Simulations Documentation

the AWESOME Project

February 28, 2012

Contents

28.02.2012 Successfully started some N-GenIC jobs for comparison of IC generation

17.02.2012 Discussion with Asmus about Stages Cluster → try more systematic approach to ICs

15.02.2012 Galacticus revisision 708 - `drd5_r256_2` not fixed → E-Mail to Andrew
check tomorrow: Galacticus jobs `fuenfincr256_1` and `drdx_3_r256`
Note: think about / find a good method for common metadata

14.02.2012 Wrote E-Mail to Bertschinger.

13.02.2012 Deleted some jobs I started yesterday because they had artificial crosses or were practically unconstrained
Third simulation `fuenfincr256_1` ran through - Galacticus restart worked well!
Note: IC with same seed but higher resolution do not yield the same simulation! → started two more test runs from r128 sims to doublecheck

12.02.2012 Updated Galacticus to revision 707 as suggested by Andrew and added parameter `hotHaloOutflowAngularMomentumAlwaysGrows` to xml file.
Two of four simulations ran through (copied hdf5 to transfer), two crashed → try to continue at saved states!

Chapter 1

Notes

10.02.2012 wrote E-Mail to Andrew about performance problems and wavelenght computation error in `fuenfincr256_1`
started some runs with higher central delta and broader smoothing lenghts, i.e. 32/dx and 100/dx; all 128 resolution except second last one (same seed!):

```
83492 0.60500 d31c_1_sta harre   r     02/10/2012 15:19:56 intel.q@astro18  16
83493 0.60500 d31c_2_sta harre   r     02/10/2012 15:20:37 intel.q@astro29  16
83494 0.60500 d31c_3_sta harre   r     02/10/2012 15:21:17 intel.q@astro25  16
83495 0.60500 d51c_sl100 harre   r     02/10/2012 15:23:21 intel.q@astro31  16
83496 0.54786 d3+3c_sl50 harre   r     02/10/2012 15:37:13 intel.q@astro12  16
83497 0.60500 d3+3c_sl50 harre   r     02/10/2012 15:39:16 intel.q@astro30  32
83498 0.60500 d15+3c_sl5 harre   r     02/10/2012 15:44:23 intel.q@astro30  16
```

09.02.2012 `drd5_r256` last written to hdf5 file feb 09, 05:07
`fuenfincr256_2` last written to hdf5 file feb 06, 03:28
`drd5_r256_2` last written to hdf5 file feb 07, 00:50

02.02.2012 `drdx_h100_128_1` run has again severe consistency metric problem
→ not clear why
upper python script does not work, was commented out again
plan: **move to python scripts in general in order to have easier arithmetic calculations**
plan: create new folder structure and remove old simulations → done

31.01.2012 note: h=70.3 in galacticus xml input file is expected, consistent tree obviously implies it
→ fixed: changed in markus parameter file for the converter and in xml file

→ question: why not read out?
→ python updateGalacticusStart.py from Markus

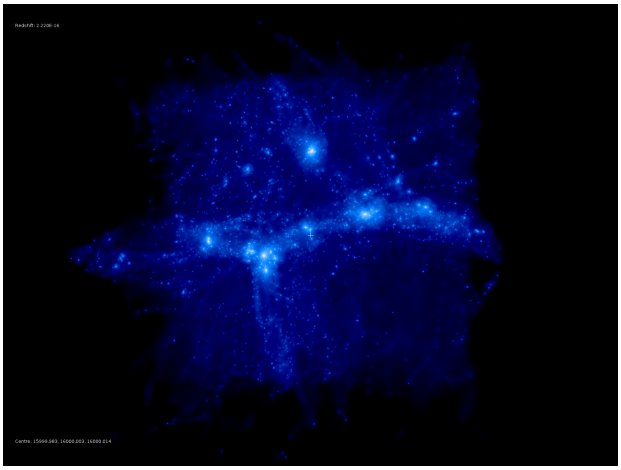
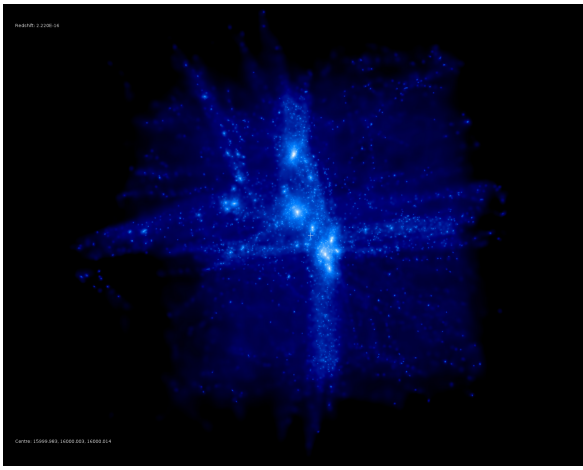
30.01.2012 new consistenttree with vmax=20

Chapter 2

Simulations

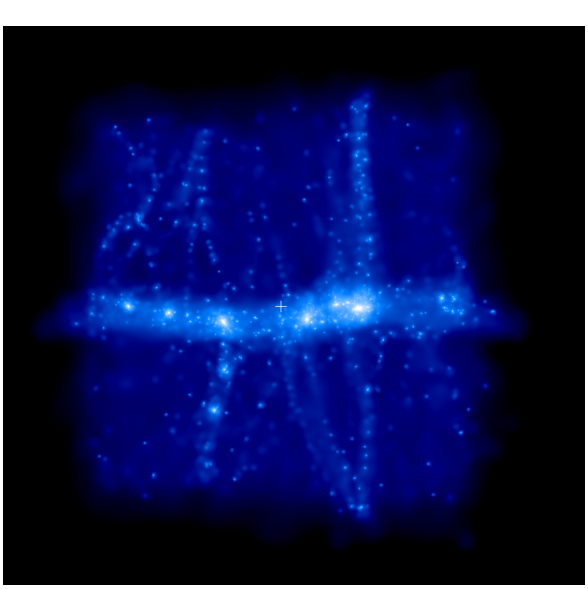
2.1 r128

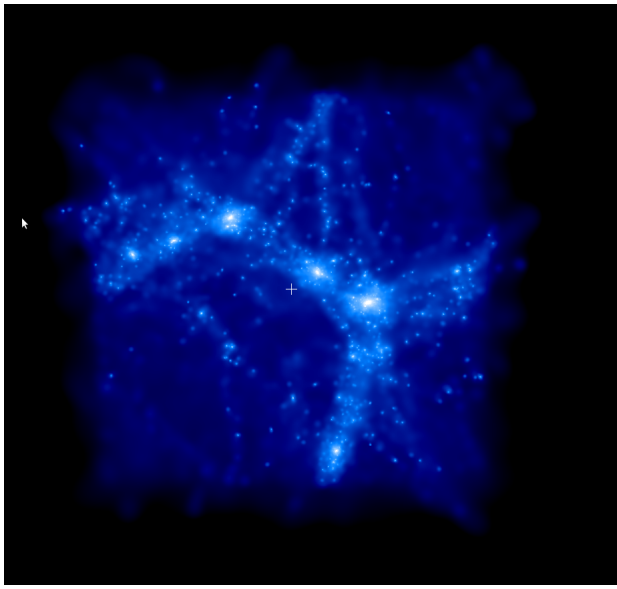
2.1.1 drdx_3

ROCKSTARRED $\surd$
pfff $\rightarrow$ Error: too few halos at scale factor 0.926072 to calculate consistency metric.

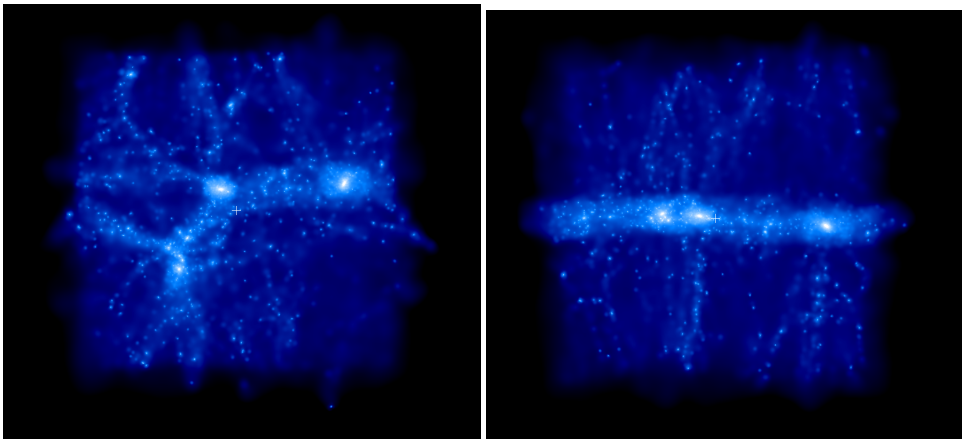
2.1.2 drdx_h100_r128_1





ROCKSTARRED $\surd$
consistenttree: too few halos at scale factor 0.896 ... $\rightarrow$ wtf?

2.1.3 drdx_h100_r128_2



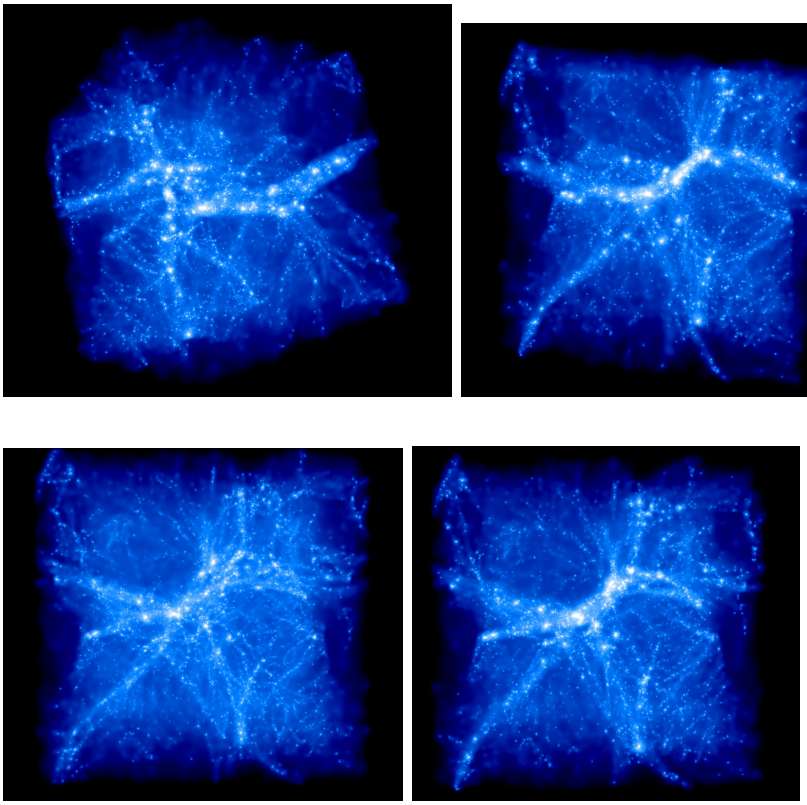
is being rockstarred

2.1.4 drkltest+3c+sl50_1

```
Error: too few halos at scale factor 0.890265 to calculate consistency metric.
Please remove this and all earlier timesteps from the scale file and rerun.
(DescScales.txt)
```

2.2 r256

2.2.1 dr5d5_r256

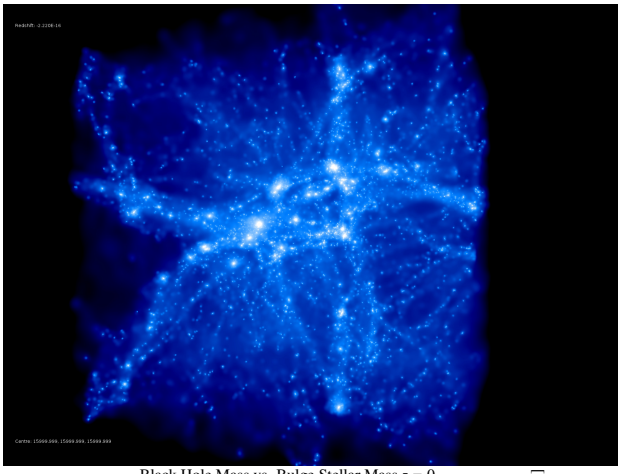


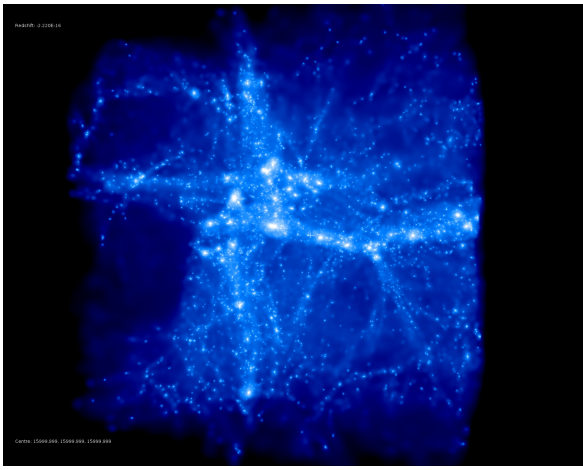
→ re-rockstar on AMD ...-03

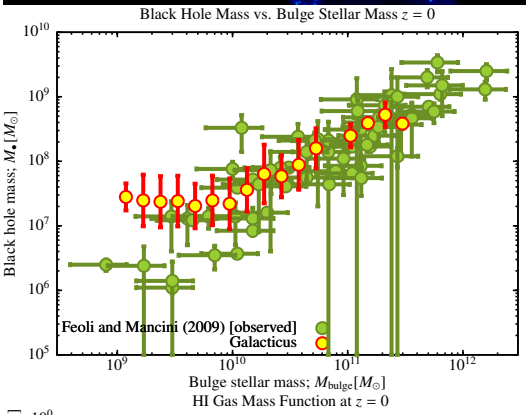
```
find_parents_and_cleanup.c:130:
lookup_new_id: Assertion ‘new_id’ failed.
```

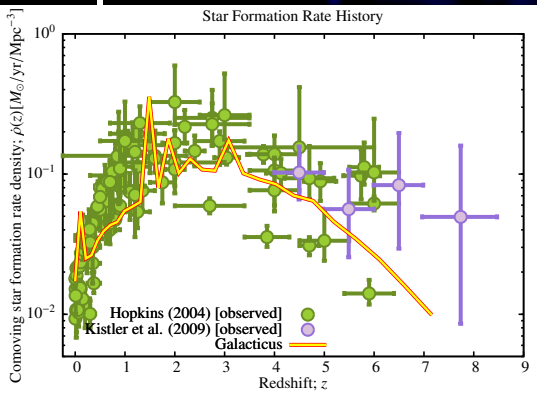
is being consistenttreed

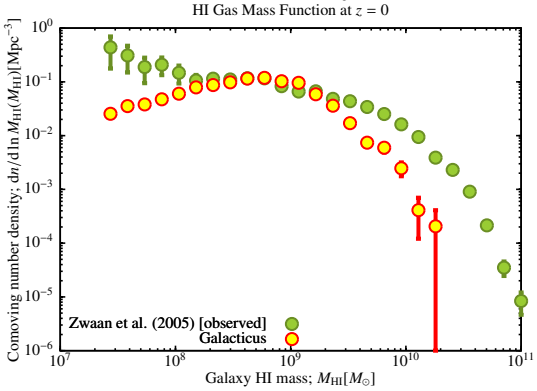
2.2.2 drd5_r256 (+)











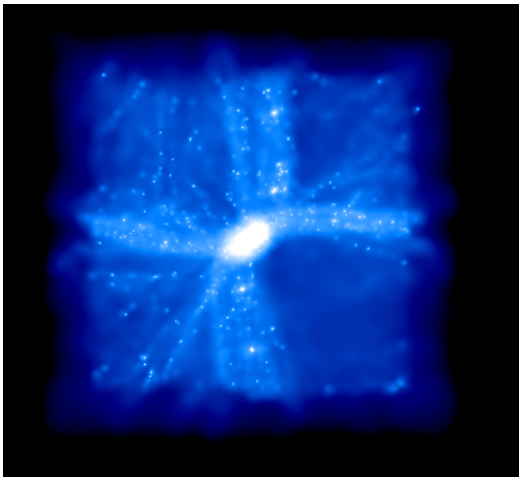
GALACTICUSSED $\surd$
galacticus running on SGE
$\rightarrow$ re-converted with bugfixed converter
tree copied to markus transfer
GALACTICUS:

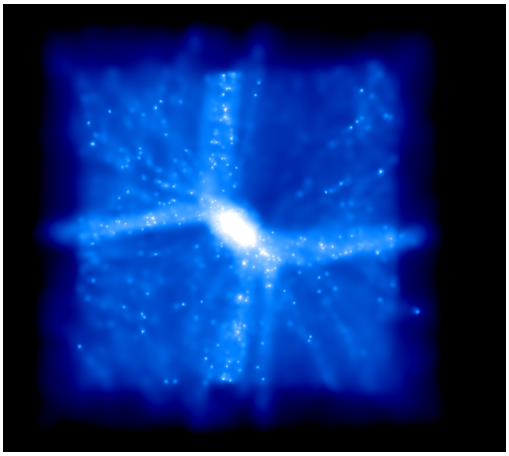
```
Fatal error in Build_Descendent\_Pointers():
```

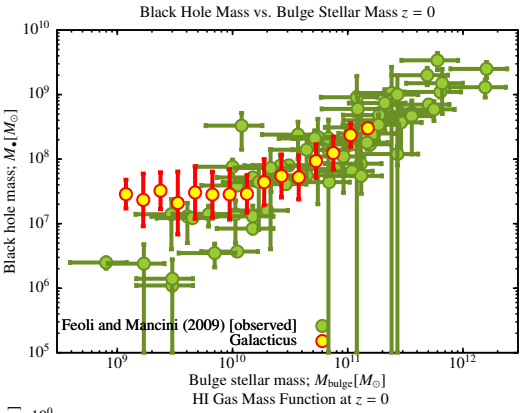
```
failed to find descendent node: 5546454 of 5522259
galacticus.sh: line 67: 25689 Aborted
```

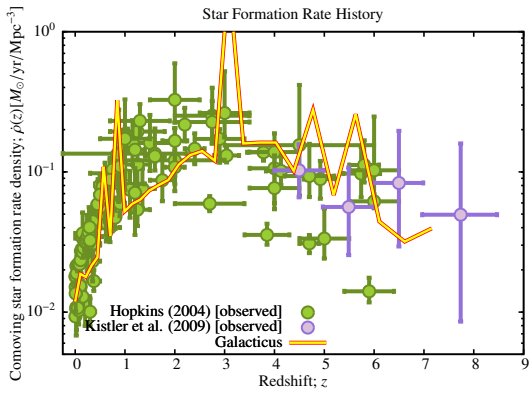
ROCKSTARRED $\surd$
CONSISTENTTREED $\surd$

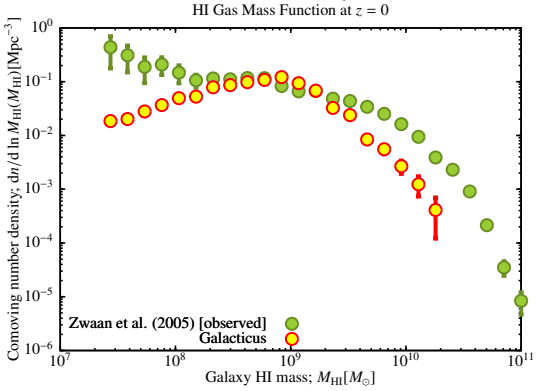
2.2.3 drd5_r256_2 → dump?











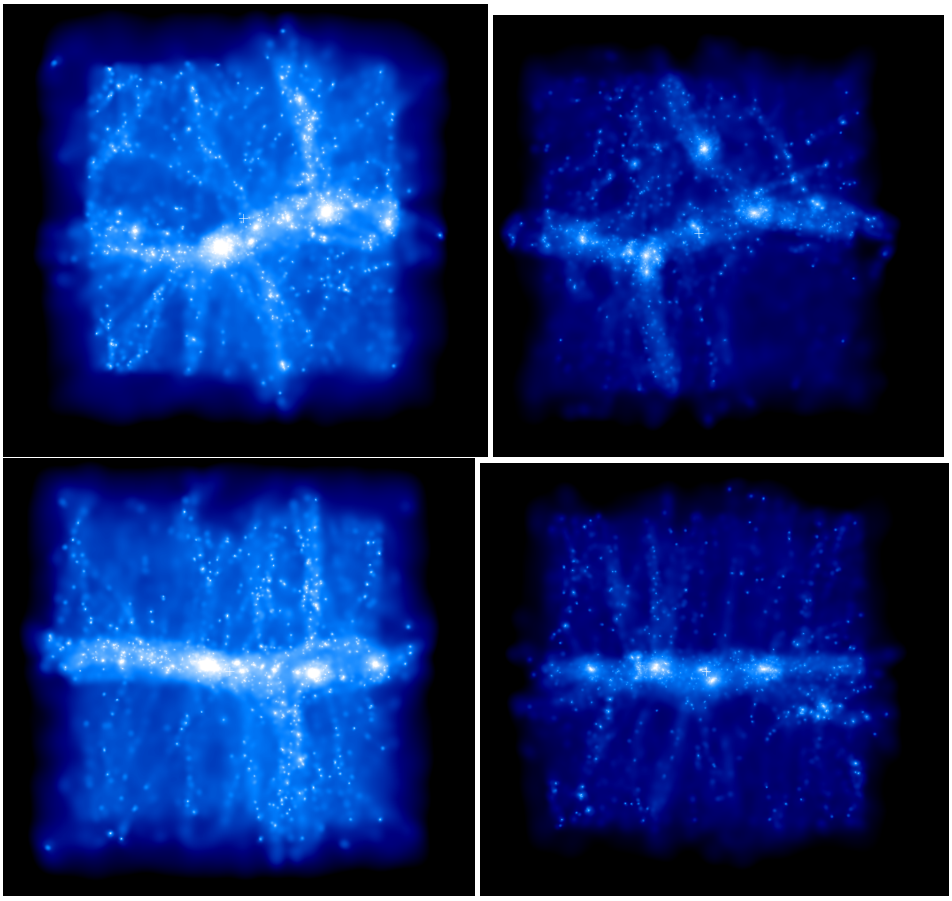
GALACTICUSSED $\surd$
→ fixed in revision 709
→ not fixed! E-Mail to Andrew
After fix in rev. 708 → is being re-galacticussed
→ DUMP IT ?
→ gadgetviewer: simulation has "artificial" cross galacticus running on SGE

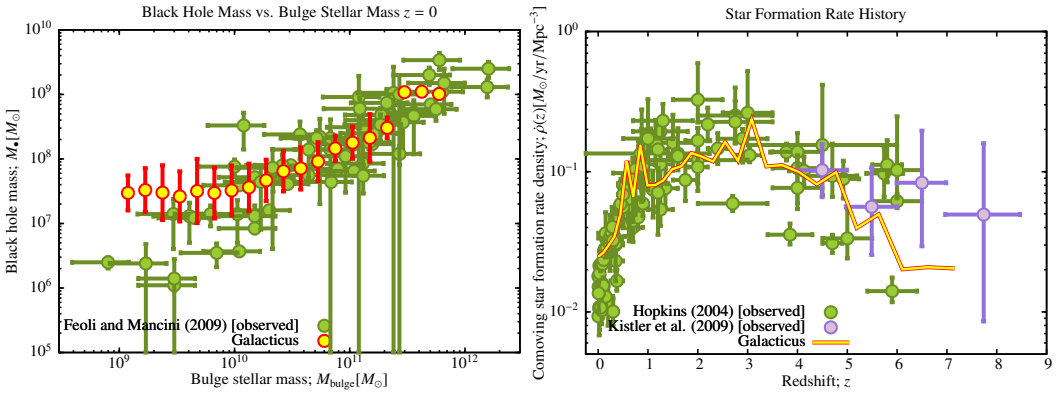
→ re-converted with bugfixed converter (v0.3)
is being galacticussed → job seems to run!

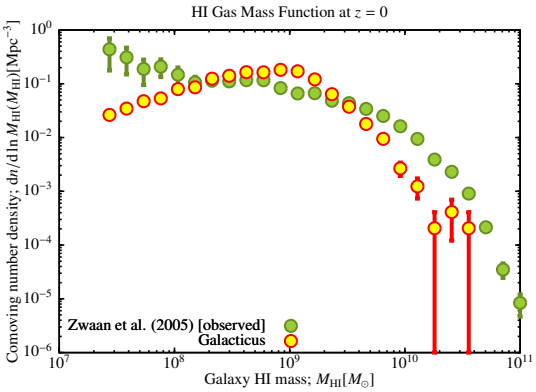
```
no: A fatal error occurred! Backtrace for this error:
#0  0x2B3F2E65E897
#1  0x2B3F2E65EE4E
#2  0x301763648F
#3  0x487AA0 in __merger_tree_read_MOD_build_descendent_pointers
#4  0x48ADC3 in __merger_tree_read_MOD_merger_tree_read_do
#5  0x48205E in __merger_tree_construction_MOD_merger_tree_create
#6  0x46F469 in __galacticus_tasks_evolve_tree_MOD_galacticus_task_evolve_tree.
.F90:0
#7  0x46F9C4 in __galacticus_tasks_evolve_tree_MOD_galacticus_task_evolve_tree
#8  0x46FA4F in __galacticus_tasks_MOD_galacticus_task_do
#9  0x4600E4 in MAIN__ at Galacticus.F90:0
```

CONSISTENTTREED $\surd$
ROCKSTARRED $\surd$ (lasted about 9000minutes)

2.2.4 drdx_3_r256







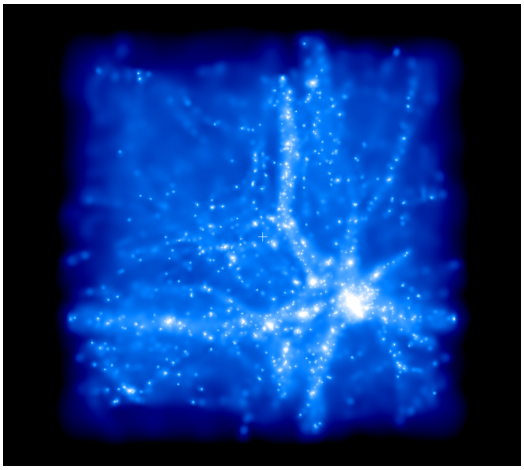
GALACTICUSSED √
→ fixed in revision 709

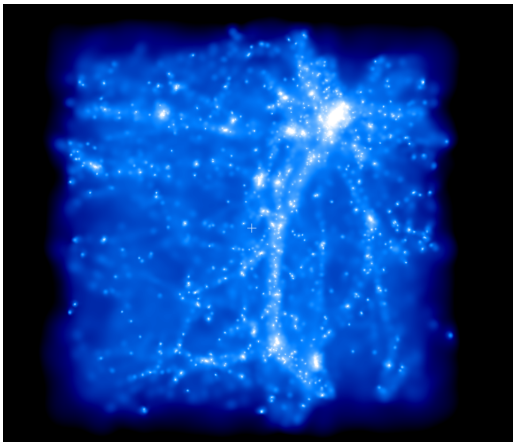
GALACTICUS REV708:

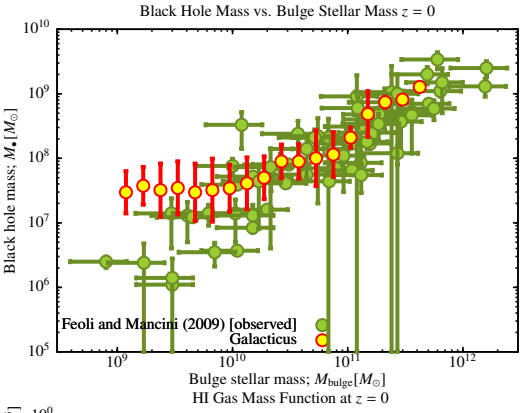
```
#4  0x301763648F
#5  0x49B1B8 in __merger_tree_read_MOD_build_descendent_pointers at merger_tree
#6  0x49FF70 in __merger_tree_read_MOD_merger_tree_read_do at merger_trees.cons
#7  0x4923BE in __merger_tree_construction_MOD_merger_tree_create at merger_tre
#8  0x4800C6 in __galacticus_tasks_evolve_tree_MOD_galacticus_task_evolve_tree.
#9  0x2AC099B4F829
#10  0x3017A07CD0
#11  0x30176DFD3C
#12  0xFFFFFFFFFFFFFFFF
/sge-root/sge/AMD64/spool/astro13/job_scripts/83594: line 22: 13318 Aborted
```

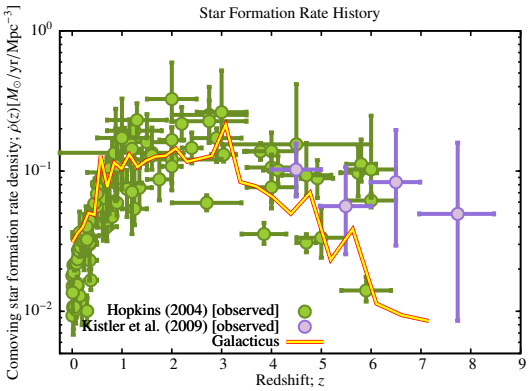
CONSISTENTTREED √
ROCKSTARRED √
is being rockstarred on `astro-x4600-03`
This run is a test if r256 and r128 (`drdx_3`) are comparable → see pictures.

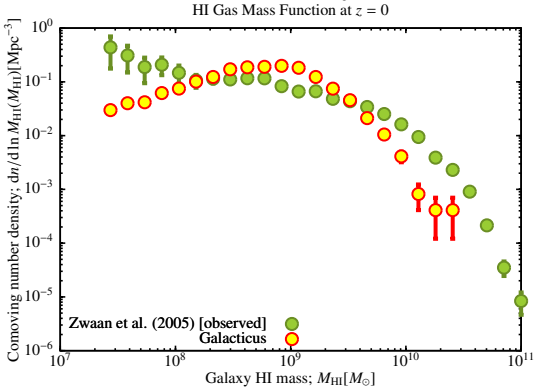
2.2.5 fuenfincr256_1











GALACTICUSSED $\surd$
$\rightarrow$ re-galacticussing with rev708
GALACTICUS: rev707 exited without error but not finished
GALACTICUSSED $\surd$ BUT:

```
[3:46:48 PM CEST] Markus Haider: der fuenfincr256_1 hat a problem
[3:46:52 PM CEST] Markus Haider: der hat keine output gruppe
```

```
[3:46:58 PM CEST] Markus Haider: also keinen output
[3:47:30 PM CEST] Markus Haider: btw schon einen output
[3:47:34 PM CEST] Markus Haider: aber es scheint was zu fehlen
```

→ E-Mail to Andrew
→ re-converted with bugfixed converter

```
 Running model.......
  Reading data for metallicity log10(Z/Z_Solar) = 0.198
   Found 188 ages in the file
  Found 1963 wavelengths in the file
gsl: ../../../../roots/brent.c:57: ERROR: function value is not finite
Default GSL error handler invoked.
```

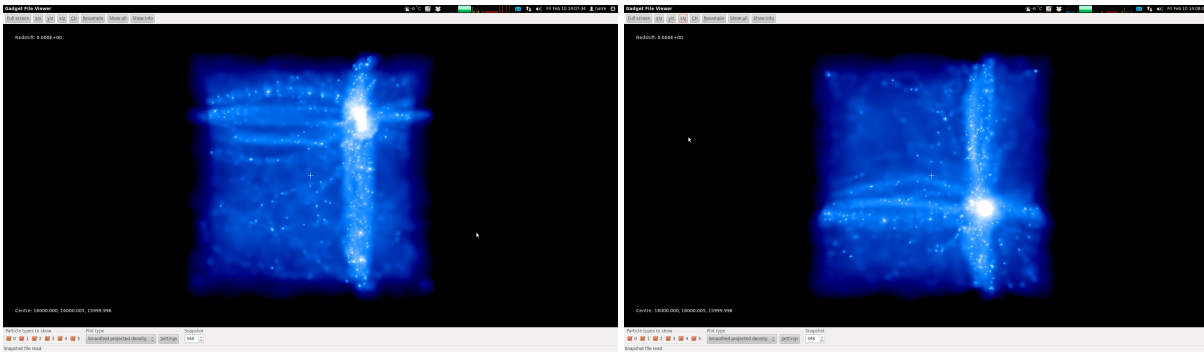
tree copied to markus transfer

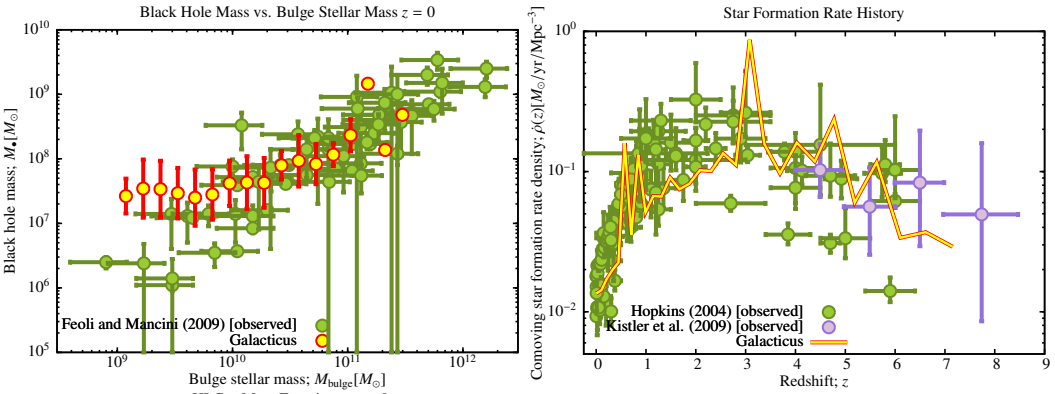
GALACTICUS:

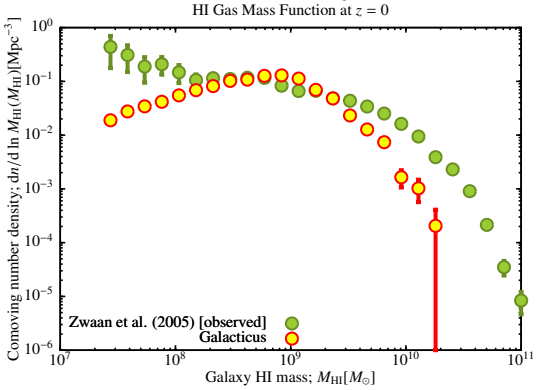
```
Fatal error in Build_Descendent_Pointers():
failed to find descendent node: 12048576 of 12014628
galacticus.sh: line 67:  5751 Aborted
```

ROCKSTARRED $\surd$
CONSISTENTTREED $\surd$

2.2.6 fuenfincr256_2 → dump!







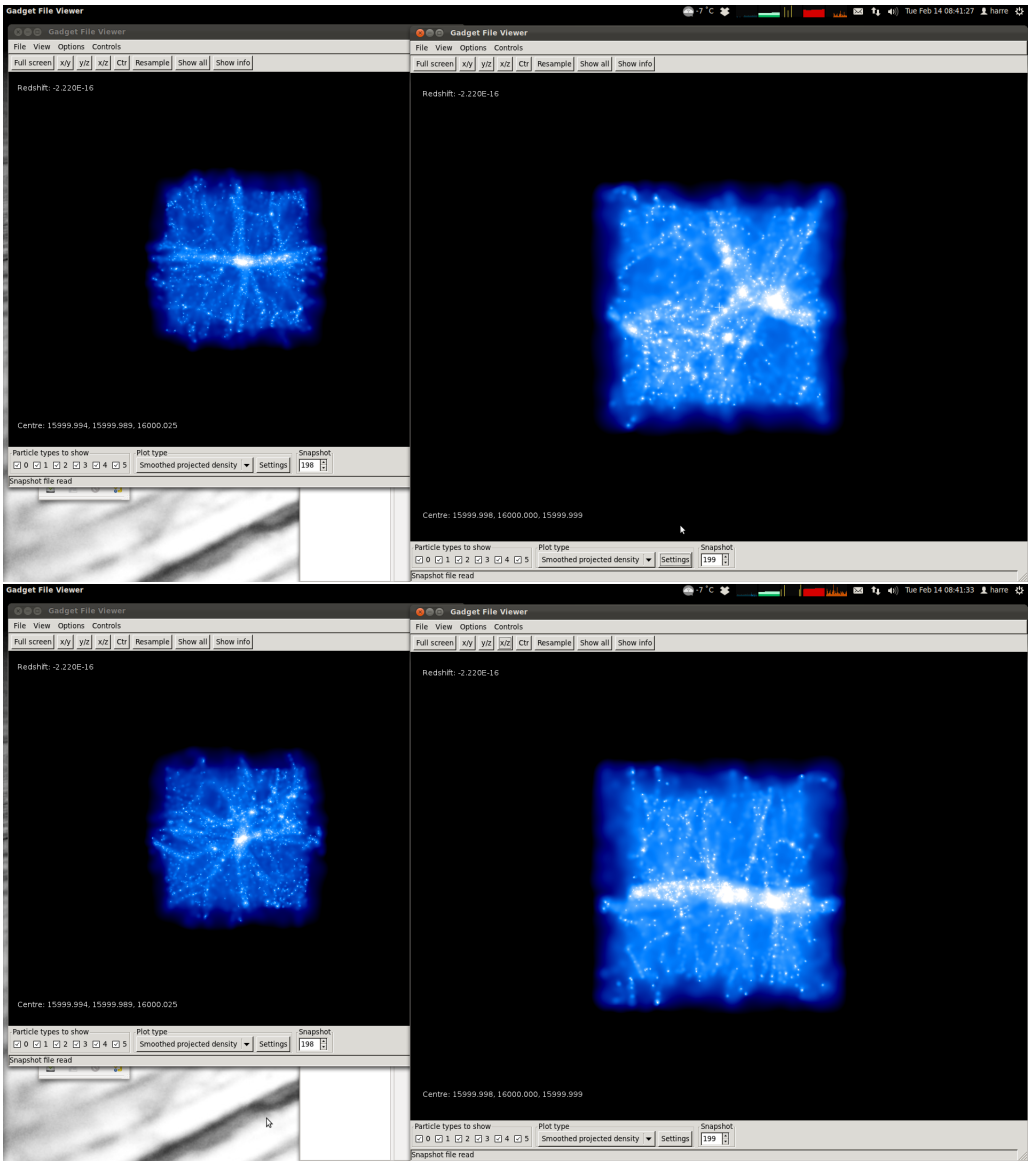
GALACTICUSSED $\surd$ → gadgetviewer: simulation has "artificial" cross on right upper corner → DUMP IT ?
→ re-converted with bugfixed converter (v0.3)
galacticus running on SGE
is being galacticussed → job seems to run!
GALACTICUS:

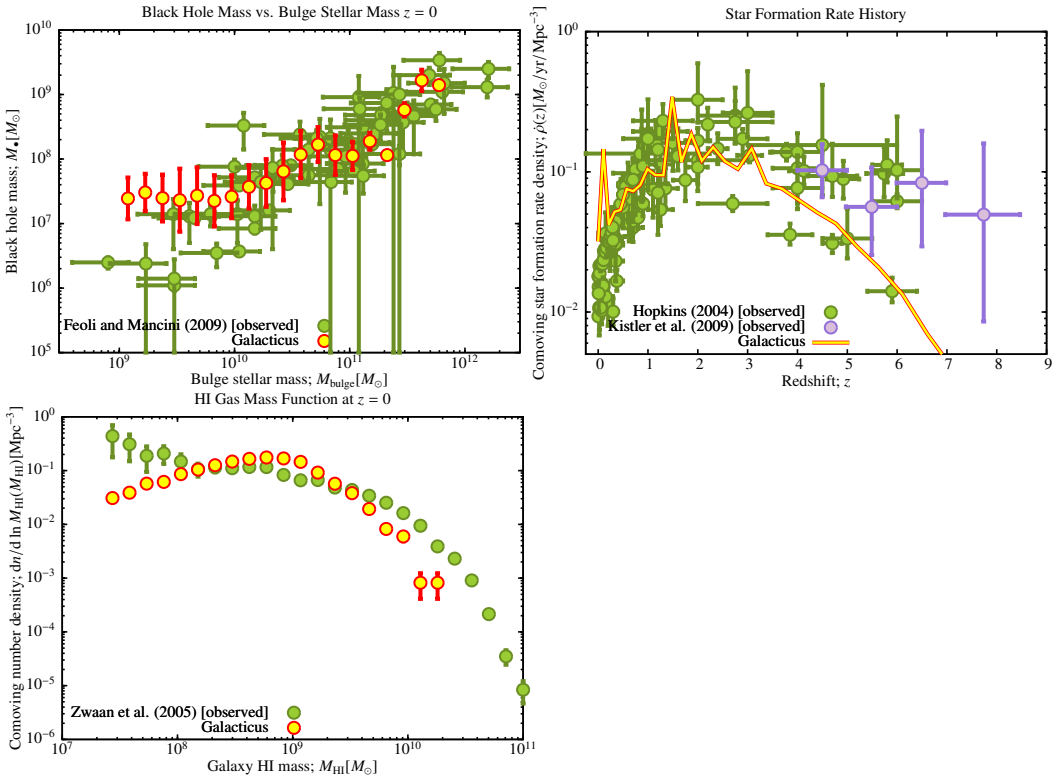
```
Fatal error in Build_Descendent_Pointers():
failed to find descendent node
```

CONSISTENTTREED $\surd$

ROCKSTARRED $\surd$ (lasted about 9000minutes)

2.2.7 gendrkl1r2_1c_1





GALACTICUSSED WITH REVISION 709 $\surd$ CONSISTENTTREED $\surd$ ROCKSTARRED $\surd$

is being rockstarred on `astro-x4600-03`

E-Mail sent to Bertschinger

```
$ diff drkt+3c+sl5_1+r2/constraints_drkt+3c+sl5_1+r2.f
r128/h100/gendrkl1_1c_1/constraints_gendrkl1_1c_1.f

$ diff gendrkl1r2_1c_1/grafic_inc_gendrkl1r2_1c_1.f
r128/h100/gendrkl1_1c_1/grafic_inc_gendrkl1_1c_1.f
5c5
<  parameter (np1=256,np2=256,np3=256,ncon=1)
---
>  parameter (np1=128,np2=128,np3=128,ncon=1)

diff gendrkl1r2_1c_1/graficIO_gendrkl1r2_1c_1.out r128/h100/gendrkl1_1c_1/grafi
23c23
<  Particle lattice size: np1,np2,np3=         256         256         256
---
```

```
>  Particle lattice size: np1,np2,np3=         128         128         128
25,27c25,27
<  chosen:  0.12500000       0.0000000      5.00000007E-02
<  npart, L_x, L_y, L_z= 16777216    32.00    32.00    32.00 Mpc
<  Particle mass= .1447E+09 solar masses
---
>  chosen:  0.25000000       0.0000000      5.00000007E-02
>  npart, L_x, L_y, L_z=  2097152    32.00    32.00    32.00 Mpc
>  Particle mass= .1158E+10 solar masses
37c37
<           ak,akmax=   16.100662       16.000005475554534
---
>           ak,akmax=   16.068306       16.000005475554534
40,41c40,41
<       Mean sigma_delta, sigma_psi=   4.8100653       4.7177238      Mpc
<       Chisq, dof, nu=   16781832.        16777215  0.79710007
---
>       Mean sigma_delta, sigma_psi=   4.1531582       4.7162638      Mpc
>       Chisq, dof, nu=   2095840.0         2097151 -0.64012647
43c43
<  Constraint   1:  Sampled, desired= 0.28453870E-02 0.25000000E-01
---
>  Constraint   1:  Sampled, desired=-0.64672055E-02 0.25000000E-01
46c46
<       Sampled, desired=  0.21657717       16.718990
---
>       Sampled, desired=   1.1184790       16.713776
49c49
<  Constraint   1:  Final= 0.25000000E-01
---
>  Constraint   1:  Final= 0.25000002E-01
52,54c52,54
<       sigma_delta, sigma_psi=   4.9692168       7.6522889      Mpc
<       Chisq, dof=   16781832.        16777214
<       Maximum delta, displacement=   27.548712       17.026833      Mpc
---
>       sigma_delta, sigma_psi=   4.2376528       6.6093922      Mpc
>       Chisq, dof=   2095838.9         2097150
>       Maximum delta, displacement=   22.542503       14.168747      Mpc
56c56
<  Scaling density and displacements to a=  2.75129788E-02
---
>  Scaling density and displacements to a=  3.36233079E-02
58,59c58,59
```

```
<  For a=astart: linear sigma, delmax=  0.18037927      0.99999994
<  RMS, max. 3-D displacement=  0.27777302      0.61806273      Mpc
---
>  For a=astart: linear sigma, delmax=  0.18798503       1.0000000
>  RMS, max. 3-D displacement=  0.29319692      0.62853473      Mpc
```

This run is a test if r256 and r128 (`gendrkl_1c_1`) are comparable → see pictures. Sims are not only different in resolution!