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RESEARCH ARTICLE

SUPERPOSITION OF COSMIC RADIATION WAVES AS THE SOURCE OF THE HESSDALEN LIGHT PHENOMENA

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ABSTRACT

The light phenomena of the Norwegian valley of Hessdalen are one of several unexplained light phenomena around the world. Scientists have investigated it since 1981 without a proven theory of what causes the phenomena. In this article, the superposition of cosmic radiation due to local distortion of Earth's magnetic field is investigated as the source of the phenomena. Hessdalen has been shown to have special characteristics in the low end of the electromagnetic spectrum and this could cause the cosmic radiation entering the valley from above to superimpose into the visible spectrum. This new theory is tested against the observed and unexplained special properties of the light phenomena, showing some promising results.

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INTRODUCTION

The stories about an unexplained light phenomenon in the Norwegian valley of Hessdalengoes back to 1981 when residents reported a light in the night sky. The phenomenon has since been observed everywhere in the valley and acts in many ways. There can be large balls of light floating around for several hours, or several bright spots. The lights can be white, blue, yellow and red. Quick flashes that are difficult to see, and silver objects in daylight, have also been observed. Two engineers from Østfold University College, Erling Strand and BjørnGitleHauge, have been documenting the phenomenon since it was first observed. Project Hessdalen was established in 1983 by, among others Strand, aiming to find out what the phenomenon is. The project was meant to last for two months in 1984. Strand writes in the final report that they do not know what the phenomenon is, but that it can be measured with radar and laser, possibly also with magneto graph and spectrum analyzer (Strand, 1984). In the thirty years that have passed since the field study in 1984, the project has lived on. Strand has a website ("Project Hessdalen") documenting observations and lectures for various institutions. He also collaborates with Østfold University College, where students have written theses on the phenomenon since 1993.

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Strand firmly believe that the phenomenon cannot be explained with the knowledge we have about the world, and believes it can lead us forward to groundbreaking knowledge such as a new energy source. Bjorn GitleHauge at Østfold University College involved in research in 1994. His background has been important for the development of equipment and techniques for validation of the measurements, and in 1998 a measurement station was set up (Teodorani, 2004). He also had many students from middle schools and high schools with the Nature and Science project Science Camp in the valley, and his famous photograph of the phenomenon from 2007 is considered one the most important milestones in the research on the phenomenon. Both Strand and GitleHauge has participated in many television documentaries, performances and interviews, and a mantra is that when they find out something new, the mystery deepens. In an interview with a German website about the phenomenon GitleHaugestates that "it is as if it is there all the time everywhere but it lit up at certain places."(Hessdalen Germany). Professional radio astronomers from Italy are particularly concerned that the atmosphere in the valley seems to exhibit special electromagnetic properties in the low part of the spectrum. The Italian scientists made their first trip to Hessdalen in 1996, and in 2013 they published an article about this that was later reproduced in the science magazine New Scientist (Williams, C., 2014). Here they suggested that the valley serves as a car battery. They proposed that the two

valley sides are the electrodes and the river Hesja that runs through the valley conduct current between them. When there is electricity in the river, it forms a gas, and these gas bubbles can rise into the air and become electrically charged by the excitement in the valley and thus begin to brighten. Several experts have dismissed the theory due to too much distance between valleys and thus lack of energy from the electric field. The Aim of my work is to propose and evaluate a new theory of what is causing the light, i.e. that it is caused by the superposition of cosmic radiation due to local distortion of Earth's magnetic field. In the normal case, Earth has a magnetic field around it parallel to the surface of Earth. It affects the direction of electromagnetic radiation that enters it. This also includes the cosmic radiation from the universe. These waves fluctuate so that we cannot see them but they are there - all the time. The cosmic radiation spectra is continuous with detected peaks in several ranges e.g. the Cosmic Microwave Background (CMB), the Cosmic Infrared Background (CIB), the Cosmic Ultraviolet Background (COUVB), and the Cosmic Radio Background (CRB)(Bowyer, 1991). In the same manner as visible light, this radiation has a direction perpendicular towards the ground in normal case due to Earth's magnetic field.(Wright, 2003), (Bowyer, 1991).

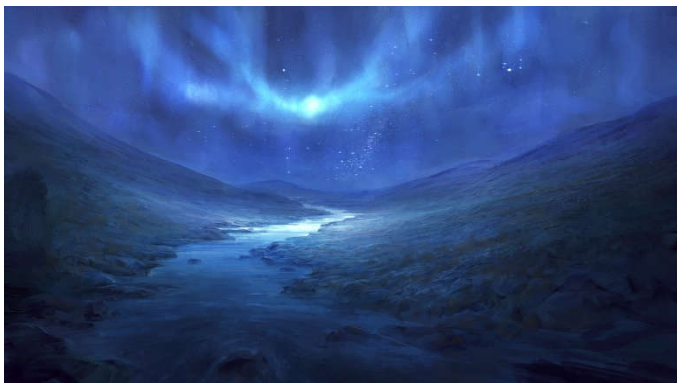


Figure 1. Artistic illustration of the light phenomena caused by superposition of cosmic radiation waves due distortion of Earth's magnetic field.

METHODS

The theory that superposition of cosmic radiation waves could be the source of the Hessdalen light phenomena will be tested against observed and unexplained characteristics of the light. These characteristics include that the light phenomena:

- is located in the valley, often under the mountain tops.
- appears at seemingly random times.
- occurs in various colors and formations.
- seems to be there all the time, like "pearls on a string".
- has been measured to take a "90 degree turn".
- has been measured to have all frequencies we can measure and to have a large proportion energy from the ultraviolet spectrum

RESULTS

The special properties can be examined in light of the new theory proposed in this paper:

- The location of the phenomena in the valley supports the theory. Hessdalen exhibit special properties associated with the low-frequency magnetic field. This is most likely due to the influence of conductive minerals in the valley formation and the river Hesja that runs through the valley. The change of the earth magnetic field will cause the electromagnetic waves coming into it to behave differently than in the normal case, e.g. the direction of the cosmic radiation coming from above. Hence it could cause the radiation to change direction and "collide" before they hit the ground. And when waves collide in a certain way it creates new waves, i.e. superposition of waves. The resulting waves can be stronger, weaker and they can change their frequency, i.e. how fast they move. If the right waves collide in a certain way it can also be changed to waves within the visible spectrum, i.e. visible light.
- The superposition will be affected by a permanent (the valley) and a time dependent (the river) local variation of the magnetic field. The seemingly random timing of the visible appearance of the light would be supported by the theory as the special case of visible superposition only happens when the conductive minerals in the river Hesja has the right concentration to distort the local magnetic field in a certain way.
- The different colors and appearances of the light in the valley is also due to the time varying magnetic field causing the different superposition cases observed.
- The cosmic radiation is there all the time and the superposition will occur along curves in the magnetic field lines. Only some of the superposition of waves will fall into the range we capture with our eyes, but the superposition could occur across a wider invisible range to the human eye, i.e. along the magnetic field lines.
- The observation that the light "takes a 90 degree turn" is an illusion because it is not a light object that moves. The light we see is only the superposition of waves creating waves with visual frequency. But the collisions will be present along longer stretches where waves collide. When the light "moves" it is superposition appearing in the visible spectrum, even if they were already present.
- The measured spectrum of the light phenomena is in accordance with the fact that the cosmic radiation spectrum is continuous with detected peaks in several ranges e.g. the Cosmic Ultraviolet Background.

DISCUSSION

The result is interesting as the theory can give an intuitive explanation of all the currently unexplained properties of the phenomena. Furthermore, experiments can be designed to further validate the theory. This includes:

- Measure the radiation spectra surrounding the light phenomena and correlate it with the measurement the magnetic field of earth
- Measure the electrical current in the river Hesja when the light phenomena occur. Use the results to artificially affect the current to "reproduce" the visible superposition of cosmic radiation waves.

Conclusion

The theory is in compliance with the observed and currently unexplained characteristics of the light phenomena. Experiments should be designed to confirm the magnetic field distortion caused by the conducting valley formation and river Hesja, and the cosmic radiation pattern surrounding the light phenomena. Measuring these two in correlation with observations of the light phenomena will be an important test of the theory.

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