

A possible relation between the intensified Type III Solar Burst in HF band and solar wind acceleration region

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It has been widely believed that Type III Solar Radio Burst is generated by the non-linear process, i.e. parametric three wave interaction. However, in a case where there exists local density fluctuations in the solar corona, it is possible that electrostatic Langmuir waves are converted into the radio waves through the linear mode coupling process.

In Iitate Observatory of Tohoku University, observations of radio waves in the decameter wave length range have been carried out since 2003. From the observed data, Iizima and Nakagawa [2007] found a unique frequency range in which the burst intensity locally increases in the dynamic spectrum. After that, we have found that such a unique frequency range almost always appears around and slightly below 30MHz corresponding to the radial distance more than 0.65 solar radiuses from the photosphere. The frequency is kept unchanged in a series of successive bursts which are presumably emitted from same active region.

Numerical simulation study by Suzuki and Inutsuka [2005, 2006] have shown that, in this region, ion acoustic waves are generated from Alfvén wave and result in the solar wind acceleration. It is possible that these ion acoustic waves form density fluctuations and enhance the mode conversion from Langmuir waves into radio waves. It is also found that intensified frequency portion moves at a speed of about 300km/s. This result suggests propagation speed of the ion acoustic waves is about 300km/s.