

README file

1. Overview

Hydrodynamic simulations of Type Ia supernovae-driven turbulence in a hot medium of early-type galaxies.

2. References

When using these simulations, please cite the following papers:

[Li et al. 2020a, ApJ, 894,44](#)

[Li et al. 2020b, ApJ, in review arXiv: 1909.04204](#)

3. Simulation descriptions:

The simulations are run using the Eulerian code [ENZO](#). The simulations are 3D, uniform grid, with periodic boundary conditions. The hydro-solver is the finite-volume piece-wise parabolic method (Colella & Woodward 1984). The normal-resolution runs have 128^3 cells and the high-resolution runs have 256^3 . SNe Ia exploded randomly in the box, which is implemented as injecting thermal energy into a small sphere. The box length is approximately 10 times the diameters of SN bubbles. Radiative cooling is included. The initial condition is a uniform and static medium. The only driver of turbulence is SNe Ia. More details for the setup and results can be found in the two references above.

4. Data files:

The output data can be accessed and analyzed using [yt](#). A few example runs are included on this website, each including several snapshots. The naming of the runs indicates the initial condition and SNe heating rate, e.g. “n0.02_T1e7K_H1.02C” indicates the initial condition has density $n=0.02 \text{ cm}^{-3}$, $T=3e6\text{K}$, and SNe heating rate 1.02 times the cooling rate of the medium. If present, “hr” indicates the run is high-resolution run. More data is available upon request.