

Interactive comment on “Review article: Wave analysis methods for space plasma experiment” by Yasuhito Narita

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Thank you very much for the comments. The manuscript revision is attached as a supplementary material.

“This paper provides a useful overview on data analysis methods applied to the study of monochromatic modes, turbulence and resonance/scattering phenomena. This kind of review represents something that was missing in the present Literature and as such deserves to be published after a short revision, as suggested below. However, this review would gain additional value if the Author would add some paragraphs on relatively recent techniques, wavelets based, allowing to define the “mean field direction” and the parallel and perpendicular directions to it, scale by scale (see Horbury et al., 2008, He et al., 2011, Telloni and Bruno, 2016, among others). This is not a criticism but rather

C1

a suggestion that the Author is free to take it or leave it since it does not change my overall positive evaluation of this review.”

A paragraph was added about the mean field determination (page 8, line 17 to page 9, line 2, starting with “Different approaches are possible to determine...”) with the references to Horbury et al. (2008), Wicks et al. (2010, 2011), Chen et al. (2011), He et al. (2011), Telloni and Bruno (2016).

“List of points to be revised:”

1. *“1) In 14: specify that these values refer to 1 AU”*

Done. (page 1, line 14).

2. *“2) pg 3, In 52: better to replace “that” with “where” or “such that””*

Yes. “such that” (page 3, line 14).

3. *“3) pg 4, Figure 1: would it be possible to add the ion-cyclotron branch in Figure 1? Incidentally, the Author reports the following paper: Marsch, E., and Tu, C. Y., Evidence for pitch-angle diffusion of solar wind protons in resonance with ion-cyclotron waves, J. Geophys. Res., 106, 8357–8361, 2001, in the reference list but he never recalls this paper throughout the text.”*

The ion-cyclotron branch was added to Fig. 1 and I indicate the electron-cyclotron and the ion-cyclotron branches in gray. The text was modified accordingly (page 3, lines 26–30; page 4, figure 1 caption). The reference to Marsch and Tu (2001) was added. (page 16, line 16)

C2

4. "4) pg 4, In 35: it would be useful to add a reference to Bruno and Carbone, LNP, 928, 2016 where coherent structures in turbulence are treated extensively."

Done. (page 5, line 2)

5. "5) pg 5, matrix definition (3): this looks more like the definition of Auto-Spectral Density Matrix rather than Cross-Spectral Density Matrix since the general signal is only one: $B(t)$. The CSD is usually intended to be obtained from the cross correlation matrix of two different signals, say $A(t)$ and $B(t)$."

I deleted the word "cross" and simply say "the spectral density matrix" (page 5, line 15) to avoid a confusion between what is "cross" and what is "auto" (for example in figure 8).

6. "6) pg 6, In 76: Please, add reference to Bavassano & Bruno, 94, 11977, 1989"

Done. (page 7, line 9)

7. "7) pg 6, In 77: Could the Author be more explicit when he mentions that the "Rotation sense of the field fluctuation is evaluated from the off-diagonal elements of the CSD matrix." ? Otherwise add a reference to Arthur et al., 1976."

The meaning of rotation sense is already explained on page 7, line 22 ("The value of ..."). The equations to determine the ellipticity are referred to in the beginning of the section with a reference to Fowler et al. (1967) and Arthur (1976). (page 7, lines 10–11)

8. "8) pg 12, In 30: add a reference to Matthaeus and Goldstein, this was the first estimate of these invariants in the solar wind."

C3

Done. (page 13, line 8)

9. "9) pg 12, In 42: add a reference to add Tu and Marsch 1995"

Done. (page 13, line 21)

10. "10) pg 14, In 64: add a reference to Shebalin et al. (1983)"

Done. (page 15, line 8)

11. "11) pg 16, In 44: insert 'be' after 'must'"

Done. (page 17, line 25)

Please also note the supplement to this comment:

<http://www.nonlin-processes-geophys-discuss.net/npg-2016-77/npg-2016-77-AC1-supplement.pdf>

Interactive comment on Nonlin. Processes Geophys. Discuss., doi:10.5194/npg-2016-77, 2017.