FAST NUMERICAL MODELLING OF 1D LANDAU RESONANCE USING A VLASOV HYBRID SIMULATION CODE

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In this work we develop a fast, lightweight and highly efficient code for numerical modelling of non linear Landau resonance. We use the Vlasov Hybrid Simulation (VHS) technique which numerically integrates phase space trajectories in the phase simulation box. Since distribution function F is known by Liouville's theorem, F may be interpolated onto the regular phase space grid. The code is very robust against filamentation. The work looks in detail at the time evolution of wave number spectrum, non linear growth rates and spatially averaged F, and delineates the limitations of quasi-linear theory as applied to this problem.