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Simulations of Type III Solar Radio Emission in Inhomogeneous Corona and Interplanetary Medium

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For most type III bursts, it is generally accepted that plasma emission mechanism drives the observed radiation near the electron plasma frequency and/or its second harmonic. This mechanism consists of a sequence of processes: (i) an energetic electron beam generates primary Langmuir waves by a beam instability;(ii) the primary Langmuir waves undergo electrostatic decays and generate product Langmuir waves and ion-acoustic waves; (iv) the product ion-acoustic waves stimulate the primary Langmuir waves to produce electromagnetic emission at the fundamental frequency; and (iv) the nearly oppositely-directed Langmuir waves coalesce and generate electromagnetic emission at the second harmonic of the electron plasma frequency. In this presentation, we will show the first numerical simulations of coronal and interplanetary type III emissions in the presence of both small-scale and large-scale density inhomogeneities. We will present the dynamical evolution of the type III system, which includes the beam, Langmuir and ion-sound waves and electromagnetic radiation, in coordinate and phase space. We will further demonstrate the evolution of the beam-Langmuir wave system to a stochastic growth state.