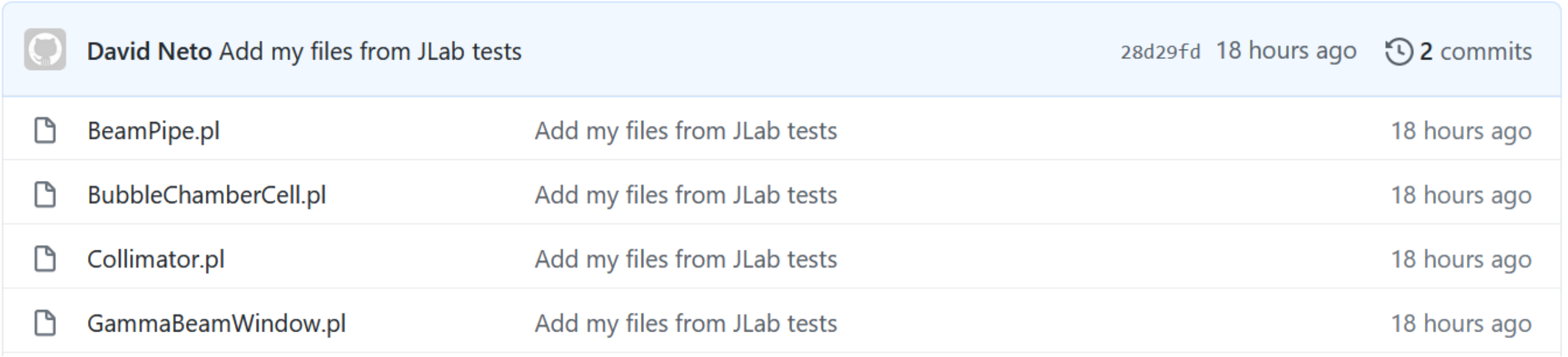
# Bubble Update 11/17/2020

David Neto

# Created a GitHub Repository for File I/O

https://github.com/dneto1729/BubbleChamberSim

- This is just for my tests with the files.
- Once everything is setup, and the files are cleaned up, can pull request with the detectors repo



# Documenting steps in Wiki of GitHub Repo

https://github.com/dneto1729/BubbleChamberSim/wiki/Bubble-Chamber-Simulation-Using-Geant4

- At the moment, this is just to document my steps
- Once everything is setup and works then we can add a section to the bubble wiki using the 2020 instructions

## Using Geant4 Monte Carlo GEMC (2020)

To try on the interactive farm at JLab

1. ssh ifarm
   for external user do
   `ssh -Y <user>@login.jlab.org`
   then do
   `ssh -X <user>@ifarm`
2. Run JLab enviroment setup script
   for c shell do
   `source /site/12gev_phys/softenv.csh 2.4`
   for bash do
   `source /site/12gev_phys/softenv.sh 2.4`
3. can double check environment loaded correctly, for example
   `which gemc`
   output should look something like
   `$ /site/12gev_phys/2.4/Linux_CentOS7.7.1908-gcc9.2.0/gemc/2.8/gemc`
4. `mkdir /group/bubble/<user>`
5. `cd /group/bubble/<user>`

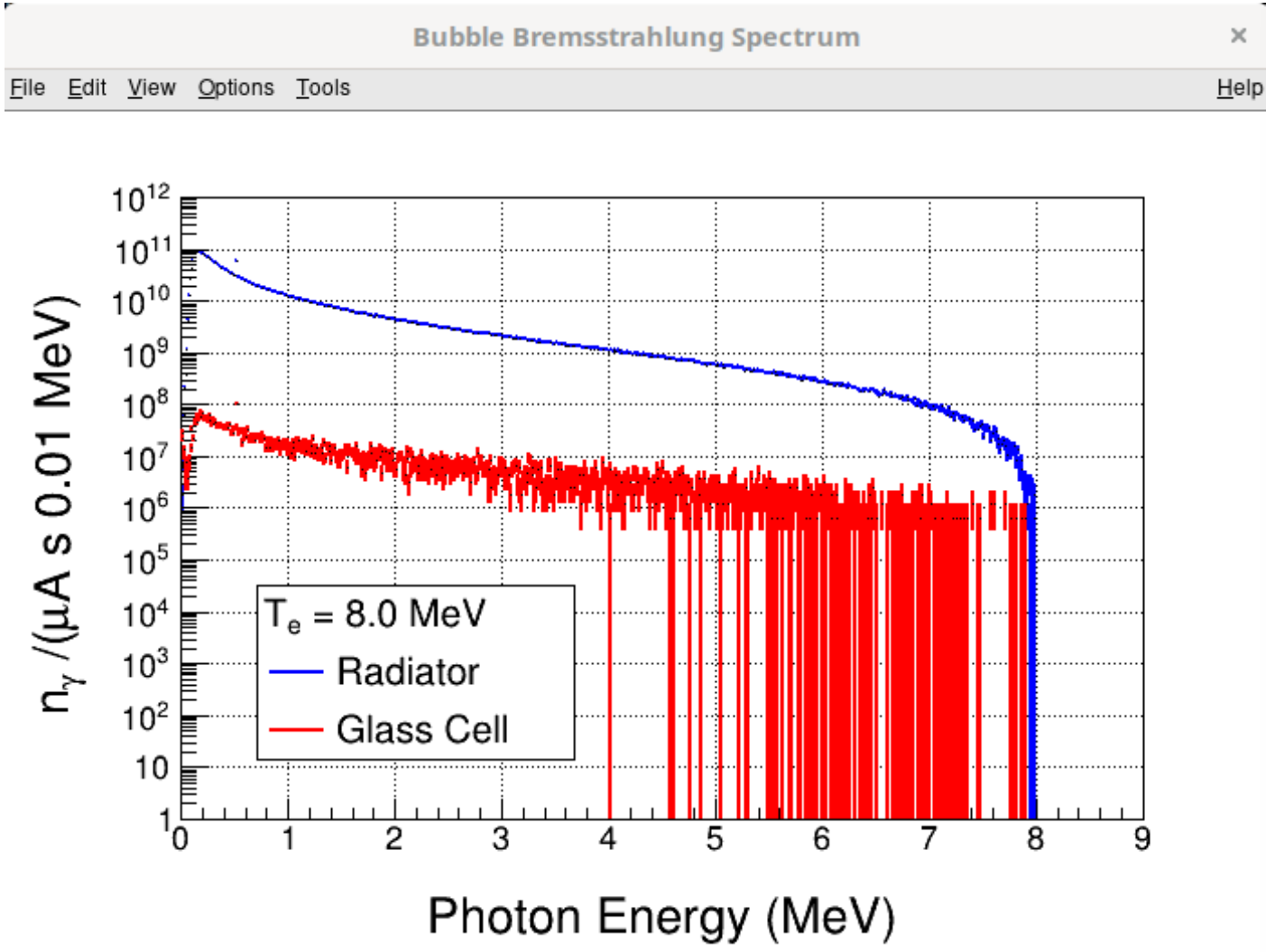
# Test with Riad's Macro and 8 MeV data file

- ROOT macros needed some minor changes to work with ROOT6, for example

f1 = new Tfile(runfile1);
TFile *f1 = new Tfile("out.root");

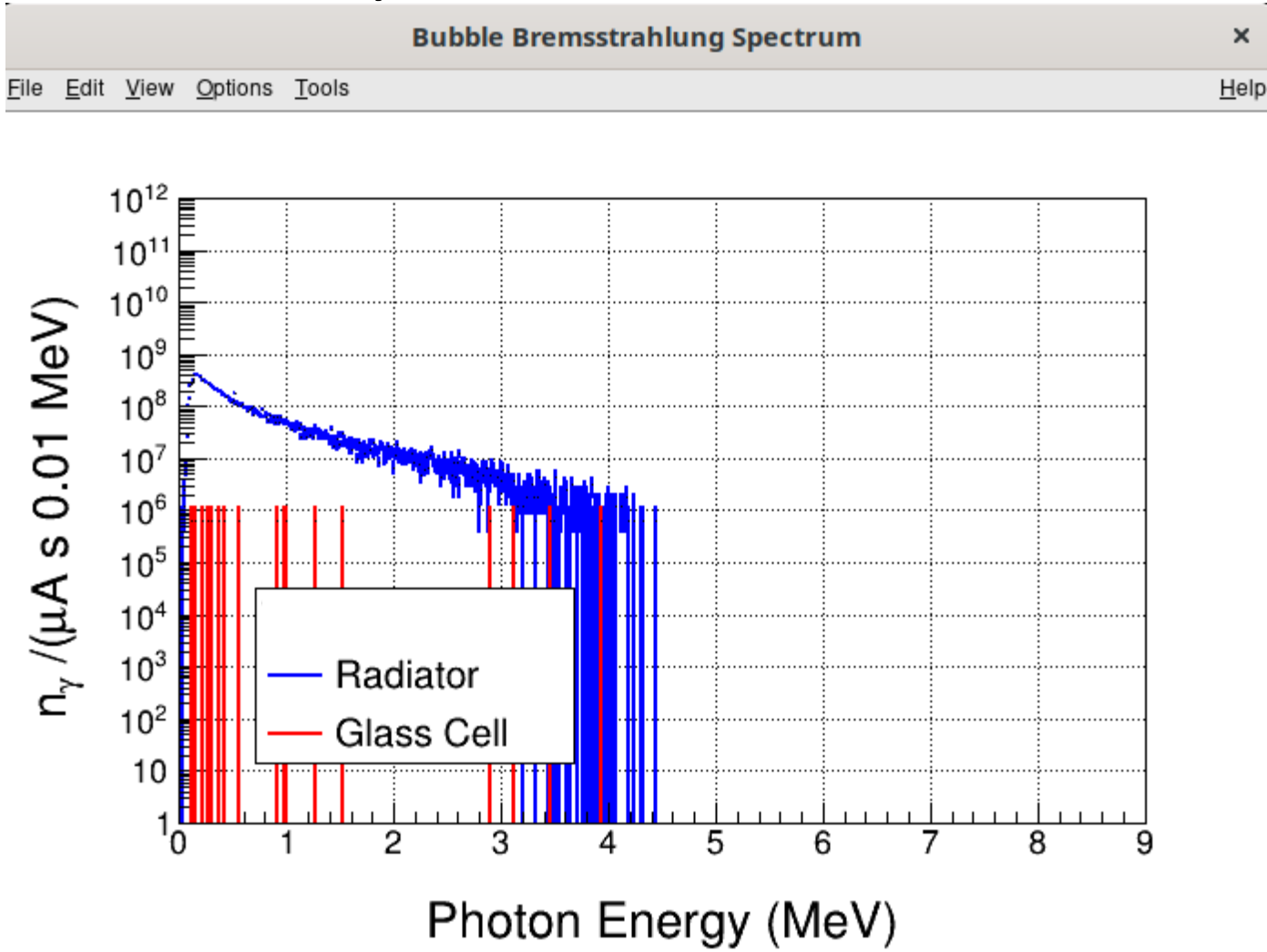
leg = new Tlegend(…);
TLegend *leg = new TLegend(…);

- Wanted to test that the analysis pipeline, aside from the G4 simulation, is working.



# Test with Riad's Macro and my test data file

- N=100,000 events at p = 4 MeV/c +- 0.050 beam spread
- Wanted to test that I could convert my out.ev file to a ROOT file, build the leaves and plot with Riad's macro.
- Rad looks good
- Glass cell looks odd, expected from low stats



# Moving Forward

- Generate ROOT files, each with N=1e6 events from Alicia's list from pervious bubble meeting
- Test loading Whit's geometry in GEMC GUI
  - Check read of ply files (needs CADMesh.h on G4)
  - Check render of ply files in GUI
- Work with Mauri to update Geo Files

| Measured p (MeV/c) | Horizontal angle (mrad) | Horizontal position (mm) | Vertical angle (mrad) | Vertical position (mm) |
|---|---|---|---|---|
| 5.299 | -0.64 | 2.26 | -1.06 | -1.15 |
| 5.406 | -1.90 | 0.99 | -3.42 | -5.24 |
| 5.517 | -1.61 | -0.26 | 0.00 | 0.66 |
| 5.517 | -1.63 | -0.29 | -0.38 | 0.10 |
| 5.605 | -3.67 | -0.78 | -1.17 | -1.17 |
| 5.703 | -3.73 | -2.36 | 0.20 | 1.03 |
| 5.703 | -2.36 | 0.45 | -0.39 | 0.23 |
| 5.840 |  | 0.32 | -0.96 | -0.91 |
| 5.840 | -2.30 | 1.02 | -0.66 | -0.46 |
| 5.887 | -3.58 | 0.95 | 4.02 | 0.86 |