Vlasiator test cases technical information
Dispersion

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This document gives technical information on the Dispersion test case.

1 Purpose

Produce dispersion plots. Runs based on Fluctuations in one dimension, with fully periodic boundary conditions. The tool `vlsv2bzt_[SD]P` extracts the (x-t)-dataset of any variable, which can then be processed using Scilab or MATLAB to obtain the (k-ω) plot. The `Dispersion.m` script does this, using `Hamming.m` for windowing in time if wanted.

2 Implementation

This test uses a gas factory-type system to initialise a consecutive block of cells of random length with the same values. The rationale was to lower the chances of nasty shocks by reducing the number of cell-interface discontinuities. It has actually not been of great help and was conflicting with seeding problems so that actually Fluctuations was used in the production runs for my MSc thesis.

3 Options

The options available in the `cfg` file are:

`B[XYZ]0`	Background magnetic field (T)
`rho`	Number density (m^{-3})
`Temperature`	Temperature (K)
`magPertAmp`	Absolute amplitude of the magnetic field perturbations (T)
`densityPertAmp`	Relative amplitude of the density perturbations
`velocityPertAmp`	Absolute amplitude of the velocity perturbations (m/s)
`seed`	Multiplied by the MPI rank to seed the `rand()` RNG
`sectorSize`	Maximal length of a consecutive sector of constant valued cells
`nSpaceSamples`	Number of sampling points along spatial dimensions within a spatial cell, includes the corners (minimum 2)
`nVelocitySamples`	Number of sampling points along velocity dimensions within a velocity cell, includes the corners (minimum 2)