

On the mechanism of generation of harmonic emission for type III radio bursts in strongly inhomogeneous plasma

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Abstract

Solar type III radio bursts are the powerful diagnostic tool to investigate the electron acceleration processes and local plasma parameters in solar corona and solar wind. It has been approved that they are generated by streams of energetic electrons that produce Langmuir waves, which, in their turn, partly convert into electromagnetic emission. Recent studies revealed that there are intense random density fluctuations in the solar wind, and they strongly affect the beam-plasma interaction. The harmonic emission around $2\omega_p$ is supposed to appear due to the process of Langmuir waves coalescence. We show hereafter that it is significantly affected by density fluctuations. We consider the electromagnetic waves generation in the regions of Langmuir waves reflection, where the intensity of these waves strongly increases. We compare the efficiency of this process with the conventional wave-wave interaction in homogeneous plasma. We evaluate the relative role of these two processes for different parameters of solar wind plasma.