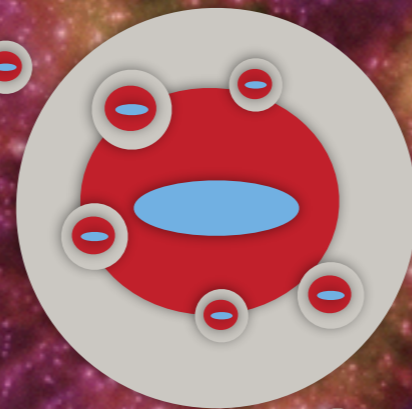


Running L-Galaxies



Running L-Galaxies and reading the output



3. Running the code

After the code has been compiled, an executable called L-Galaxies will be created. To run the code simply execute the file in the command line giving it an input.par file (see [Input files](#) below) as a runtime argument:

```
./L-Galaxies ./input/input_Henriques2015_MR_W1_PLANCK.par
```

With this input file, as downloaded from the online repository, you will be running exactly the Henriques2015 version of L-Galaxies.

The variables FirstFile and LastFile, in the input file, define the first and last dark matter merger tree files in which the galaxy formation model will be run. These correspond to sub-volumes of the dark matter simulation. As default, only file 5 is computed (a subvolume roughly representative of the full simulation) but you have files 0-9 in the download package (the full Millennium simulation corresponds to files 0-511).

(later, to run the code in parallel, you might want to use the bash scripts available in ./AuxCode/Run/, e.g. cosma.bash.)

Running L-Galaxies and reading the output



4. Analysing the Output

After the galaxy formation model has finished, output galaxy catalogues will be created in the output directory (./output/ is the default). One file will be created for each of the dark matter simulation sub volumes (just file number 5 as default, 0-9 available in the download package, a total of 512 for the full Millennium simulation). In normal mode, one file will be created for each output snapshot (1 file per subvolume and 1 file per snapshot):

SA_z56.42_0, SA_z56.42_1, ..., SA_z56.42_511

...

SA_z0.05_0, SA_z0.05_1, ..., SA_z0.05_511

SA_z0.03_0, SA_z0.03_1, ..., SA_z0.03_511

SA_z0.00_0, SA_z0.00_1, ..., SA_z0.00_511

If +OPT = -DGALAXYTREE, all snapshots, for a given sub-volume, will be in a single file:

SA_galtree_0, SA_galtree_1, ..., SA_galtree_511

Python and Idl scripts to read the model output and produce a few simple plots can be downloaded on the top of the page. Critically you will need to know the galaxy structure written into the output files. If you run make metadata, in the root directory, the output structure will be written into ./AuxCode/awk/idl/LGalaxy.pro. This will likely change if you change the Makefile options. !!!

Check if the files were created in the output folder

Go into the Python or IDL folder to start analysing the output

Running L-Galaxies and reading the output

Python

main.ipynb:

is the main file to produce plots in python

LGalaxies_Henriques2015a_struct.py:

is the galaxy structure in the output folder

procedures.py:

contains some functions used by main.ipynb including those used to read the catalogs

plots.py:

contains the functions to produce different scaling relations

plots_input.py:

contains input variables, Datadir, MCMCdir & DirName_MR must be changed

plots available:

```
opt_stellar_mass_function=1
opt_metals_vs_stellarmass=1
opt_BHBM=1
opt_SFRR=1
opt_gas_fraction=1
opt_HI_MF=1
opt_sfr_vs_stellar_mass=1
opt_ur_vs_r=1
opt_UVJ_colour=1
opt_redfraction_color_cut=1
```

Running L-Galaxies and reading the output

IDL

`plots_public_release.pro`:

is the main file to produce plots in IDL

`Datadir`, `MCMCdir` & `DirName_MR` must be changed

plots available:

```
plot_kband_bband_vband_smf=1
stellar_mass_vs_sfr=1
color_vs_magnitude=1
color_ssfr_age_hist=1
UVJ_color=1
red_fraction_colorcut=1
stellar_mass_function_by_color=1
morphology=1
bhb=1
gas_mass_function=1
mstar_metals=1
```

`LGalaxies_Henriques2015a.pro`:

is the galaxy structure in the output folder

`procedures.pro`:

contains most of the functions

Running L-Galaxies and reading the output



4. Analysing the Output

After the galaxy formation model has finished, output galaxy catalogues will be created in the output directory (./output/ is the default). One file will be created for each of the dark matter simulation sub volumes (just file number 5 as default, 0-9 available in the download package, a total of 512 for the full Millennium simulation). In normal mode, one file will be created for each output snapshot (1 file per subvolume and 1 file per snapshot):

SA_z56.42_0, SA_z56.42_1, ..., SA_z56.42_511

...

SA_z0.05_0, SA_z0.05_1, ..., SA_z0.05_511

SA_z0.03_0, SA_z0.03_1, ..., SA_z0.03_511

SA_z0.00_0, SA_z0.00_1, ..., SA_z0.00_511

If +OPT = -DGALAXYTREE, all snapshots, for a given sub-volume, will be in a single file:

SA_galtree_0, SA_galtree_1, ..., SA_galtree_511

Python and Idl scripts to read the model output and produce a few simple plots can be downloaded on the top of the page. Critically you will need to know the galaxy structure written into the output files. If you run make metadata, in the root directory, the output structure will be written into ./AuxCode/awk/idl/LGalaxy.pro. This will likely change if you change the Makefile options. !!!

