

# ***Interactive comment on “Variation in altitude of high-frequency enhanced plasma line by the pump near the 5th electron gyro-harmonic” by Jun Wu et al.***

## **Anonymous Referee #3**

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Variation in altitude of high-frequency enhanced plasma line by the pump near the 5th electron gyro-harmonic Jun Wu et al.

The paper describes the behaviour of high frequency plasma line (HFPL) during an experiment conducted near the 5th electron gyroharmonics at EISCAT heating facility on 11th March 2014. The same experimental data by these authors have already been published in a series of manuscripts (e.g. Wu et al., The extending of observing altitudes of plasma and ion line during ionospheric heating, JGR, 123, 918-930, 2018 and Wu et al., The behavior of electron density and temperature during ionospheric heating near the fifth electron gyrofrequency, JGR, 122, 1277-1295, 2017). In this paper, the

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authors are discussing the effect of electron temperature on the altitude decent of the HFPL and they conclude that HFPL altitude is dependent on the dispersion behaviour of the enhanced Langmuir wave and Bragg condition, and is determined by the profiles of the electron density and enhanced electron temperature. Their discussion and conclusion adds nothing new to what has already been published and discussed by many authors. To make any firm conclusion on the altitude variation of the HFPL, you need to know the altitude that these are generated accurately, but in this paper there is no proper discussion and calculation of the reflection height and upper hybrid height for each stepping frequency based on independent measurement such as Dynasonde which can be obtained at EISCAT heating facility.

It is also important to note that when heating along the local magnetic field line, then the reflection altitude changes and is below the reflection height for vertical incidence, but can be calculated using ray tracing. It should also be noted that the linear dispersion properties of Langmuir waves in un-magnetised plasma which has been used for interpretation of the results are not appropriate and have its limitation. In summary, this paper is not suitable for publication since it does not provide any new result.

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