

Seminar Review

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I review the online seminar presented by Professor Joshua Semeter of Boston University's ECE Department at Aurorasaurus, the award-winning citizen science project that aims to create the first global, real-time aurora map. This webinar gave an introduction to the phenomenon known as STEVE, the Strong Thermal Emission Velocity Enhancement, which appears very similar to classical auroras but has a number of different and unique characteristics. The webinar goes over some interesting features of STEVE and talks about the contributions of citizen scientists, photographers, and how people can contribute to the project going forward. The link to the webinar is <https://youtube.com/watch?v=zE9J4rQBFzM>.

Word Count: 587

INTRODUCTION

This seminar review was created using the American Political Science Review template, which may make it look interesting. The webinar was presented by Professor Joshua Semeter, the head of Boston University's Center for Space Physics (CSP) and a professor of the Department of Electrical and Computer Engineering, as well as Michael Hunnekuhl, a laser physicist who works as a citizen scientist at NASA.

SUMMARY OF THE SEMINAR

After the introductions, part 1 of the seminars was conducted by Professor Semeter, who identifies his research into STEVE as the fulfilment of a lifelong dream of combining art and science. He introduces the Strong Thermal Emission Velocity Enhancement phenomenon, known as STEVE. STEVE appears as green finger-like streaks in the sky with a purple glow underneath them. The phenomenon lasts for about five minutes to several hours. However since most of the available data is from citizens, it

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is unknown just how long the STEVE being recorded went on for, because the vast majority of observations is from people who recorded a phenomenon they found interesting.

He then explains the physics behind the phenomenon - namely, the interaction of charged particles from the sun and earth's atmosphere lead to auroral phenomena. However, STEVE has finger-like streaks and the explanation of what exactly causes these streaks is an unsolved problem in physics today. Some photos of STEVE phenomena are shown. The problems that are faced by scientists trying to analyze the phenomena are shown - namely, how do we determine the velocity, altitude, and length of the phenomena based on amateur observations? Graphs showing the assumed behavior of the phenomena based on assumed altitudes are presented.

The field stations are described. Basic calculations such as triangulation are shown as well as their pitfalls and downsides. Michael Hunnekuhl then comes in, expanding on the specific problems observed with camera recordings of STEVE. He proposes some image analysis techniques, but emphasizes that they are basic. A Q&A session is then held.

WHAT QUESTIONS DID THE WEBINAR ADDRESS?

1. What are STEVE?.
2. Roughly, how are STEVE caused?
3. What observations of STEVE do we have?
4. What are the main challenges of STEVE observations?
5. What has already been done to address these challenges?
6. What simple techniques can we use to analyze STEVE?
7. What specific techniques can we use to analyze recordings of STEVE?

STRENGTHS OF THE PRESENTATION

- Gave an introduction to STEVE
- Described how STEVE differed from aurorae
- Explained the essential challenges of STEVE observations, namely, the challenges associated

with getting data from uncontrolled observations

WEAKNESSES OF THE PRESENTATION

- Did not fully explain the ground stations. This is not necessarily the fault of the presenters, as they were not presenting to experts.
- Did not fully explain just how difficult it was to analyze STEVE. As I have worked on this for a while, I know how difficult analyzing STEVE is.
- Did not seem to get the strangeness of this phenomenon across. Many QA questions were based on observations and not the physics, which is more important in my opinion

CONCLUSION

This was a decent introduction to STEVE, but I felt that it could have been done better. Since it did not explain the failures of the known physics in trying to explain STEVE, I felt disappointed. I also felt that too much emphasis was given on image processing without quite going into depth. Whatever was explained only scratched the surface. In short reading the paper associated with this webinar would be better and more interesting, since it explains things in greater detail.