Bolshoi

This simulation is good for

- Modelling galaxies with stellar masses above ~$10^{7.5}$ M_{sun}
- Probing scales up to $250/h^{-1}$ Mpc (without repetition)
- Resolving small structures with high time resolution

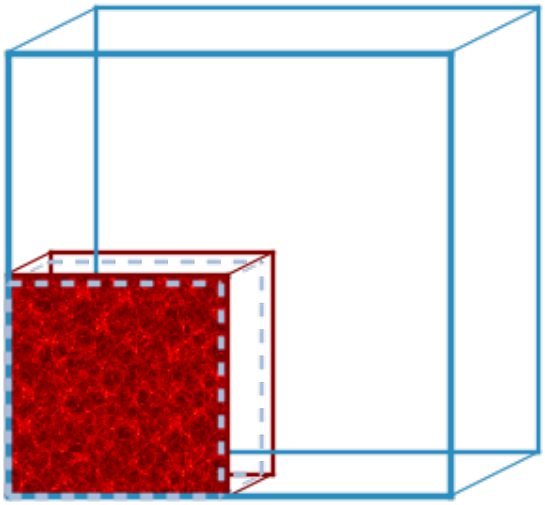
Overview

The Bolshoi simulation was run with the Adaptive Refinement Tree (ART) code. It has nearly the same number of particles as Millennium, but was catered to high resolution rather than a large box size. It is, therefore, favourable for working with satellite galaxies and low-density environments. Full details of the simulation can be found in the paper by Klypin et al. (2011) and at this address.

Size

Box length: **$250/h^{-1}$ cMpc**

Relative volume to Millennium and an all-sky survey out to z=0.05:



Resolution

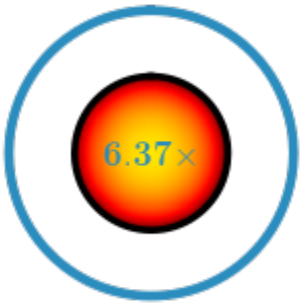
Particle mass: **$1.35 \times 10^{8}/h^{-1}$ M_{sun}**

Gravitational softening: **$1/h^{-1}$ ckpc**

Number of particles: **2048^3**

Number of snapshots to z=0: **181**

Particle size compared to Millennium:



Bolshoi has 6.37 times higher mass resolution than Millennium, meaning a Bolshoi halo contains 6.37 times the number of particles of a Millennium halo of equivalent mass.

Cosmology

The cosmological parameters for Bolshoi are based on *WMAP*-7 data (Jarosik et al. 2011), but maintain consistency with earlier *WMAP* releases.

$_M$ = 0.27
$_\Lambda$ = 0.73
$_b$ = 0.0469

$_8$ = 0.82
n **= 0.95**
h **= 0.7**

Haloes

Haloes and subhaloes were identified using ROCKSTAR, with merger trees subsequently built with CONSISTENT-TREES. Where other codes might only use the positions of particles to build haloes, ROCKSTAR uses the velocities of particles as well. The trees follow all (sub)haloes down to as few as 2 particles.

Semi-analytic galaxies

Galaxy catalogues for Bolshoi available on *TAO* have been built with the following semi-analytic models:

SAGE