Installation notes for the simulation of the High Resolution Array at the RIBF

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May 7, 2019

1 Disclaimer

I write here based on my experience. It does not mean that this is the best way to get things done.
This installation was tested with:

- Ubuntu 16.04.6 LTS
- g++ (Ubuntu 5.4.0-6ubuntu1 16.04.11) 5.4.0 20160609

2 Install Geant4

Get Geant 4.10.4.p03 from `https://geant4.web.cern.ch/support/download_archive`
Due to backwards compatibility issues, this is the required version of Geant4!
Instructions on how to install can be found in
`http://geant4-userdoc.web.cern.ch/geant4-userdoc/UsersGuides/InstallationGuide/html/index.html`.
Here I list the main steps:

- Get the required software:
  - cmake 2.8 or higher: `sudo apt-get install cmake`
  - gcc ($\geq$5.0). Check with `gcc --version` and `g++ --version`
  - OpenGL/MesaGL: `sudo apt-get install libgl1-mesa-dev mesa-common-dev`
    You can check the installation by typing `glxinfo | grep -i opengl` and seeing some lines containing "OpenGL"
  - Qt4: `sudo apt install libqt4-designer libqt4-opengl libqt4-svg libqtgui4 libqtwebkit4`
  - Xmi libraries: `sudo apt-get install libxmu-dev libxi-dev`
  - gv: `sudo apt install gv`
- Get the additional sorftware
  - DAWN:
    * Get the source of DAWN 3.90b from `http://geant4.kek.jp/ tanaka/DAWN/About_DAWN.html`
    * Make sure you have Tcl/Tk by typing "wish" in a shell and seeing a window opening
    * Be sure to have a tcsl shell: `sudo apt-get install tcsh`
    * Select the postscript viewer: `tcsh and then setenv DAWN_PS_PREVIEWER "okular"`
      (I chose okular)
    * Decompress DAWN: `tar -xvzf dawn_3_90b.tgz`
      Copy the decompressed folder to the path of your preference. For me: `/home/liliana/Packages`

    * Inside the DAWN folder:
      `make clean`
      `make guiclean`
      `./configure` (answer the questions as you prefer. I put no flags)
      `make`
      `make install` (depending where you chose to install it you may need to be su)
      Be sure that your installation folder is in the PATH!
      Test by typying `dawn primitives.prim`
  - HepRep:
    * Download the file from: `http://www.slac.stanford.edu/ perl/HepRApp/HepRApp.jar`
    * Put the HepRApp.jar wherever you want
    * Open HepRep with: `java -jar HepRApp.jar`
    * If you do not have java, install the Java Runtime Environment with
      `sudo apt-get install default-jre`
  - WIRED:
    * Download Jas3 from `http://jas.freehep.org/jas3/Download.html`
    * Unpack the file and copy it to the place of your preference (for me `/home/liliana/Packages`)
    * inside the folder, run ./jas3
    * make a link (or copy) to this executable so it is in your PATH
    * To instal Wired:
      Open Jas3
      Open View $->$ Plugin Manager
      Go to the tab called "Available" and select WIRED4. Instal it and restart.
      This should also install WIRED 4 Base Library and HepRep plugins.

- Install Geant4.10.4
  - I make a folder called Packages/Geant4.10.4, and inside put the folder containing the source code of geant, which i got in the first step
  - Inside the same folder, I make two more folders, one called "install" and one called "build". The structure is:
    Packages/Geant4.10.4/geant4.10.4.p03
    Packages/Geant4.10.4/build
    Packages/Geant4.10.4/install
  - inside the build folder I run the cmake command as (include download of the data and openGL support):
    `cmake -DCMAKE_INSTALL_PREFIX=/home/liliana/Packages/Geant4.10.4/install`
    `-DGEANT4_INSTALL_DATA=ON -DGEANT4_USE_OPENGL_X11=ON -DGEANT4_USE_SYSTEM_EXPAT=OFF`
    `/home/liliana/Packages/Geant4.10.4/geant4.10.04.p03`
  - `make -j6`
  - `make install`

- Setting variables and running a example
  - To setup the environment fo to the install/bin and run `. geant4.sh`
  - If you are planning to compile with GNUmakefile and not cmake (as is the case for this simulation), go to
    `install/share/geant4make/` and do
    `source geant4make.sh`
    This will setup the binmake.gmk that is needed for GNUmakefile. In this script, the default path to put the compiled applications is set. By default it is in $\sim$`/geant4_workdir`.
    I prefere to change it, but up to you! In case you want to do it, replace
    `if test "x$G4WORKDIR" = "x" ; then`

```
export G4WORKDIR=$HOME/geant4_workdir
fi
```
With
```
export G4WORKDIR=/home/liliana/Packages/Geant4.10.4/bin
```
(or wherever you want). This folder should also be in your PATH

– go to examples folder Geant4.10.4/geant4.10.4.p03/examples/basic/B1/ (for example)
type `make`
After compiling, type `exampleB1` and see the result.
Be sure that you have the visualization software also in the PATH!

3 Running the HR-simulation

- Be sure that you set the environment variable correctly. The script `geant4.10.4` can be useful to set them up
- Get the code and untar it
- Inside the Frankenball folder type `make`
- Type `UCFrankenball`
```
Idle>
Idle> /control/execute vis.mac
Idle> exit
```

- It all works fine, you should have an eps file with the gemetry like this: