E109-011 **Room: 101A** **Time: May 30 11:45-12:00**

Effects of dissipation in parametric processes of Alfven waves

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Since finite amplitude, low-frequency, quasi-parallel Alfven waves in the solar wind can travel long distance without much suffering from collisionless damping, they can efficiently transport energy and momentum. As the loading of the energy and momentum to the background is completed when the waves are vanished, it is important to examine how the waves can be dissipated. Among various possible scenarios of the wave dissipation, parametric instabilities are one of the most robust processes for the solar wind Alfven waves under a typical set of wave and plasma parameters.

While a majority of theoretical studies of the Alfven parametric instabilities has been based on fluid formulations, considerable attention has recently been paid to the effects of ion kinetics. Our recent analysis [1], as well as a number of past studies, suggest that, although the inclusion of ion Landau damping reduces the 'fluid-type' parametric instability growth rates in general, new instabilities can emerge which are absent within the fluid model. Typically, the growth rates of these new instabilities are relatively small compared with the 'fluid-type' instabilities, but they can play important roles in the evolution of Alfven turbulence since the two types of instabilities have quite different unstable regimes in the wave number space [2].

In this presentation we discuss physical nature of these new instabilities from a rather general point of view. It turns out that it is the inclusion of dissipation (whether fluid-like or kinetic) rather than the kinetic behavior of ions which is responsible for these instabilities to emerge. The mechanism is similar to the dissipation-induced instability recently pointed out for the Benjamin-Feir instability of water waves [3]. Detailed analysis of the instability and application to the solar wind Alfven waves will be presented.

[1] Y. Nariyuki and T. Hada, J. Geophys. Res. 112, A10107 (2007).
[2] Y. Nariyuki, T. Hada, K. Tsubouchi, Phys. Plasmas 14, 122110 (2007).
[3] T. J. Bridges and F. Dias, Phys. Fluids 19, 104104 (2007).