

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

Anonymous Referee #1

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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, Telsoni and Bruno, 2016, among others). This is not a criticism but rather 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.

List of points to be revised:

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- 1) In 14: specify that these values refer to 1 AU
- 2) pg 3, In 52: better to replace "that" with "where" or "such that"
- 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.
- 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.
- 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 $B(t)$.
- 6) pg 6, In 76: Please, add reference to Bavassano & Bruno, 94, 11977, 1989
- 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.
- 8) pg 12, In 30: add a reference to Matthaeus and Goldstein, this was the first estimate of these invariants in the solar wind.
- 9) pg 12, In 42: add a reference to add Tu and Marsch 1995
- 10) pg 14, In 64: add a reference to Shebalin et al. (1983)
- 11) pg 16, In 44: insert "be" after "must"

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

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