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Nonlinear evolution of Langmuir waves excited by electron-beam instability: Ion kinetic effects

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It is well known that there exists electromagnetic "2fp" waves at Earth's bow shock and the solar radio burst. Such electromagnetic 2fp waves are considered to be exited by nonlinear evolution in beam-plasma interactions. Recently, it is suggested that induced back-scattering of Langmuir waves by enhanced thermal fluctuations of ions are more important than the coherent decay instability in exiting the electromagnetic 2fp waves[1]. In this study, we carry out a parametric study by using the 1-D electrostatic Vlasov code to discuss the ion kinetic effects in the nonlinear evolution of the Langmuir waves in detail.

[1]Umeda, T., J. Geophys. Res., 115, A01204, 2010.

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