安装步骤及调试记录

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引言

Symba 软件项目地址：https://bitbucket.org/M_Janssen/symba/src/master/

Symba 软件有两种安装方式：

1. 从源文件直接进行安装，比较繁琐。这里我们使用这种方式进行安装。
2. 使用 docker 或者 singularity 容器进行简单的安装。镜像地址：https://hub.docker.com/r/mjanssen2308/symba

Symba 依赖项目软件地址：

1. https://github.com/achael/eht-imaging
2. https://github.com/rdeane/MeqSilhouette
3. https://bitbucket.org/M_Janssen/picard
4. CASA

注：以上是 symba 直接依赖，但是每个依赖仍有依赖。

服务器 Ubuntu 版本：16.04
anaconda 虚拟环境：python2.7

注：python3.x 也可以正常安装

安装依赖 1-eht-imaging

1. 选择 dev 分支，下载项目压缩包，解压并上传到/home/zl/data/AIWork 下
2. 进入执行：pip setup.py install
3. 根据确实的库添加即可，pip install 缺失库名 –i http://pypi.doubanio.com/simple
4. 安装 eht 成功后，添加 NFFT 和 pynfft 库，后面会用到：conda install -c conda-forge pynfft
5. 添加环境变量：
   a) vim ~/.bashrc，在最后一行添加：
   b) export PYTHONPATH="/home/zl/data/AIWork/eht-imaging-dev":$PYTHONPATH
   c) source ~/.bashrc，激活环境变量

安装依赖 2- MeqSilhouette

1. 选择 leakage 分支，下载项目压缩包，解压并上传到/home/zl/data/AIWork 下

2. 依赖库：
   a) Python2.7 安装：python-casacore==2.1.2；python3.X 直接 pip install python-casacore http://pypi.doubanio.com/simple 即可，测试是否安装成功：python 可以导入 casacore 和 pyrap
   b) scipy>=0.17
   c) astLib
   d) termcolor
   e) matplotlib
   f) seaborn
   g) pandas
   h) mpltools
   i) numpy
   j) pyfits
3. sudo apt-get install meqtrees casalite simms pyxis wsclean
4. 如果 3.中的依赖软件下载不成功，手动下载即可，例如：手动下载 pyxis 项目（https://github.com/ska-sa/pyxis/），解压添加到/home/zl/data/AIWork 下，python setup.py install
5. 添加环境变量：
   a) vim ~/.bashrc，在最后一行添加：
   b) export PYTHONPATH="/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/framework":$PYTHONPATH
   c) export PATH="/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/framework":$PATH
   d) export MEQS_DIR=/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette
   e) source ~/.bashrc，激活环境变量
6. 安装 AATM 软件：请看第 7 页错误 3.

安装依赖 3- picard

1. Obtain the correct CASA version for the pipeline:
   a) $ wget ftp://ftp.mpifr-bonn.mpg.de/outgoing/mjanssen/casa-CAS-13295-4.tar.xz
   b) $ tar xvJf casa-CAS-13295-4.tar.xz
2. 从 https://bitbucket.org/M_Janssen/picard 下下来项目，解压到/home/zl/data/AIWork 下
3. **下载完正确版本的 casa 之后，必须要下载这个版本的 casa**，进入 picard 中，执行：
   a) python setup.py install -p casa-CAS-13295-4
   b) 中间默认，一共按了两次 enter 键。
4. 添加环境变量:
   a) vim ~/.bashrc，在最后一行添加：
   b) export PATH=$PATH:/home/zl/data/AIWork/picard/picard
   c) export PYTHONPATH=$PYTHONPATH:/home/zl/data/AIWork/picard/picard
   d) source ~/.bashrc，激活环境变量

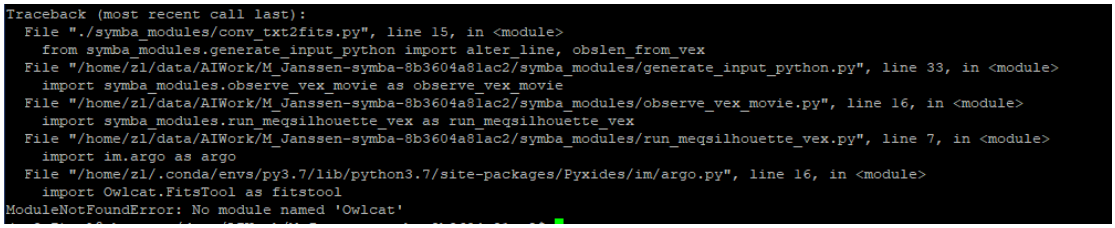
测试并补充间接依赖

测试说明

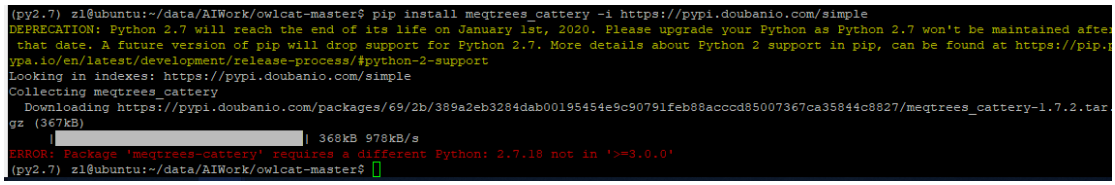
1. 在 symba 的目录直接运行./symba.sh master_input.txt
2. master_input.txt 里面为一些参数
3. 也必须将 symba 项目添加到环境变量中：
   a) export PATH="/home/zl/data/AIWork/symba":$PATH
   b) export PYTHONPATH="/home/zl/data/AIWork/symba":$PYTHONPATH
   c) export PYTHONPATH=$PYTHONPATH:/home/zl/data/AIWork/symba/symba_modules

间接依赖 1-Owlcat 库

1. 安装原因：



2. 项目地址：https://github.com/ska-sa/owlcat
3. 项目目录放到：/home/zl/data/AIWork
4. 核心需求包：casacore、pyrap 必须能够成功 import，这两个来自 python-casacore
5. 需求软件 1：MeqTrees Cattery 库
   a) 安装原因：



   b) 项目地址：https://github.com/ska-sa/meqtrees-cattery
   c) 安装方式和上面的没有什么区别，目录放到：/home/zl/data/AIWork
   d) 执行 `python setup.py install`
   e) 添加到环境变量中，同理添加到~/.bashrc 文件中，并执行 `source ~/.bashrc`：
      i. `export MEQTREES_CATTERY_PATH=/home/zl/data/AIWork/meqtrees-cattery-master/Cattery`
6. 进入 owlcat 目录，使用 python setup.py install 安装即可，若有包没按，单独按即可，常规。

间接依赖 2-Timba 库

1. 安装原因：

```
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "/home/zl/.conda/envs/py2.7/lib/python2.7/site-packages/meqsilhouette-2.7-py2.7.egg/meqsilhouette/framework/meqtrees_funcs.py", line 5, in <module>
    import mqt
  File "/home/zl/.conda/envs/py2.7/lib/python2.7/site-packages/Pyxides/mqt.py", line 10, in <module>
    import Timba
ImportError: No module named Timba
>>>
```

2. 项目目录放到：/home/zl/data/AIWork
3. 项目地址: https://github.com/ska-sa/meqtrees-timba/releases
4. 注意：v1.8.1 禁止了 python2.X 安装，如果强行使用 python2.x 安装，最后会遇到：

```
(py2.7) zl@ubuntu:~/data/AIWork/meqtrees-timba-1.8.1/build$ cmake -DPYTHON_INSTALL_DIR=/home/zl/.conda/envs/py2.7/lib/python2.7/site-packages  -DPythonInterp=/home/zl/.conda/envs/py2.7/
bin .
-- Invalid option for BUILD_TYPE, defaulted to 'Release' build
 * CUDA not found -- CUDA support disabled. This support is still only experimental, do not be alarmed.
-- Compiling backend against Python 3.x
-- Found PythonInterp: /opt/anaconda3/bin/python3 (found suitable version "3.7.4", minimum required is "3.0")
-- Found PythonLibs: /opt/anaconda3/lib/libpython3.7m.so (found suitable exact version "3.7.4")
-- Found PythonInterp: /opt/anaconda3/bin/python3 (found version "3.7.4")
-- Found PythonLibs: /opt/anaconda3/lib/libpython3.7m.so (found version "3.7.4")
-- PYTHON_PACKAGES_DIR = /opt/anaconda3/lib/python3.7/site-packages
-- A library with BLAS API found.
-- A library with LAPACK API found.
-- Configuring done
-- Generating done
CMake Warning:
  Manually-specified variables were not used by the project:

    PythonInterp


-- Build files have been written to: /home/zl/data/AIWork/meqtrees-timba-1.8.1/build
(py2.7) zl@ubuntu:~/data/AIWork/meqtrees-timba-1.8.1/build$
```

所以这里 python2.x 使用 v1.7.0 版本进行安装。

5. 安装需求软件 1：blitz
   a) 安装原因：https://github.com/ska-sa/meqtrees/issues/868
   b) `apt-get install libblitz0-dev`
6. 安装需求软件 2：qdbm
   a) 安装原因：https://github.com/ska-sa/meqtrees/issues/712
   b) apt-get install libqdbm-dev
7. 对 Timba 进行编译安装，进入 Timba 目录中：
   a) `mkdir build`
   b) `cd build`
   c) `cmake ..`
   d) `make`
      i. 可能出现的问题：

```
/bin/sh: 1: /home/zl/data/AIWork/meqtrees-timba-1.8.1/DMI/src/makeglobreg.p1: Permission denied
DMI/CMakeFiles/dmi.dir/build.make:62: recipe for target 'DMI/AID-Global-Registry.cc' failed
make[2]: *** [DMI/AID-Global-Registry.cc] Error 126
CMakeFiles/Makefile2:204: recipe for target 'DMI/CMakeFiles/dmi.dir/all' failed
make[1]: *** [DMI/CMakeFiles/dmi.dir/all] Error 2
Makefile:127: recipe for target 'all' failed
make: *** [all] Error 2
(py2.7) zl@ubuntu:~/data/AIWork/meqtrees-timba-1.8.1/build$ chmod 777 /home/zl/data/AIWork/meqtrees-timba-1.8.1/DMI/src/makeglobreg.p1
(py2.7) zl@ubuntu:~/data/AIWork/meqtrees-timba-1.8.1/build$ make
[  5%] Built target timbase
[  5%] Generating AID-Global-Registry.cc
=== wrote 798 registry entries to /home/zl/data/AIWork/meqtrees-timba-1.8.1/build/DMI/AID-Global-Registry.cc
Scanning dependencies of target dmi
[  5%] Building CXX object DMI/CMakeFiles/dmi.dir/src/AID-DMI-Registry.cc.o
[  6%] Building CXX object DMI/CMakeFiles/dmi.dir/src/AtomicID.cc.o
[  6%] Building CXX object DMI/CMakeFiles/dmi.dir/src/BlockSet.cc.o
[  6%] Building CXX object DMI/CMakeFiles/dmi.dir/src/BObj.cc.o
[  7%] Building CXX object DMI/CMakeFiles/dmi.dir/src/BOIO.cc.o
[  7%] Building CXX object DMI/CMakeFiles/dmi.dir/src/ConfigMgr.cc.o
/home/zl/data/AIWork/meqtrees-timba-1.8.1/DMI/src/ConfigMgr.cc: In member function 'bool DMI::ConfigMgr::merge(const string&, bool, bool)':
/home/zl/data/AIWork/meqtrees-timba-1.8.1/DMI/src/ConfigMgr.cc:115:25: warning: ignoring return value of 'char* fgets(char*, int, FILE*)', declared with attri
unused-result]
     fgets(s,sizeof(s),f);
                       ^
[  7%] Building CXX object DMI/CMakeFiles/dmi.dir/src/Container.cc.o
[  8%] Building CXX object DMI/CMakeFiles/dmi.dir/src/CountedRefBase.cc.o
[  8%] Building CXX object DMI/CMakeFiles/dmi.dir/src/CountedRefTarget.cc.o
[  8%] Building CXX object DMI/CMakeFiles/dmi.dir/src/DMI.cc.o
[  9%] Building CXX object DMI/CMakeFiles/dmi.dir/src/DynamicTypeManager.cc.o
[  9%] Building CXX object DMI/CMakeFiles/dmi.dir/src/Exception.cc.o
[ 10%] Building CXX object DMI/CMakeFiles/dmi.dir/src/HIID.cc.o
[ 10%] Building CXX object DMI/CMakeFiles/dmi.dir/src/List.cc.o
[ 10%] Building CXX object DMI/CMakeFiles/dmi.dir/src/NumArray.cc.o
[ 11%] Building CXX object DMI/CMakeFiles/dmi.dir/src/NumArrayFuncs2.cc.o
```

      ii. 解决方式：提权

```
(py2.7) zl@ubuntu:~/data/AIWork/meqtrees-timba-1.8.1/build$ chmod 777 /home/zl/data/AIWork/meqtrees-timba-1.8.1/DMI/src/makeglobreg.pl
(py2.7) zl@ubuntu:~/data/AIWork/meqtrees-timba-1.8.1/build$ make
[  5%] Built target timbase
[  5%] Generating AID-Global-Registry.cc
=== wrote 798 registry entries to /home/zl/data/AIWork/meqtrees-timba-1.8.1/build/DMI/AID-Global-Registry.cc
Scanning dependencies of target dmi
[  5%] Building CXX object DMI/CMakeFiles/dmi.dir/src/AID-DMI-Registry.cc.o
[  6%] Building CXX object DMI/CMakeFiles/dmi.dir/src/AtomicID.cc.o
[  6%] Building CXX object DMI/CMakeFiles/dmi.dir/src/BlockSet.cc.o
```

iii. make 成功：

```
Scanning dependencies of target mequtils
[ 99%] Building CXX object PyApps/CMakeFiles/mequtils.dir/src/mequtils_symlink.cc.o
[ 99%] Linking CXX shared library mequtils.so
[ 99%] Built target mequtils
Scanning dependencies of target parmtables
[100%] Building CXX object PyApps/CMakeFiles/parmtables.dir/src/parmtables.cc.o
[100%] Linking CXX shared library parmtables.so
[100%] Built target parmtables
(py2.7) zl@ubuntu:~/data/AIWork/meqtrees-timba-1.8.1/build$
```

e) make install

i. 可能出现的问题：

```
Makefile:61: recipe for target 'install' failed
make: *** [install] Error 1
(py2.7) zl@ubuntu:~/data/AIWork/meqtrees-timba-1.8.1/build$ ls
AppAgent        CMakeFiles          config.h.in  include   MEQ     MeqNodes      MeqServer  OCTOPython  TimBase
CMakeCache.txt  cmake_install.cmake  DMI          Makefile  MeqMPI  _meqpackages  OCTOPUSSY  PyApps      VisCube
(py2.7) zl@ubuntu:~/data/AIWork/meqtrees-timba-1.8.1/build$
```

ii. 解决方式：管理员权限：

```
(py2.7) zl@ubuntu:~/data/AIWork/meqtrees-timba-1.8.1/build$ sudo make install
[sudo] password for zl:
[  5%] Built target timbase
[ 16%] Built target dmi
```

iii. make install 成功：

```
[100%] Built target parmtables
Install the project...
-- Install configuration: "Release"
-- Installing: /usr/local/lib/libtimbase.so
-- Installing: /usr/local/bin/meqtrees-gprof-run
-- Installing: /usr/local/lib/libdmi.so
-- Installing: /usr/local/lib/liboctopussy.so
-- Installing: /usr/local/lib/octopython.so
-- Set runtime path of "/usr/local/lib/octopython.so" to "/home/zl/.conda/envs/py2.7/
-- Installing: /opt/anaconda3/lib/python3.7/site-packages/Timba/octopython.so
-- Set runtime path of "/opt/anaconda3/lib/python3.7/site-packages/Timba/octopython.s
-- Installing: /opt/anaconda3/lib/python3.7/site-packages/Timba/version_info/__init__
-- Installing: /opt/anaconda3/lib/python3.7/site-packages/Timba/array.py
-- Installing: /opt/anaconda3/lib/python3.7/site-packages/Timba/__init__.py
-- Installing: /opt/anaconda3/lib/python3.7/site-packages/Timba/qt_threading.py
-- Installing: /opt/anaconda3/lib/python3.7/site-packages/Timba/octopussy.py
-- Installing: /opt/anaconda3/lib/python3.7/site-packages/Timba/dmi_repr.py
-- Installing: /opt/anaconda3/lib/python3.7/site-packages/Timba/dmi.py
-- Installing: /opt/anaconda3/lib/python3.7/site-packages/Timba/utils.py
-- Installing: /usr/local/lib/libmeq.so
-- Set runtime path of "/usr/local/lib/libmeq.so" to "/home/zl/.conda/envs/py2.7/lib:
-- Installing: /usr/local/lib/libviscube.so
-- Installing: /usr/local/lib/libmeqmpi.so
-- Installing: /usr/local/lib/libmeqnodes.so
-- Installing: /usr/local/lib/libappagent.so
-- Installing: /usr/local/lib/libapputils.so
-- Installing: /usr/local/bin/addbitflagcol
-- Set runtime path of "/usr/local/bin/addbitflagcol" to "/home/zl/.conda/envs/py2.7/
-- Installing: /usr/local/bin/addtiledmscol
-- Set runtime path of "/usr/local/bin/addtiledmscol" to "/home/zl/.conda/envs/py2.7/
-- Installing: /usr/local/bin/wsrt_j2convert
```

修改 symba 测试的配置文件-master_input.txt

1. 将路径 usr/local/src 换为所有对应项目的正确路径

执行过程调试

1. 错误 1：

```
CASA 5.1.1-5   -- Common Astronomy Software Applications

--> CrashReporter initialized.
('./symba_modules/generate_input_CASA.py', '/home/zl/data/AIWork/symba/symba-fitsinput-PqlcTE0yywycR/master_input.txt')

>> Preparing stations...
Traceback (most recent call last):
  File "/opt/casalite-5.1.1/lib/python2.7/init_welcome.py", line 24, in <module>
    execfile(__candidates[0])
  File "./symba_modules/generate_input_CASA.py", line 95, in <module>
    main()
  File "./symba_modules/generate_input_CASA.py", line 33, in main
    set_input_antennas(sys.argv[-2], sys.argv[-1])
  File "./symba_modules/generate_input_CASA.py", line 48, in set_input_antennas
    os.makedirs(ant_table)
  File "/opt/casalite-5.1.1/lib/python2.7/os.py", line 150, in makedirs
    makedirs(head, mode)
  File "/opt/casalite-5.1.1/lib/python2.7/os.py", line 150, in makedirs
    makedirs(head, mode)
  File "/opt/casalite-5.1.1/lib/python2.7/os.py", line 157, in makedirs
    mkdir(name, mode)
OSError: [Errno 13] Permission denied: '/data'
```

a) 解决方式：更改/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data 中的文件

/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data/eht230.json - zl@192.168.1.108 - 编辑器 - WinSCP

```
{
"outdirname":"/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data/output/ehttest",
"input_fitsimage":"/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data/sky_models/singlept",
"input_fitspol":1,
"input_changroups":1,
"output_to_logfile":0,
"add_thermal_noise":1,
"make_image":0,
"exportuvfits":0,
"station_info":"/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data/eht_betterweather.antennas",
"bandpass_enabled":1,
"bandpass_table":"/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data/eht_bandpass.txt",
"bandpass_freq_interp_order":1,
"bandpass_makeplots": 1,
"elevation_limit":0.174,
"corr_quantbits":2,
"predict_oversampling":8191,
"predict_seed":42,
"ms_antenna_table":"/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data/ANTENNA_EHT2017",
"ms_datacolumn":"DATA",
"ms_RA":187.70591666666667,
"ms_DEC":12.391122222222222,
"ms_polproducts":"RR RL LR LL",
"ms_nu":228,
```

2. 错误 2：

```
Traceback (most recent call last):
  File "./symba_modules/generate_input_python.py", line 418, in <module>
    main()
  File "./symba_modules/generate_input_python.py", line 48, in main
    set_input_files(args[0])
  File "./symba_modules/generate_input_python.py", line 95, in set_input_files
    observe_vex_movie.observe_vex_movie(master_inp, jsonfile, ra, dec, obs_vex)
  File "/home/zl/data/AIWork/symba/symba_modules/observe_vex_movie.py", line 525, in observe_vex_movie
    run_meqsilhouette_vex.main(json_dir + '/json_%s.json'%(scan.number), 'scan%s_%s'%(scan.number, scan.sourcename), master_inp)
  File "/home/zl/data/AIWork/symba/symba_modules/run_meqsilhouette_vex.py", line 187, in main
    parameters['parang_corrected'], gainR_mean, gainR_std, gainL_mean, gainL_std, leakR_mean, leakR_std, leakL_mean, leakL_std, feed_angle)
TypeError: __init__() takes exactly 34 arguments (33 given)
```

a) 错误原因：缺少一个传入的参数

```
class SimCoordinator():

    def __init__(self, msname, output_column, input_fitsimage, input_fitspol, input_changroups, bandpass_table, bandpass_freq_interp_orde
                 corr_eff, predict_oversampling, predict_seed, aperture_eff, elevation_limit, trop_enabled, trop_wetonly, pwv, \
                 gpress, gtemp, coherence_time, fixdelay_max_picosec, uvjones_g_on, uvjones_d_on, parang_corrected, gR_mean, \
                 gR_std, gL_mean, gL_std, dR_mean, dR_std, dL_mean, dL_std, feed_angle, thermal_noise_enabled):
```

b) 解决方式：

i. 参考这个文件：

```
run_meqsilhouette.py   SimCoordinator.py   eht230.json
Package requirements 'mpltools', 'seaborn', 'astLib', 'astropy', 'termcolor', 'numpy', 'matplotlib', 'pyfits', 'simms' are not satisfied   Install requirements   Ignore requirements
eters['corr_quantbits'] == 2: corr_eff = 0.88                                                                                                    34 13 171 109
t('Invalid number of bits used for quantization. Value of "corr_quantbits" in input json file must be 1 or 2')

ting empty MS with simms')
MS, input_fitsimage, ms_dict)

ms log into the output directory
'mv %s %s'%('log-simms.txt', input_copy_path.rsplit('/',1)[0]))

te mount types into the MOUNT column in the empty MS prior to generating synthetic data.
unt_types = np.loadtxt(parameters['station_info'], usecols=[19], dtype=str, skiprows=1)
able(v.MS)
t.table(tab.getkeyword('ANTENNA'), readonly=False)
col('MOUNT', station_mount_types)
se()
)

lating sky model into %s column in %s'%(ms_dict['datacolumn'],MS))
= SimCoordinator(MS,ms_dict["datacolumn"],input_fitsimage, input_fitspol, input_changroups, bandpass_table, bandpass_freq_interp_order, sefd, corr_eff, parameters['pred
                 parameters["predict_seed"], aperture_eff,\
                 parameters["elevation_limit"], parameters['trop_enabled'], parameters['trop_wetonly'], pwv, gpress, gtemp,\
                 coherence_time, parameters['trop_fixdelay_max_picosec'], parameters['uvjones_g_on'], parameters['uvjones_d_on'], parameters['parang_corrected'],\
                 gR_mean, gR_std, gL_mean, gL_std, dR_mean, dR_std, dL_mean, dL_std, feed_angle, parameters['add_thermal_noise'])

interferometric_sim()
```

ii. 解决：

```
sim_coord = SimCoordinator(MS,ms_dict['datacolumn'],this_fitsimage, input_fitspol, input_changroups, bandpass_table, bandpass_freq_interp_order, sefd, \
                           float(parameters['quantisation_efficiency']), parameters['predict_oversampling'], parameters['corr_eff'], aperture_eff,
                           parameters["elevation_limit"], parameters['trop_enabled'], parameters['trop_wetonly'], pwv, gpress, gtemp, \
                           coherence_time,parameters['trop_fixdelay_max_picosec'], parameters['uvjones_g_on'], parameters['uvjones_d_on'], \
                           parameters['parang_corrected'], gainR_mean, gainR_std, gainL_mean, gainL_std, leakR_mean, leakR_std, leakL_mean, leakL_std, feed_angle,parameters['add_thermal_noise'])


sim_coord.interferometric_sim()
```

3. 错误 3：

```
/bin/sh: 1: absorption: not found
Traceback (most recent call last):
  File "./symba_modules/generate_input_python.py", line 418, in <module>
    main()
  File "./symba_modules/generate_input_python.py", line 48, in main
    set_input_files(args[0])
  File "./symba_modules/generate_input_python.py", line 95, in set_input_files
    observe_vex_movie.observe_vex_movie(master_inp, jsonfile, ra, dec, obs_vex)
  File "/home/zl/data/AIWork/symba/symba_modules/observe_vex_movie.py", line 525, in observe_vex_movie
    run_meqsilhouette_vex.main(json_dir + '/json_%s.json'%(scan.number), 'scan%s_%s'%(scan.number, scan.sourcename), master_inp)
  File "/home/zl/data/AIWork/symba/symba_modules/run_meqsilhouette_vex.py", line 187, in main
    parameters['parang_corrected'], gainR_mean, gainR_std, gainL_mean, gainL_std, leakR_mean, leakR_std, leakL_mean, leakL_std, feed_angle,parameters['add_thermal_noise'])
  File "/home/zl/.conda/envs/py2.7/lib/python2.7/site-packages/meqsilhouette-2.7-py2.7.egg/meqsilhouette/framework/SimCoordinator.py", line 124, in __init__
    self.opacity, self.sky_temp = self.trop_return_opacity_sky_temp()
  File "/home/zl/.conda/envs/py2.7/lib/python2.7/site-packages/meqsilhouette-2.7-py2.7.egg/meqsilhouette/framework/SimCoordinator.py", line 424, in trop_return_opacity_sky_temp
    output = subprocess.check_output(ATM_abs_string,shell=True)
  File "/home/zl/.conda/envs/py2.7/lib/python2.7/subprocess.py", line 223, in check_output
    raise CalledProcessError(retcode, cmd, output=output)
subprocess.CalledProcessError: Command 'absorption --fmin 226.963375 --fmax 228.963375 --fstep 0.031250 --pwv 1.500000 --gpress 555.000000 --gtemp 271.000000' returned non-zero exit status 127
(py2.7) zl@ubuntu:~/data/AIWork/symba$
```

中途执行了一个shell命令，即子进程

a) 错误原因：中间执行 shell 命令 absorption，但是没有没有在 bin/sh 中找到此命令，在安装 MeqSilhouette-leakage 时，没有正常安装 AATM

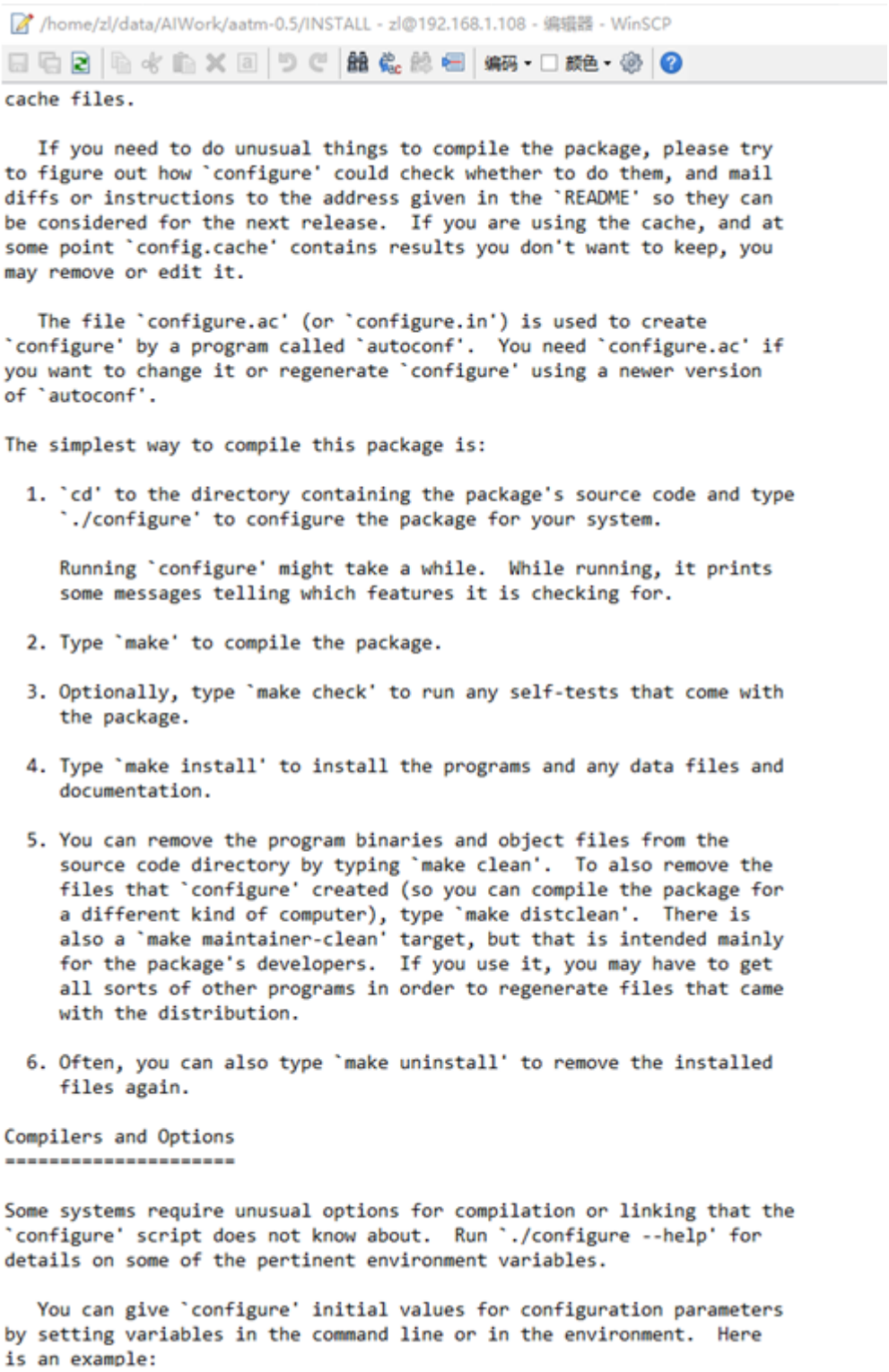
b) 解决方式:

i. 网址：http://www.mrao.cam.ac.uk/~bn204/alma/atmomodel.html

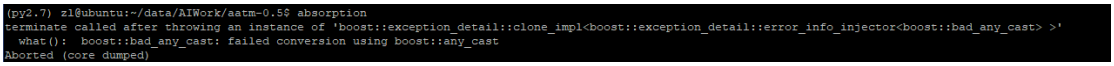
ii. 项目包下载链接：https://drive.google.com/file/d/1z_vEVbcy_NRGgrhC5g_7rOgijkAHvjXr/view

iii. 下载 aatm-0.5 并解压放到：/home/zl/data/AIWork 下

iv. 参考 INSTALL 文件，编译：



1.
2. Make install 出错，使用管理员权限
3. 可以使用 absorption 命令：



4. 错误 4：

```
--> CrashReporter initialized.
Traceback (most recent call last):
  File "/opt/casalite-5.1.1/lib/python2.7/init_welcome.py", line 24, in <module>
    execfile(__candidates[0])
  File "./symba_modules/copy_modeldata.py", line 24, in <module>
    import symba_modules.input_reader as input_reader
ImportError: No module named symba_modules.input_reader
```

i. 解决方式：

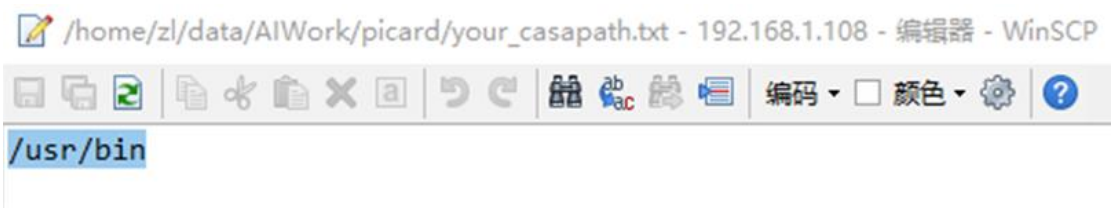
```
#import symba_modules.input_reader as input_reader
from casac import casac
import input_reader
```

5. 错误 5：
   a) 错误提示：auxiliary 方法没有 is_set()，但是有
   b) 解决方式：修改为下图所示

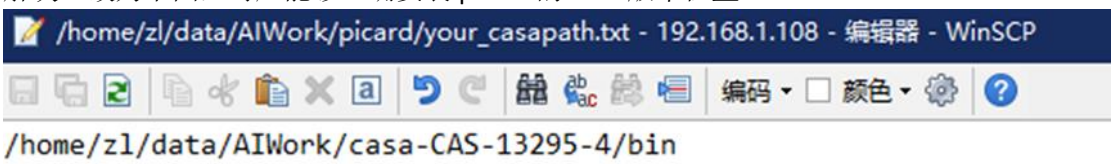
```
#import pipe_modules as auxiliary
from pipe_modules import auxiliary
```

6. 错误 6：
   a) 错误提示：mpicasa 在 usr/bin/下找不到
   b) 错误原因：

```
scriptpath=$(readlink -f "$0")  #/home/zl/data/AIWork/picard/picard/picard
pipedir=$(dirname "$scriptpath")/  #/home/zl/data/AIWork/picard/picard/
casadir=$(cat ${pipedir}../your_casapath.txt) #读取/home/zl/data/AIWork/picard目录下的your_casapath.txt文件
```



   c) 解决：改为下图，对应能够正确安装 picard 的 casa 版本位置



第一次出现阶段结束之后的错误

```
         -- Executing step 1 --

Exporting the calibrated data...
  Generating an averaged MS: bhc_synthetic.MS.avg
    Using combinespws=False, chanbin=999999, timebin=10s
  Generating uvfits files for all sources from bhc_synthetic.MS.avg
    Exporting M87_calibrated.uvf
Done


Changing directories from
/home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data
to
/home/zl/data/AIWork/symba


_____________________________________________________________________
                ........................................

                              - FINISHED -
                         Now: Tea. Earl Grey. Hot.
                   Waiting for the MPI environment wrap-up...
                    ****************************************
```

7. 警告 1
   a) 警告提示：

```
Warning: scikit-image not installed! Cannot use hough transform
```

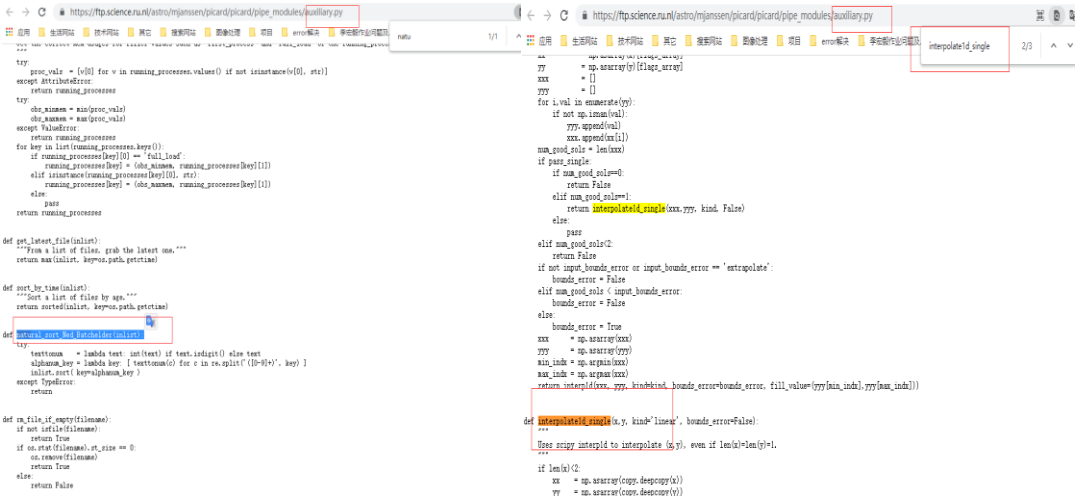
   b) 解决警告：
      i. pip install scikit-image -i https://pypi.doubanio.com/simple

8. 错误 7：
   a) 错误提示：

```
/home/zl/.conda/envs/py2.7/lib/python2.7/site-packages/pyfits-3.5-py2.7-linux-x86_64.egg/pyfits/__init__.py:22: PyFITSDeprecationWarni
ng: PyFITS is deprecated, please use astropy.io.fits
  PyFITSDeprecationWarning)  # noqa
Welcome to eht-imaging! v 1.2.2

Traceback (most recent call last):
  File "./symba_modules/netcal.py", line 6, in <module>
    import symba_modules.read_input_models as read_input_models
  File "/home/zl/data/AIWork/symba/symba_modules/read_input_models.py", line 4, in <module>
    from pipe_modules import interpolateld_single, natural_sort_Ned_Batchelder
ImportError: cannot import name interpolateld_single
```

   b) 解决方式：
      i. 因为导报位置错了



ii. 解决：

```
#from pipe_modules import interpolateld_single, natural_sort_Ned_Batchelder
from pipe_modules.auxiliary import interpolateld_single, natural_sort_Ned_Batchelder
```

9. 错误 8：

a) 错误提示：

```
Loading fits image:  /home/zl/data/AIWork/symba/symba-fitsinput-OGhWMD141Kf5m/input_sky_model/000000.fits
Loading uvfits:  /home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data/M87_calibrated.uvf
POLREP_UVFITS: circ
Number of uvfits Correlation Products: 4
No NX table in uvfits!
No stations specified in network cal: defaulting to calibrating all stations!
Not Using Multiprocessing
Scan 779/780 : [------------------------------ ]99%
network_cal time: 217.814364 s
Downloading https://datacenter.iers.org/data/9/finals2000A.all
|================================================================================| 3.4M/3.4M (100.00%)         2s
Building NX table
No NX table in saved uvfits
Traceback (most recent call last):
  File "./symba_modules/netcal.py", line 44, in <module>
    main()
  File "./symba_modules/netcal.py", line 16, in main
    netcal(args[0])
  File "./symba_modules/netcal.py", line 39, in netcal
    obs_nc.save_uvfits('%s/%s_calibrated_netcal.uvf'%(master_inp.outdirname, sourcename))
  File "/home/zl/data/AIWork/eht-imaging-dev/ehtim/obsdata.py", line 4502, in save_uvfits
    force_singlepol=force_singlepol, polrep_out=polrep_out)
  File "/home/zl/data/AIWork/eht-imaging-dev/ehtim/io/save.py", line 833, in save_obs_uvfits
    return hdulist_new.copy()
AttributeError: 'HDUList' object has no attribute 'copy'
```

b) Astropy4.x 版本只适合 python3.X 安装

要求

`astropy` 有以下严格要求：

- Python 3.7 或更高版本
- Numpy >=1.17 或更高版本
- PyERFA >=1.7.3 或更高版本

c) copy()方法源代码：

```
def __copy__(self):
    """
    Return a shallow copy of an HDUList.

    Returns
    -------
    copy : `HDUList`
        A shallow copy of this `HDUList` object.

    """

    return self[:]

# Syntactic sugar for `__copy__()` magic method
copy = __copy__

def __deepcopy__(self, memo=None):
    return HDUList([hdu.copy() for hdu in self])
```

d) 解决方式: 只能去掉 copy()

```
#return hdulist_new.copy()
return hdulist_new
```

10. 错误 9：

a)

```
Traceback (most recent call last):
  File "/opt/casalite-5.1.1/lib/python2.7/init_welcome.py", line 24, in <module>
    execfile(__candidates[0])
  File "./symba_modules/plotms.py", line 2, in <module>
    import symba_modules.input_reader as input_reader
ImportError: No module named symba_modules.input_reader
```

执行完毕

```
/home/zl/.conda/envs/py2.7/lib/python2.7/site-packages/pyfits-3.5-py2.7-linux-x86_64.egg/pyfits/__init__.py:22: PyFITSDeprecationWarning: PyFITS is
 deprecated, please use astropy.io.fits
  PyFITSDeprecationWarning)  # noqa
Welcome to eht-imaging! v 1.2.2

Loading uvfits:  /home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data/M87_calibrated_netcal_uvflagged.uvf
POLREP_UVFITS: circ
Number of uvfits Correlation Products: 4
No NX table in uvfits!
Loading uvfits:  /home/zl/data/AIWork/MeqSilhouette-leakage/meqsilhouette/data/M87_fiducial_ehtim.uvfits
no IF in uvfits header!
POLREP_UVFITS: circ
Number of uvfits Correlation Products: 4
No NX table in uvfits!
39 minutes and 33 seconds elapsed.
(py2.7) zl@ubuntu:~/data/AIWork/symba$
```