to the magnetic field of a star. Earth scientists do not recognize that an external EM wave could be influencing the magnetic field of the Earth.

### Magnetic Field Anomaly

The Earth's magnetic field experienced a strange anomaly on 25 June 2020. [1] It is described as a “pulse continuous” anomaly. 'Space physicists call this phenomenon a “pulsation continuous” or “Pc” for short. Imagine blowing across a piece of paper, making it flutter with your breath. Solar wind can have a similar effect on magnetic fields. Pc waves are essentially flutters propagating down the flanks

of Earth's magnetosphere excited by the breath of the sun. During more active phases of the solar cycle, these flutters are easily lost in the noise of rambunctious geomagnetic activity. But during the extreme quiet of Solar Minimum, such waves can make themselves "heard" like a pin dropping in an silent room.' Another site detected the anomaly in both the Earth's magnetic field and ground currents. [2] 'Our magnetic field swung back and forth by about 1/3rd of a degree. I also detected ground currents with the same 10 minute period.'

With the proper orientation of an external magnetic field to an object with a magnetic field, the two fields will interact, even the magnetic field of an EM wave. Depending upon its structure, an antenna will interact with either the electric or magnetic field of an EM wave. Simple ferrite core antennas used in some radios designed for the AM broadcast band are designed to respond to the magnetic field of a passing EM wave. The EM wave is being detected by different types of magnetometers, ref(1).

Radio astronomers have not attempted to identify whether EM frequencies below 1 Hz are coming from beyond Earth. The Earth's magnetic field is responding to them. Why not the Sun's magnetic field? In references (1) & (2), the short duration magnetic field excursions are embedded upon a much longer period magnetic field deviation. Or is that considered an "instrument drift?"

## **EM Frequency Scale Correction**

It does not appear possible that the nonlinear frequency problem can be completely eliminated. A 2011 technical publication revealed that EM wave parameters, wavelength, frequency and the speed of light, can be presented using Euclidean geometry.[3] The title, "A Methodology to Define Physical Constants Using Mathematical Constants" explains what was accomplished. The information in the article identifies a possible way to mitigate the EM frequency scale nonlinear issue, but that was not mentioned directly. The nonlinear frequency scale mitigation must readily allow identifying EM wave harmonics and heterodynes over the complete spectrum.

## **Summation**

The longest EM wave was not determined when the EM frequency scale was established. This has influenced many in the science community that there are no EM waves below 1 Hz.

None of the authors' text books identify, "What is the purpose for the existence of EM waves?" If one considers that the universe is a closed system, the Conservation of Energy principle applies. Then, fundamentally, it appears that EM waves were created for the purpose of energy transfer.

The acoustic frequency scale is based upon the same time duration selected for the EM frequency scale. Seismic waves use the same frequency scale as EM waves. Seismic waves are being detected that have frequencies that have durations in the tenths of a second rather than a whole unit value, which indicates a nonlinear scale. It is expected there will be other phenomena that are being described using a nonlinear frequency scale.

## **References**

[1] Watts, Anthony "Weird: Out of Nowhere, Something Just Rocked Earth's Magnetic Field"

Whats Up With That, June 25, 2020 <https://wattsupwiththat.com/2020/06/25/weird-out-of-nowhere-something-just-rocked-earths-magnetic-field/>

[2] Stammers, R. <https://spaceweather.com/images2020/25jun20/stammes.jpg>

[3] Makinson, F.H. "A methodology to define physical constants using mathematical constants." IEEE Potentials July/August 2011, Vol. 30 Issue 4, pgs 39-43. DOI 10.1109/POT.2011.940377

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