



Review provided by : **Säm Krucker**

In order to allow the PhD defense : **Vratislav KRUPAR**

Title of the PhD dissertation :

Stereoscopic Observations of Solar Radio Emissions by the S/Waves Instrument onboard the STEREO Spacecraft

1) GENERAL EVALUATION

In comparison to other recent PhDs in the same field that the referee has personally known, the referee's opinion on the thesis is that it deserves to **be defended to obtain the doctoral degree**:

- No
- Yes (without modification)
- Yes (with major modification)

If yes, is the Ph D

of a scientific level estimated as

- Exceptional
- Excellent
- Very good
- Good
- Satisfactory

with a presentation estimated as

- Exceptional
- Excellent
- Very good
- Good
- Satisfactory
- To be improved

2) SUMMARY OF THE MAIN POINTS OF THE REVIEW AND REMARKS (in about ten lines)

The thesis of Vratislav Krupar describes radio observations taken by the two STEREO spacecraft with an emphasis on data analysis methods to derive the incident direction of the observed radio waves. The thesis is written in a concise way and satisfies the common scientific standards.

The first part of the thesis describes very well the different approaches of the data analysis techniques of 'direction finding' or genipolarimetry. The data analysis is very challenging, labor-intensive and makes slow progress. To make sure the data analysis tools work correctly, direction finding results from STEREO are compared when both spacecraft are close together. Additionally, the STEREO results are compared to radio observations from the WIND spacecraft. These cross-comparisons are found satisfactory.

In the second part of the thesis, the previously discussed direction finding techniques are applied to solar radio bursts produced by semi-relativistic electron beams escaping from the corona, so-called radio type III bursts. These first results nicely show the potential of the observations, but also highlight the unavoidable limitations.

3) PROPOSED GRADE FOR THE DOCTORAL DEGREE

In the case where this work seems to you acceptable for a PhD, what do you propose as being the most appropriate grade:

- Honorable
- Très honorable

4) EXTENDED REPORT

A few detailed comments are listed below:

- 1) Figure 3.9 compares STEREO A and B intensities. The text states that the data is 'well inter-calibrated'. Some quantitative details would be helpful. In particular, the events with up to a factor of 3 differences should be discussed.
- 2) Comparison of STEREO and WIND intensities are shown in Figure 3.10. The figure suggests less scatter, but that could be because a smaller range of ratio is shown. Please clarify.
- 3) Looking at the scatter in Figure 3.9 and 3.10 the questions arises how individual events compare in time. From Figure 3.11 it looks like a whole time series can match really well. How does it look for events with relative intensities much different from 1.
- 4) Page 48, top: 'Results .. confirm ...that suprathermal electrons ... propagate along the Parker Spiral' and Figure 4.3 left: the high frequency points are coming from the back of the Sun, hence, those points do not match a Parker spiral. Please discuss.
- 5) On the same topic: Is there a way to fit the data to a Parker Spiral model? The error circles are rather small and a fit could be performed. This could provide a quantitative result. Furthermore, it could be compared to models that say the Parker spiral is distorted by

random magnetic fields (e.g. Figure 1 and 2 in The Astrophysical Journal, Volume 641, Issue 2, pp. 1222).

- 6) Figure 4.7: the derived points are all from behind the Sun as seen from STEREO A and B. Please discuss how emission can propagate to the spacecraft. Is this frequently observed?
- 7) Unfinished sentence on page 51.
- 8) Figure 4.14: the power-law decay of the flux density after the peak is striking. Do you have any ideas what is behind this?

Date : 09/09/12

Signature :

