Abstract Submitted
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Fluid nonlinear frequency shift of nonlinear ion acoustic waves in multi-ion species plasmas in small wave number region[1] QINGSONG FENG, CHENGZHUO XIAO, QING WANG, CHUNYANG ZHENG, ZHANJUN LIU, LIHUA CAO, XIANTU HE, Peking Univ — The properties of the nonlinear frequency shift (NFS) especially the fluid NFS from the harmonic generation of the ion-acoustic wave (IAW) in multi-ion species plasmas has been researched by Vlasov simulation. The pictures of the nonlinear frequency shift from harmonic generation and particles trapping are shown to explain the mechanism of NFS qualitatively. The theoretical model of the fluid NFS from harmonic generation in multi-ion species plasmas is given and the results of Vlasov simulation are consistent to theoretical result of multi-ion species plasmas. When the wave number $k\lambda_{De}$ is small, such as $k\lambda_{De} = 0.1$, the fluid NFS dominates in the total NFS and will reach as large as nearly 15% when the wave amplitude $|e\phi/T_e| \sim 0.1$, which indicates that in the condition of small $k\lambda_{De}$, the fluid NFS dominates in the saturation of stimulated Brillouin scattering especially when the nonlinear IAW amplitude is large.

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