The SLFitter

SLFitter: environment

The same environment provided by the [guide](#) is suitable.

SLFitter: downloading and building the code

The source code for the SLFitter is stored in [Baltig](#).

✓ Since the source code of the SLFitter can be downloaded only by the authorized developers, credentials for Baltig are necessary.

The simplest way is using RSA keys, the public key must be uploaded into Baltig and the private key must be saved into ${HOME}/.ssh/id_rsa

Once git client has been correctly configured the commands are:

```
git clone git@baltig.infn.it:muontomography/SLFitter.git
cd SLFitter
```

The commands to build the code are:

```
cmake3 <path-to-source>
make
```

⚠ <path-to-source> is the path to the CMakeLists.txt file in SLFitter directory, e.g.: /home/centos/SLFitter

The executable is found in the directory **run/**

SLFitter: running the code

The SLFitter application performs the reconstruction of tracks from CMS Super-Layers (SL) hits produced with the castor-simulator software, see [The OpenCMT Castor Simulator](#).

Preliminary settings: the configuration file

All the input parameters needed to run the code must be set in a dedicated configuration file **config.ini**. A template of this file can be found in the **utils/** directory and must be copied in the **run/** directory. Now you can modify the **config.ini** file in your **run/** directory.

- General information

Variable	Type	Description
runNumber	int	number of the castor-simulator dataset to be analyzed
rawDirName	string	path of the input file directory
rawFileName	string	name of the input file
outputDirName	string	path of the output file directory, e.g. **../output**
outputFileName	string	name of the output file
maxEventNumber	int	maximum number of events to be read

- Execution mode:
  The application can be run in three different modes (please choose only one mode at each execution)

  1. *Display mode*: show event-per-event display
  2. *Histogram mode*: fill histograms for track reconstruction analysis and save them in a root output file
  3. *TTree mode*: fill a root TTree with the reconstructed track parameters and save them in a root output file

Variable	Type	Description
display	bool	set to 1 to run in *Display mode*, 0 otherwise
wait	bool	should be equal to the display variable
histos	bool	set to 1 to run in *Histograms mode*, 0 otherwise
ttree	bool	set to 1 to run in *TTree mode*, 0 otherwise

- Debugging

Variable	Type	Description
debug	bool	set to 1 to dump debug messages

- Castor MC information

Variable	Type	Description
is_CastorMC	bool	set to 1 for simulated datasets (0 not implemented for now)
use_trueDriftTimes	bool	set to 1 to use true drift times, 0 to use smeared drift times
det0_rot	float	same rotation angle set for det0 in MC simulation [deg]
det1_rot	float	same rotation angle set for det1 in MC simulation [deg]
det_dist	float	same distance of det0 and det1 from origin in MC simulation [cm]

Example of configuration file

```
# ------------------------------
#  SLFITTER CONFIGURATION FILE
# ------------------------------
#
# ------------------------------
#       General information
# ------------------------------
runNumber            0063
rawDirName           /mnt/muotom-data/data/castor/geant/G4vmc_genCyl/NewSim
rawFileName          muCastorMC_2022-04-22-10-40-56_63.root
outputDirName        ../output
outputFileName       SLTtree_muCastorMC_63
maxEventNumber       5000000
# ------------------------------
#         Display mode
# ------------------------------
display          0
wait             0
# ------------------------------
#         Histos mode
# ------------------------------
histos           0
# ------------------------------
#          Ttree mode
# ------------------------------
ttree            1
# ------------------------------
#          Debugging
# ------------------------------
debug            0
# ------------------------------
#          Castor MC
# ------------------------------
is_CastorMC      1
use_trueDriftTimes  0
det0_rot         0
det1_rot         120
det_dist         199.69
```

How to run

```
cd run
./runSL
```