GuineaPig++ Guide/Manual

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Installation

GuineaPig++ GitLab Page: https://gitlab.cern.ch/clic-software/guinea-pig
Clone GitLab page to chosen system.

```
git clone ssh://git@gitlab.cern.ch:7999/clic-software/guinea-pig.git
```

Follow ReadMe instructions to install.
FFTW libraries are optional. This guide will not compile with FFTW libraries.

ReadMe:

```
cd guinea-pig
./configure -prefix=$YOUR_INSTALL_DIR
make
make install
```

The "guinea" executable will be in the $YOUR_INSTALL_DIR/bin directory.

Input Files

Go to guinea-pig/testing directory and find electron.ini.gz

Decompress electron.ini.gz file to get electron.ini

```
gzip -d electron.ini.gz
```

Also within the guinea-pig/testing directory is acc.dat file.

This contains the accelerator and particle parameters that can be modified. Use your preferred text editor to edit. Here is a default acc.dat file: https://gitlab.cern.ch/clic-software/guinea-pig/-/blob/master/testing/acc.dat

Default acc.dat:

Here is a guide to all parameters and variables, taken from Daniel Schulte's PhD thesis: https://gitlab.cern.ch/clic-software/guinea-pig/-/blob/master/doc/GuineaPigManual.pdf

```
$ACCELERATOR:: default
{energy=1500.0;particles=0.4;
beta_x=8.0;beta_y=0.15;emitt_x=0.68;
emitt_y=0.02;sigma_z=44.0;espread=0.001;dist_z=0;f_rep=100.0;
offset_y.1=-0.242605;offset_y.2=-0.242605;
offset_x.1=-1.905500;offset_x.2=-1.905500;
n_b=312;waist_y=0;}
$PARAMETERS:: default
{n_x=128;n_y=256;n_z=40;
n_t=1;n_m=68000;cut_x=400;
cut_y=35;cut_z=3.0*sigma_z.1;
force_symmetric=0;electron_ratio=0.2;do_photons=0;store_photons=0;
ecm_min=2970.0;photon_ratio=0.2;do_hadrons=0;store_hadrons=0;
do_coherent=0;grids=0;rndm_load=0;rndm_save=0;
do_pairs=0;track_pairs=0;store_pairs=0;do_compt=0;load_beam=3;
hist_ee_bins=1010;hist_ee_max=2.02*energy.1;charge_sign=-1.0;
do_lumi=0;num_lumi=100000;}
```

C3 acc.dat Example

```
$ACCELERATOR:: C3
{energy=250.0;particles=0.4;
beta_x=12.0;beta_y=0.12;emitt_x=0.9;
emitt_y=0.02;sigma_z=100.0;espread=0.001;dist_z=0;f_rep=120.0;
offset_y.1=0;offset_y.2=0;
offset_x.1=0;offset_x.2=0;
n_b=133;waist_y=0;}
$PARAMETERS:: C3_parameters
{n_x=128;n_y=256;n_z=40;
n_t=1;n_m=70000;cut_x=400;
cut_y=35;cut_z=3.0*sigma_z.1;
force_symmetric=0;electron_ratio=0.2;do_photons=1;store_photons=0;
ecm_min=2970.0;photon_ratio=0.2;do_hadrons=1;store_hadrons=0;
do_coherent=0;grids=0;rndm_load=0;rndm_save=0;
do_pairs=1;track_pairs=0;store_pairs=0;do_compt=1;load_beam=0;
hist_ee_bins=1010;hist_ee_max=2.02*energy.1;charge_sign=-1.0;
do_lumi=0;num_lumi=100000;}
```

To run GuineaPig:

./$YOUR_INSTALL_DIR/bin/guinea --acc_file [your acc.dat file path] --el_file [your electron.ini file path] --pos_file [your positron.ini file path] accelerator parameter_set output_file

--acc_file : acc.dat, the accelerator parameters
--el_file : electron.ini
--pos_file : also electron.ini

The order in which the first three options are placed does not matter, but the last three arguments must be “accelerator parameter_set output_file”.

Default output will be your “output_file” in its chosen directory.

Run Examples

Generic:

./bin/guinea –acc_file guinea-pig/testing/acc.dat --el_file guinea-pig/testing/electron.ini --pos_file guinea-pig/testing/electron.ini default default default_output

Personalized Example:

./GuineaPig/bin/guinea --acc_file guinea-pig/testing/acc.dat --el_file guinea-pig/testing/electron.ini --pos_file guinea-pig/testing/electron.ini C3 C3_parameters C3GuineaOutput/C3_guinea_v1_1

Additional Output Files

Turning on some of the “store_” switches within acc.dat will create some ASCII files of raw data. More info in GuineaPig Manual: https://gitlab.cern.ch/clic-software/guinea-pig/-/blob/master/doc/GuineaPigManual.pdf

store_pairs=1 will create pairs.dat
store_photons=1 will create photon.dat
store_hadrons=1 will create hadron.dat