

Abstract Submitted  
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**Averaged variational principle for autoresonant BGK modes<sup>1</sup>**

PAVEL KHAIN, LAZAR FRIEDLAND, Hebrew University of Jerusalem — Whitham's averaged variational principle is applied in describing the dynamics of the excitation process of Bernstein- Greene-Kruskal (BGK) modes driven by a chirped frequency wave [1]. A flat-top electron velocity distribution is assumed as a model allowing Lagrangian formulation within the water bag theory [2]. The corresponding Lagrangian, averaged over the fast phase variable, yields variational equations for the slow fields in the problem. In the quasi-linear limit, these equations yield a system characteristic of autoresonance in many nonlinear dynamical problems. Numerical solutions of the full nonlinear set of the variational equations are in a good agreement with Vlasov-Poisson simulations. [1] L. Friedland, P. Khain, and A.G. Shagalov, Phys. Rev. Lett. 96, 225001 (2006). [2] P. Khain and L. Friedland, Phys. Plasmas 14, 082110 (2007).

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Lazar Friedland  
Hebrew University of Jerusalem

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