

MultiDark (Planck)

This simulation is good for

- Modelling galaxies with stellar mass above $\sim 10^{9.0} M_{\text{sun}}$
- Probing Gpc scales

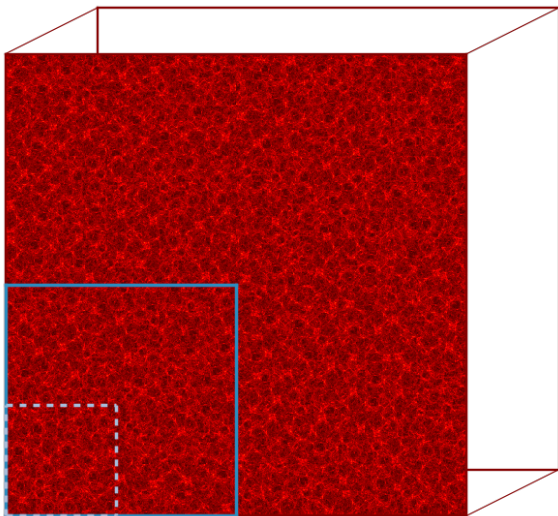
Overview

The MultiDark simulations comprise a suite of N -body simulations of various cosmologies, volume, and resolution (which are part of a larger family of simulations that includes [Bolshoi](#)), described in [Klypin et al. \(2016\)](#). *TAO* currently hosts the MultiDark (Planck) simulation, otherwise abbreviated to MDPL. Currently, MDPL is the largest-volume simulation available on *TAO* with full semi-analytic model data, and it has the most up-to-date cosmology. MDPL was run with [GADGET2](#). Further information and data products for MultiDark can be found [here](#).

Size

Box length: $1000 h^{-1} \text{ cMpc}$

Relative volume to [Millennium](#) and an all-sky survey out to $z=0.05$:



Resolution

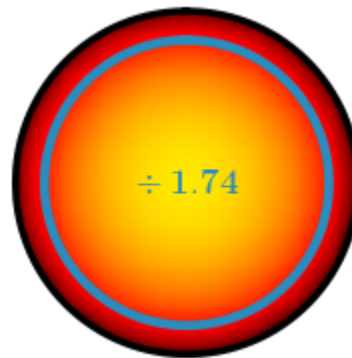
Particle mass: $1.5 \times 10^9 h^{-1} M_{\text{sun}}$

Gravitational softening: $5 h^{-1} \text{ kpc}$

Number of particles: 3840^3

Number of snapshots to $z=0$: 126

Particle size compared to [Millennium](#):



MDPL has 1.74 times lower mass resolution than Millennium, meaning a Millennium halo contains 1.74 times the number of particles of an MDPL halo of equivalent mass.

Cosmology

The cosmological parameters of the MDPL simulation are based on *Planck* data released in 2013 (published as [Planck Collaboration XVI 2014](#)).

$\Omega_m = 0.307$

$\Omega_b = 0.048$

$h = 0.678$

$\sigma_8 = 0.829$

$n = 0.96$

$h = 0.678$

Halo

Halo and subhalo were identified using [ROCKSTAR](#), with merger trees subsequently built with [CONSISTENT-TREES](#).

Semi-analytic galaxies

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

[SAGE](#)