

Installing CosmoMC & the Planck likelihood

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Downloading CosmoMC

1. Go to <http://cosmologist.info/cosmomc/submit.html>
2. Fill in your data (name, surname and e-mail address), and submit.
3. Open the e-mail you have received, and click the link in it.
4. Download the latest version of CosmoMC: *cosmomc_Jul15_1.tar.gz*

Downloading the Planck likelihood

1. Go to <http://pla.esac.esa.int/pla/#cosmology> & click *SIGN IN* and *REGISTER*.
2. Create yourself an account. Fill in your name, surname, e-mail and submit.
3. Open the e-mail you have received, and copy the authentication code.
4. Open another mail you have received, and create yourself a password.
5. Sign in with your new account, and download:
 - The likelihood code: `COM_Likelihood_Code-v2.0_R2.00.tar.bz2`
 - The data files: `COM_Likelihood_Data-baseline_R2.00.tar.gz` (contains high_l, low_l, lensing)

Installing CosmoMC & Planck likelihood

* Example of working directory: /home/USERNAME/

1. Copy the Planck likelihood code, Planck likelihood data and CosmoMC to your path.

- COM_Likelihood_Code-v2.0_R2.00.tar.bz2
- COM_Likelihood_Data-baseline_R2.00.tar.gz
- cosmomc_Jul15_1.tar.gz

2. Uncompress the Planck likelihood code, Planck likelihood data and CosmoMC.

1. `cd /home/USERNAME/`
2. `tar -xvf COM_Likelihood_Code-v2.0_R2.00.tar.bz2` —> which creates a folder named `plc-2.0`
3. `tar -xvf COM_Likelihood_Data-baseline_R2.00.tar.gz` —> which creates a folder named `plc_2.0`
4. `tar -xvf cosmomc_Jul15_1.tar.gz` —> which creates a folder named `cosmomc`

Installing CosmoMC & Planck likelihood

* Linking to the Plank likelihood:

3. Add this to your `.bashr` file or execute before you compile/run CosmoMC
 1. `source /opt/ohpc/pub/compiler/intel/compilers_and_libraries_2016.0.109/linux/mpi/intel64/bin/mpivars.sh`
 2. `source /opt/ohpc/pub/compiler/intel/compilers_and_libraries_2016.0.109/linux/bin/compilervars.sh intel64`
4. Install the Planck likelihood
 1. `cd /home/USERNAME/plc-2.0`
 2. `./waf configure --install_all_deps --lapack_mkl=/opt/ohpc/pub/compiler/intel/compilers_and_libraries_2016.0.109/linux/mkl --lapack_mkl_version=10.3`
 3. `./waf install`
5. Put a symbolic link to the Planck data in CosmoMC data:
 1. `cd /`
 2. `ln -s /home/USERNAME/plc_2.0 /home/USERNAME/cosmomc/data/clik`

Installing CosmoMC & Planck likelihood

* Linking to the Plank likelihood:

6. Modify the CosmoMC Makefile

3. `cd /home/USERNAME/cosmomc/source/`

4. `vi Makefile`

replace in line 7: `MPIF90C ?= mpif90` → `MPIF90C ?= mpif90 -f90=ifort`

7. Compile CosmoMC

3. `make clean`

4. `make`

8. Run a toy chain (leave it running for a minute, this is not a parallel run). Done! 😎

3. `cd ..`

4. `vi test.ini`

replace in line 37: `action = 0 (test)` → `action = 4 (full MCMC)`

3. `./cosmomc test.ini`

Example: Compiling CosmoMC

COMPILING COSMOMC & THE PLANCK LIKELIHOOD

```
[mtrashorras@hydra0 cosmomc]$ ./cosmomc test.ini
Number of MPI processes:      1
file_root:test
Random seeds: 12464, 24560 rand_inst:  1
Doing non-linear Pk: F
Doing CMB lensing: T
Doing non-linear lensing: T
TT lmax = 2500
EE lmax = 2500
ET lmax = 2500
BB lmax = 2500
PP lmax = 2500
lmax_computed_cl = 2500
Computing tensors: F
max_eta_k      = 14000.00
transfer kmax  =  5.000000
adding parameters for: smica_g30_ftl_full_pp
adding parameters for: BKPlanck_detset_comb_dust
Fast divided into      2 blocks
Block breaks at:      8
  9 parameters ( 6 slow ( 0 semi-slow),  3 fast ( 0 semi-fast))
skipped unused params: acib217 xi asz143 aps100 aps143 aps143217 aps217 aksz kgal100 kgal143 kgal143217 kgal217 cal0 cal2
starting Monte-Carlo
Chain:0 drag acppt:  0.6000000    fast/slow  18.00000    slow:      47
Chain:0 drag acppt:  0.6122449    fast/slow  18.00000    slow:      94
^Cforrtl: error (69): process interrupted (SIGINT)
```

Example: Sending a CosmoMC job



EXAMPLES OF A COSMOMC JOB

cosmomc.sh

```
#!/bin/bash
```

```
#SBATCH -J cosmomc_test      job name
#SBATCH -o ./stdout/job.%j.out  creates output files
#SBATCH -e ./stdout/job.%j.err  creates error files
#SBATCH --nodes 1              total number of nodes
#SBATCH --ntasks 8             total number of cores
#SBATCH -time 140:00:00        max. running hours
#SBATCH -p batch                selects queue "batch"

./cosmomc test.ini             execute the code
```

cosmomc.sh

```
#!/bin/bash
```

```
#SBATCH -J cosmomc_test      job name
#SBATCH -o ./stdout/job.%j.out  creates output files
#SBATCH -e ./stdout/job.%j.err  creates error files
#SBATCH --nodes 2              total number of nodes
#SBATCH --ntasks 16           total number of cores
#SBATCH -time 140:00:00        max. running hours
#SBATCH -p batch                selects queue "batch"

./cosmomc test.ini             execute the code
```


Example: Sending a CosmoMC job



EXAMPLE OF A PARALELL JOB

cosmomc.sh

```
#!/bin/bash
```

```
#SBATCH -J cosmomc_test      job name
#SBATCH -o ./stdout/job.%j.out  creates output files
#SBATCH -e ./stdout/job.%j.err  creates error files
#SBATCH --nodes 1             total number of nodes
#SBATCH --ntasks 8           total number of cores
#SBATCH -time 140:00:00       max. running hours
#SBATCH -p batch              selects queue "batch"
export $OMP_NUM_THREADS=8

prun-n 1 ./cosmomc test.ini    execute the code
```

cosmomc.sh

```
#!/bin/bash
```

```
#SBATCH -J cosmomc_test      job name
#SBATCH -o ./stdout/job.%j.out  creates output files
#SBATCH -e ./stdout/job.%j.err  creates error files
#SBATCH --nodes 2             total number of nodes
#SBATCH --ntasks 16           total number of cores
#SBATCH -time 140:00:00       max. running hours
#SBATCH -p batch              selects queue "batch"
export $OMP_NUM_THREADS=16

prun2 ./cosmomc test.ini      execute the code
```

Example: CosmoMC output

Output files: **test_1.txt**, **test_2.txt**, ..., **test.inputparams**, **test.ranges**, **test.paramnames**, **test.likelihoods**.

6.000000E+00	4.020593E+02	2.237905E-02	1.210001E-01	1.040673E+00	7.961286E-02	3.095802E+00	9.689967E-01
1.000905E+00	5.072992E+01	9.992040E-01	3.612232E+00	2.627977E+02	3.357852E+01	3.989548E+01	1.090350E+02
6.971365E+00	1.173381E+01	9.813909E+00	1.323354E+01	7.928245E+01	9.996154E-01	9.943139E-01	6.693115E+01
6.785014E-01	3.214986E-01	1.440243E-01	6.451439E-04	9.639711E-02	8.366901E-01	4.744104E-01	6.300274E-01
1.022705E+00	2.510974E+00	1.011810E+01	2.210495E+00	1.885119E+00	1.228440E+03	5.695538E+03	2.539407E+03
8.190871E+02	2.324751E+02	9.689967E-01	2.453968E-01	2.467233E-01	2.589648E+00	1.380795E+01	1.089994E+03
1.441675E+02	1.040856E+00	1.385086E+01	1.060047E+03	1.468169E+02	1.411623E-01	1.606773E-01	3.426328E+03
1.045747E-02	8.088600E-01	4.470520E-01	7.099794E-02	9.281875E+01	1.395937E+03	6.785478E-01	4.889963E-01
6.199804E-01	2.472889E+01	2.928717E+01	1.041134E+02	1.359998E+01	7.821099E+02	8.408603E+00	7.957099E+02
1.000000E+00	4.051888E+02	2.200543E-02	1.235358E-01	1.040069E+00	3.637712E-02	3.013929E+00	9.567040E-01
9.996694E-01	7.415064E+01	4.920187E-01	6.157384E+00	3.232672E+02	4.418528E+01	3.463432E+01	7.945601E+01
4.202721E+00	7.431789E+00	8.378352E+00	1.865833E+01	7.722513E+01	9.991016E-01	9.974961E-01	6.555908E+01
6.598728E-01	3.401272E-01	1.461864E-01	6.451439E-04	9.583848E-02	8.081931E-01	4.713416E-01	6.171993E-01
9.981566E-01	2.463189E+00	5.836487E+00	2.036726E+00	1.893808E+00	1.241035E+03	5.693506E+03	2.535620E+03
8.129329E+02	2.288998E+02	9.567040E-01	2.452225E-01	2.465484E-01	2.660936E+00	1.387338E+01	1.090697E+03
1.438041E+02	1.040291E+00	1.382344E+01	1.059322E+03	1.465729E+02	1.411301E-01	1.610327E-01	3.478011E+03
1.061516E-02	7.984244E-01	4.418493E-01	7.007005E-02	9.217150E+01	1.415249E+03	6.831381E-01	4.765368E-01
5.946455E-01	3.156666E+01	3.240660E+01	1.049658E+02	1.475256E+01	7.915088E+02	4.116185E+00	8.062613E+02
2.000000E+00	4.044760E+02	2.203441E-02	1.232865E-01	1.040149E+00	3.785501E-02	3.016565E+00	9.570835E-01
9.995595E-01	6.833702E+01	2.042141E-01	3.994217E+00	2.974958E+02	4.308280E+01	2.989378E+01	7.986067E+01
6.277358E+00	6.776987E+00	5.013407E+00	1.235607E+01	8.406485E+01	9.985088E-01	9.978253E-01	6.569092E+01
6.617473E-01	3.382527E-01	1.459661E-01	6.451439E-04	9.588646E-02	8.085777E-01	4.702647E-01	6.166406E-01
9.976291E-01	2.462885E+00	6.001282E+00	2.042103E+00	1.893203E+00	1.241000E+03	5.698219E+03	2.535974E+03
8.131848E+02	2.290240E+02	9.570835E-01	2.452360E-01	2.465620E-01	2.655284E+00	1.386735E+01	1.090635E+03
1.438455E+02	1.040362E+00	1.382649E+01	1.059399E+03	1.466031E+02	1.411182E-01	1.610109E-01	3.472744E+03
1.059909E-02	7.994588E-01	4.423720E-01	7.016101E-02	9.223104E+01	1.413391E+03	6.826819E-01	4.763609E-01
5.953431E-01	3.274119E+01	3.422671E+01	1.049225E+02	1.475358E+01	7.857678E+02	8.430629E+00	8.005213E+02