Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

A water bag theory of autoresonant BGK modes[1] PAVEL KHAIN, LAZAR FRIEDLAND, Hebrew University of Jerusalem — The adiabatic water bag theory describing formation and passage through phase-space of driven, continuously phase-locked (autoresonant) coherent structures in plasmas [L. Friedland et al., Phys. Rev. Lett. **96**, 225001 (2006)] and of the associated BGK modes is developed. The phase-locking is achieved by using a chirped frequency ponderomotive drive, passing through kinetic Cherenkov-type resonances. The theory uses the adiabatic invariants (conserved actions of limiting trajectories) in the problem and, for a flat-top initial distribution of the electrons, reduces the calculation of the self-field of the driven BGK mode to solution of a few algebraic equations. The adiabatic multi-water bag extension of the theory for applications to autoresonant BGK structures with more general initial distributions is suggested. The results of the theories are in a very good agreement with numerical simulations.

[1]Supported by the Israel Science Foundation, Grant No. 294/05.

Lazar Friedland
Hebrew University of Jerusalem

Date submitted: 11 Jul 2007 Electronic form version 1.4