Study of the general oscillatory pattern of BGK modes based on a kinetic simulation approach

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Bernstein-Greene-Kruskal (BGK) modes are studied, based on a kinetic simulation algorithm. The observed modulated wavepacket-like structures share a common pattern, which may hide interesting information about the mechanism responsible for their creation. Our kinetic algorithm allows us to excite various modes at different scale(s). Simulations on BGK modes associated with Langmuir type, ion-acoustic and dust-ion acoustic excitations have been carried out, and their characteristics (sharing the aforementioned common pattern) are briefly discussed here. Indeed, a supplementary peak among successive maxima of the electric field (amplitude) associated with the BGK structures is evident in all three scales studied in our simulations. The extra peak occurs as a smaller local maximum immediately following the first main peak of BGK structures. Earlier computational studies [1] also provide evidence of this peak, although it has not yet been commented upon.

[1] G. Manfredi, *Physical Review Letters* **79**, 2815 (1997).