

# Beamline Operation

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# G4beamline - simulation of beams

The image shows a Windows desktop environment with two windows open. The window on the left is titled "Protons\_on\_Target - Notepad" and contains a text file with Geant4 simulation parameters. The window on the right is titled "g4blgui" and displays the same parameters in a graphical interface.

**Notepad Window Content:**

```
Protons_on_Target - Notepad
File Edit Format View Help
# First file for Greta
# 11/06/2018

param -unset first=0 last=1000000.0 viewer=best
param -unset absMaterial=Vacuum
param -unset BScale=1.0
param -unset TotNumpart=999
param histoFile=$first histoUpdate=100000
param steppingFormat="TAG CL STEP VOL MAT PROCESS B"

#####- primary beam #####
#APRIL 2016 - WITH THE CORRECT BEAM COMPOSITION FROM THE T
      beam gaussian particle=proton meanMomentum=9000 beamZ
      sigmaX=0.00 sigmaY=0.00 sigmaXp=0.00025 sigmaYp=0.000
      firstEvent=0 lastEvent=$TotNumpart sigmaP=0

# beam gaussian particle=proton meanMomentum=$pMomentum be
#   sigmaX=0.5 sigmaY=0.44 sigmaXp=0.00025 sigmaYp=0.000
#   firstEvent=0 lastEvent=25 sigmaP=-1200

# beam gaussian particle=kaon+ meanMomentum=$pMomentum bea
#   sigmaX=0.5 sigmaY=0.44 sigmaXp=0.00025 sigmaYp=0.000
#   firstEvent=0 lastEvent=5 sigmaP=-1200

#####We MAYBE need it #####
# param -unset Q2=5.266549408
#####
```

**g4blgui Window Content:**

g4blgui  
File View Tools Help

Input file: C:/Users/Default/Desktop/Protons\_on\_Target.txt  Directory:

Parameters:

Visualization (OpenGLStoredQt) Events per Image: 1

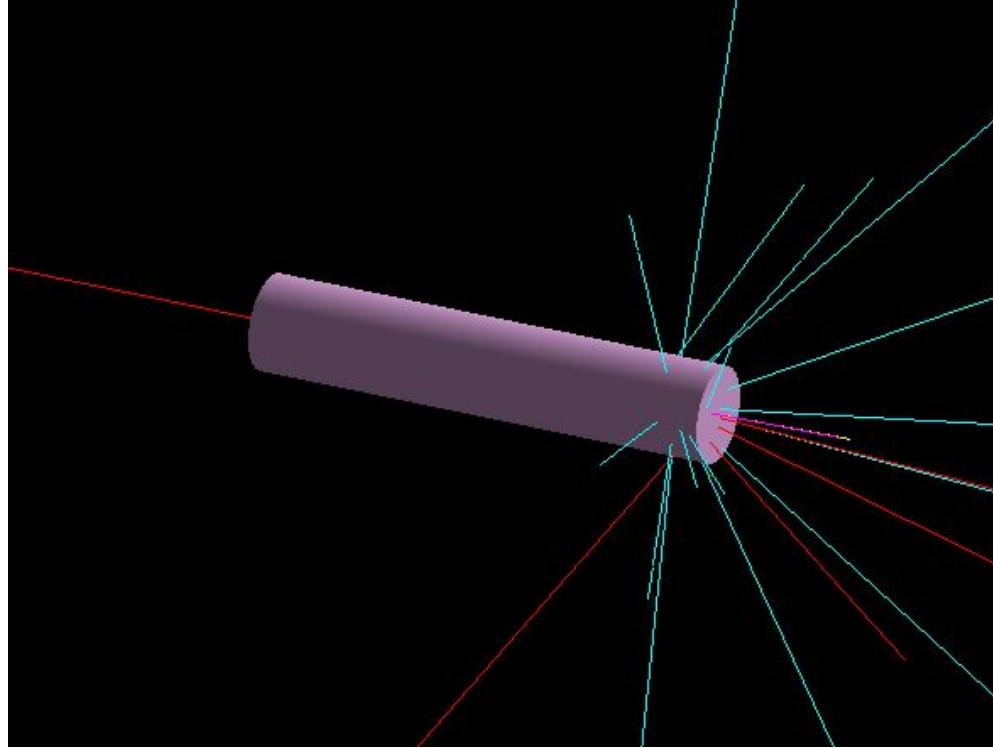
Geant4 version Name: geant4-10-03 (9-December-2016)  
Copyright : Geant4 Collaboration  
Reference : NIM A 506 (2003), 250-303  
WWW : <http://cern.ch/geant4>  
\*\*\*\*\*

```
param viewer best,1
geometry nPoints=100 printGeometry=0 visual=0
      tolerance=0.002

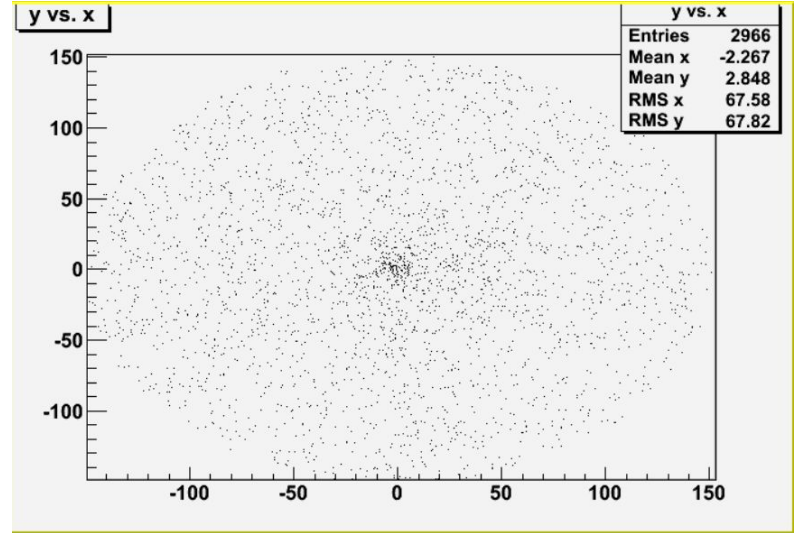
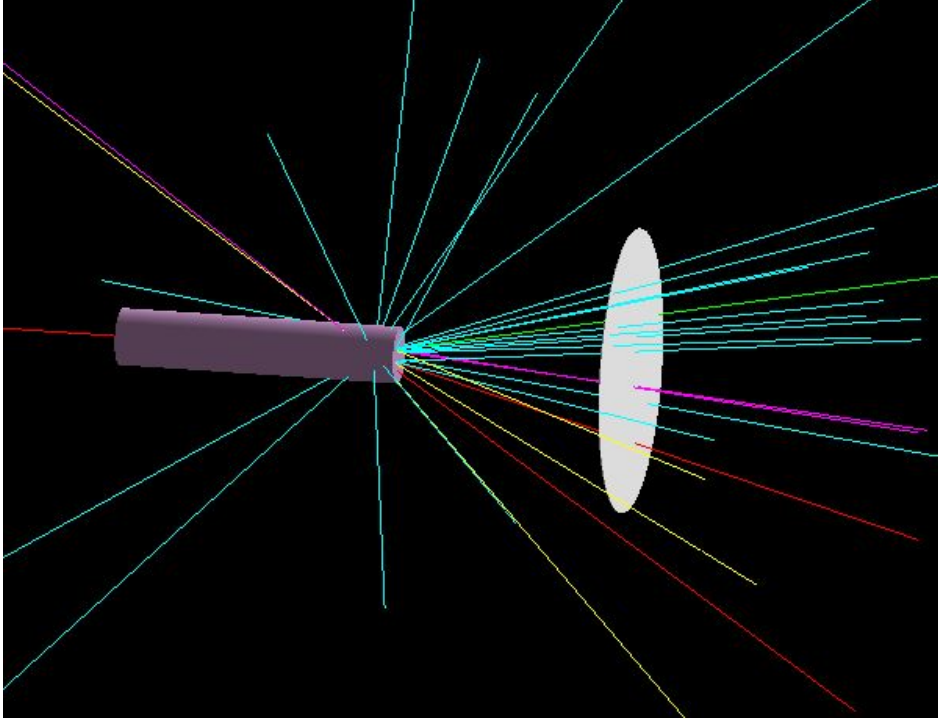
param first 0
param last 1000000.0
param viewer best,1 (already defined)
param absMaterial Vacuum
param BScale 1.0
param TotNumpart 999
param histoFile 0
param histoUpdate 100000
param steppingFormat TAG CL STEP VOL MAT PROCESS B
beam GAUSSIAN particle=proton nEvents=1000 firstEvent=0 lastEvent=999 beamX=0.0 beamY=0.0 beamZ=0.0
maxR=1000000.0
      meanMomentum=9000.0 weight=1.000000
      sigmaX=0.0 sigmaY=0.0 sigmaZ=0.0 sigmaXp=0.00000 sigmaYp=0.00000
      sigmaP=0.0 sigmaT=0.0000 meanXp=0.00000 meanYp=0.00000 meanT=0.0000

param vacuumPipeColor 0.6,0.6,0.6
param maxStep 100.0
param worldMaterial Vacuum
C4PhysListFactory::GetReferencePhysList <FTFP_BERT> EMOption= 0
<<< Geant4 Physics List simulation engine: FTFP_BERT 2.0
```

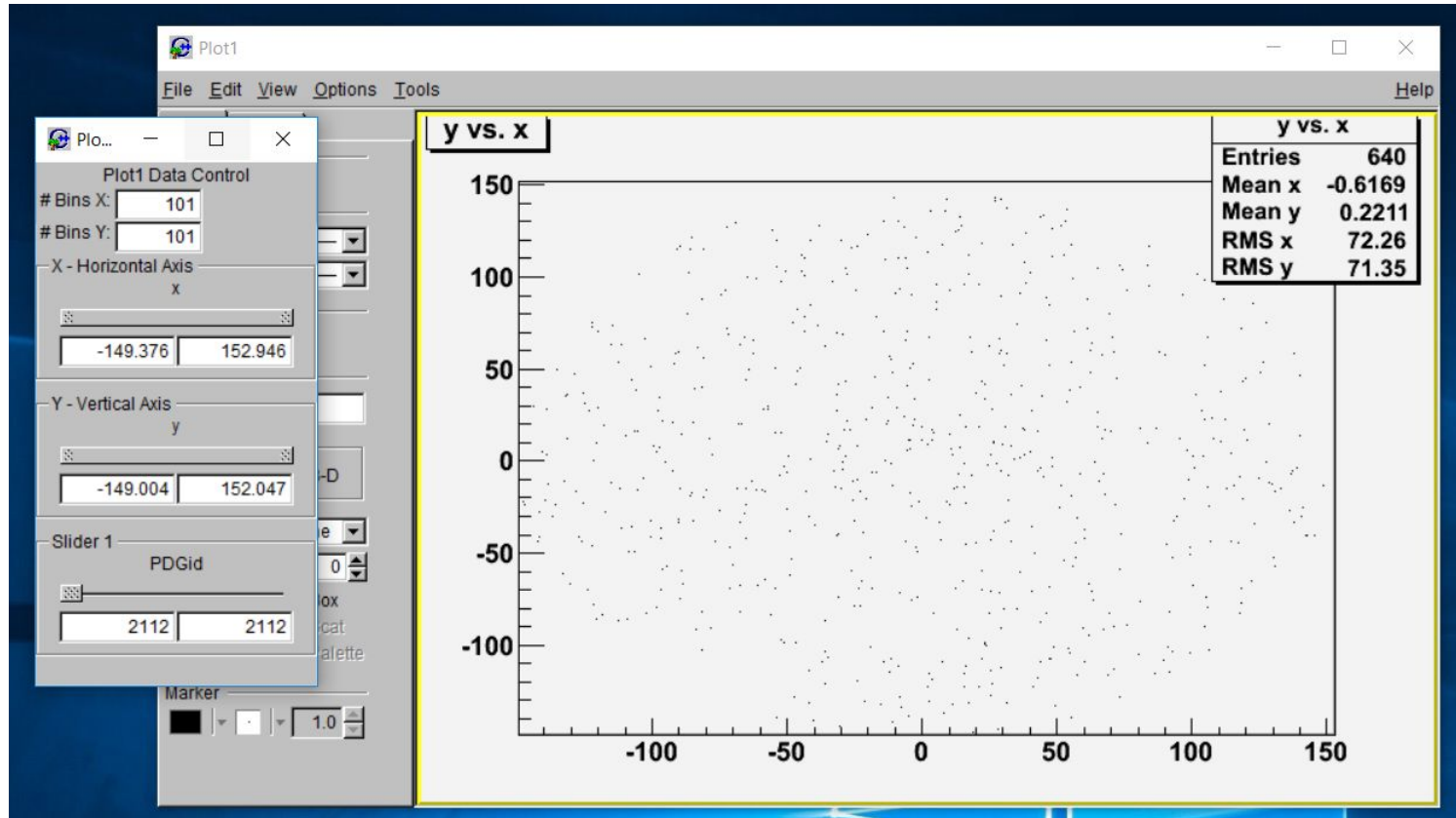
# Protons and target (Cu)



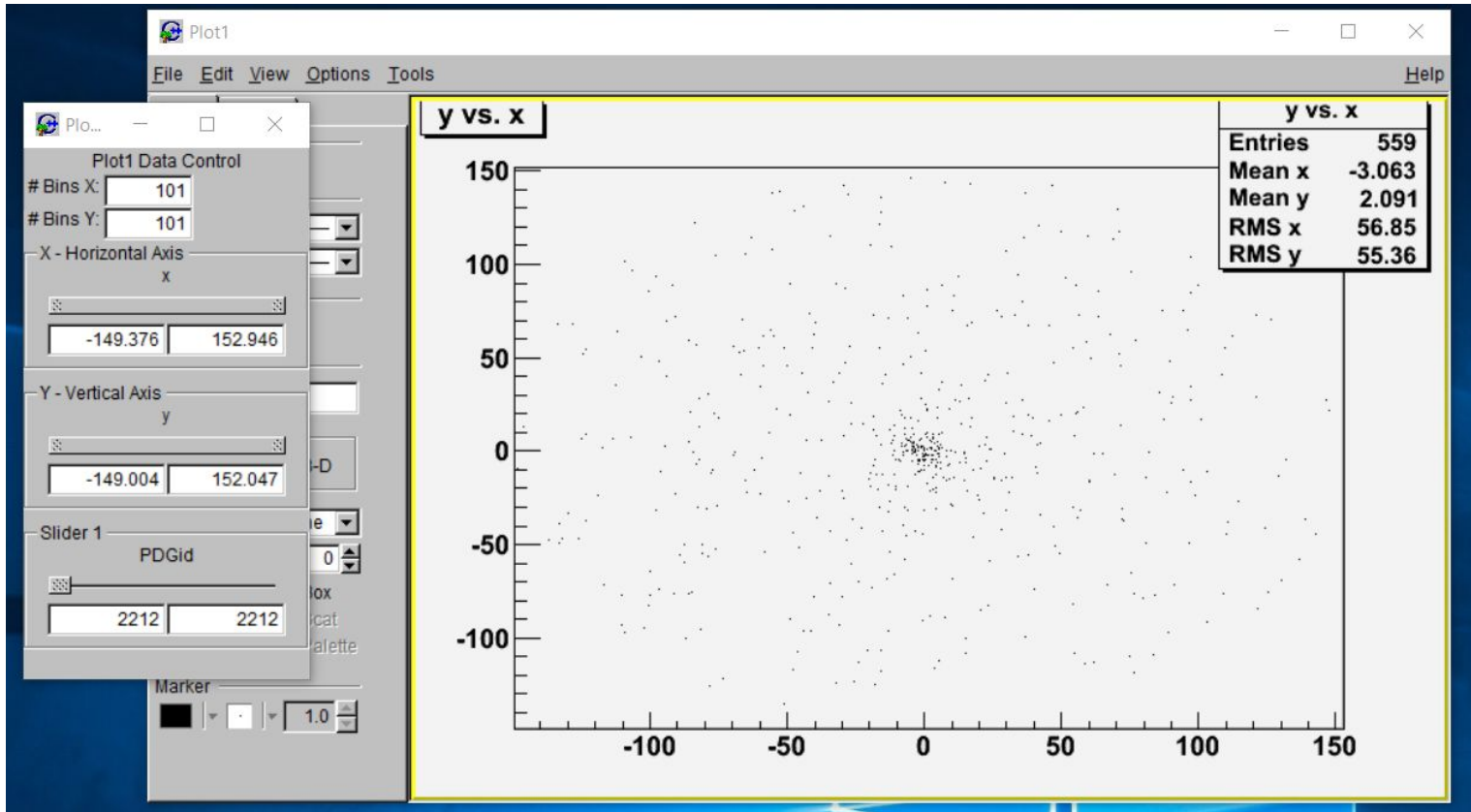
# Virtual detectors and HistoRoot



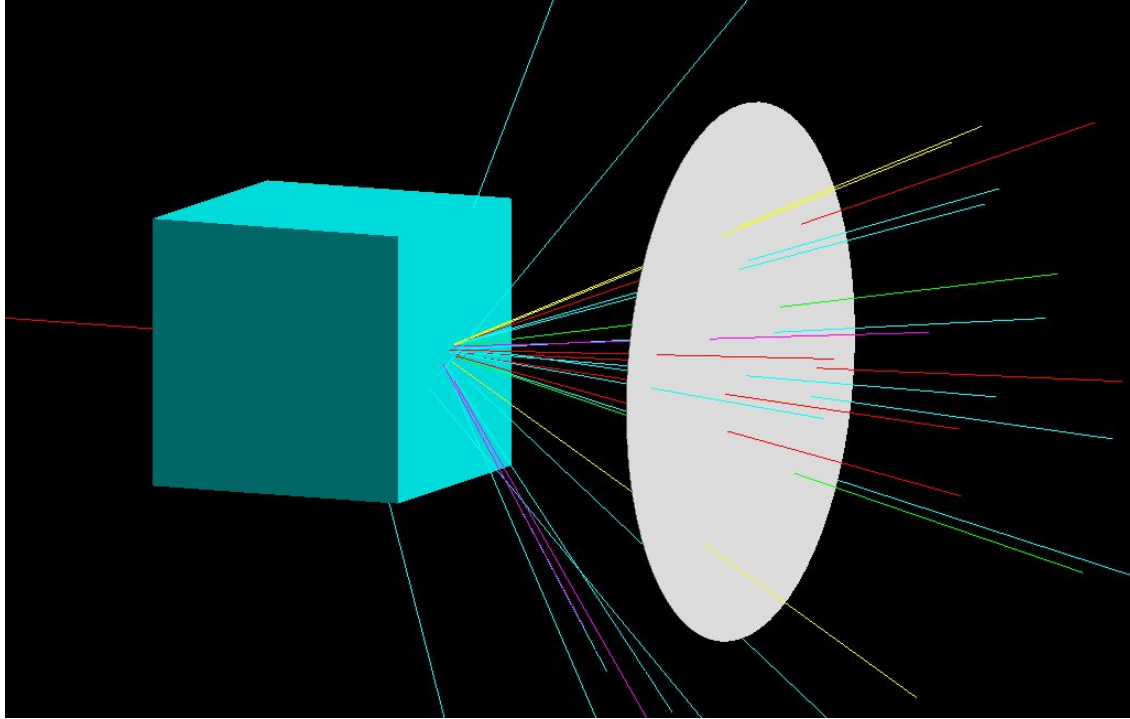
# Positions of neutrons



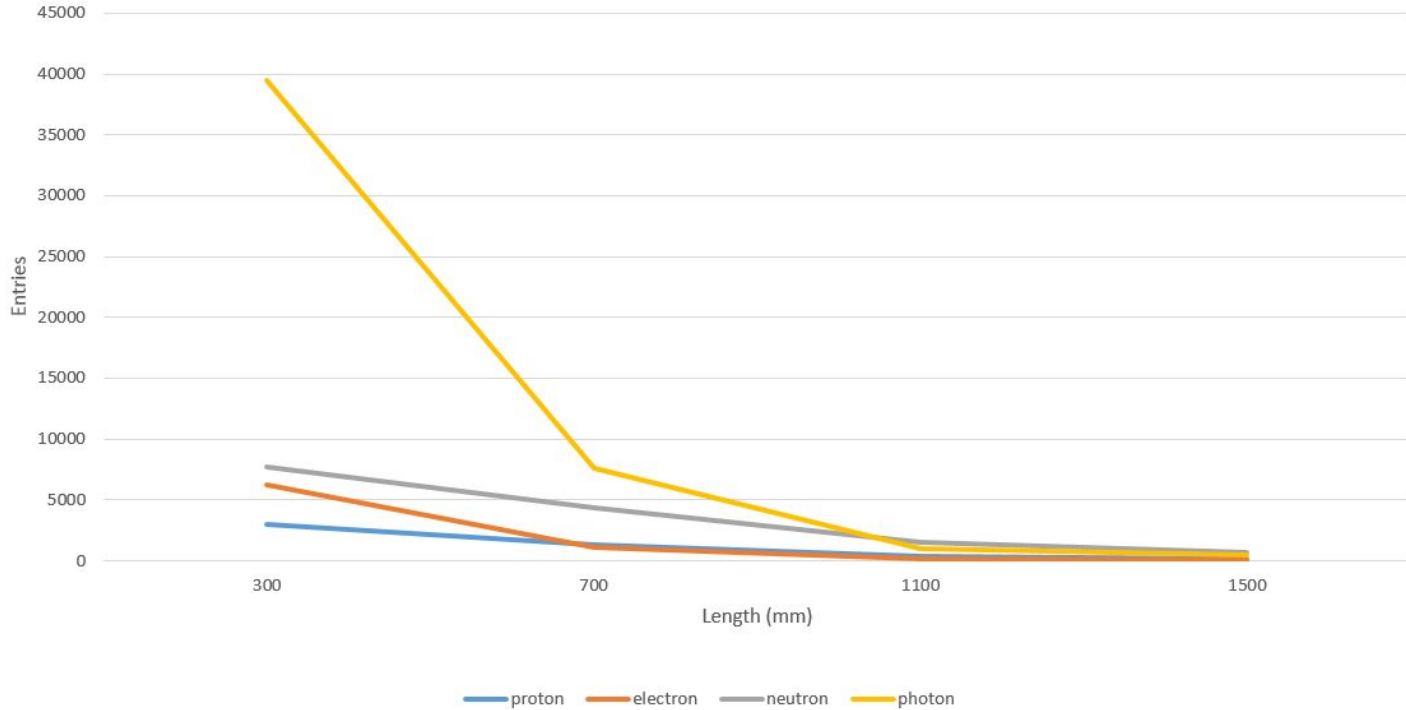
# Positions of protons



# Study of length of target and entries

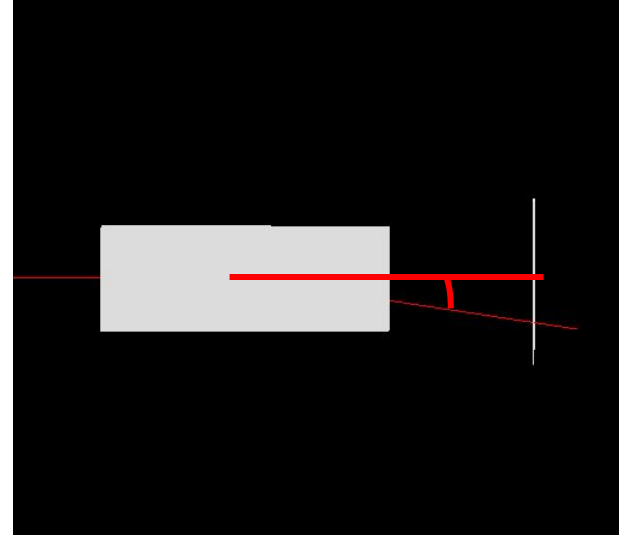
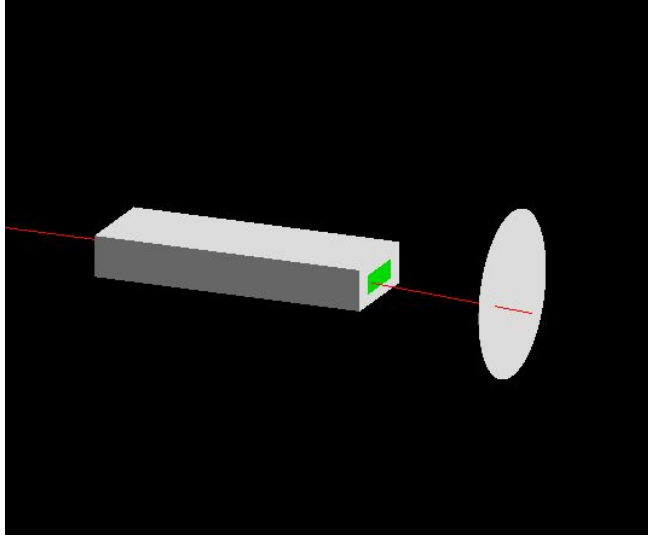


# Study of length of target and entries

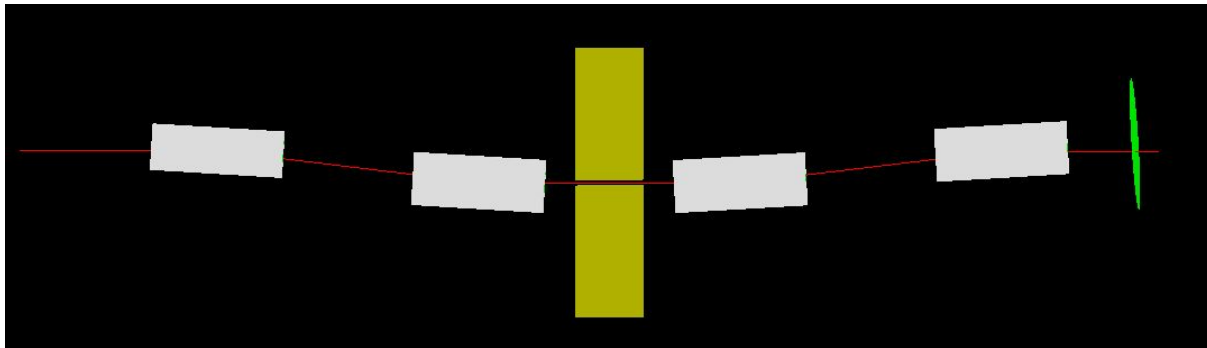
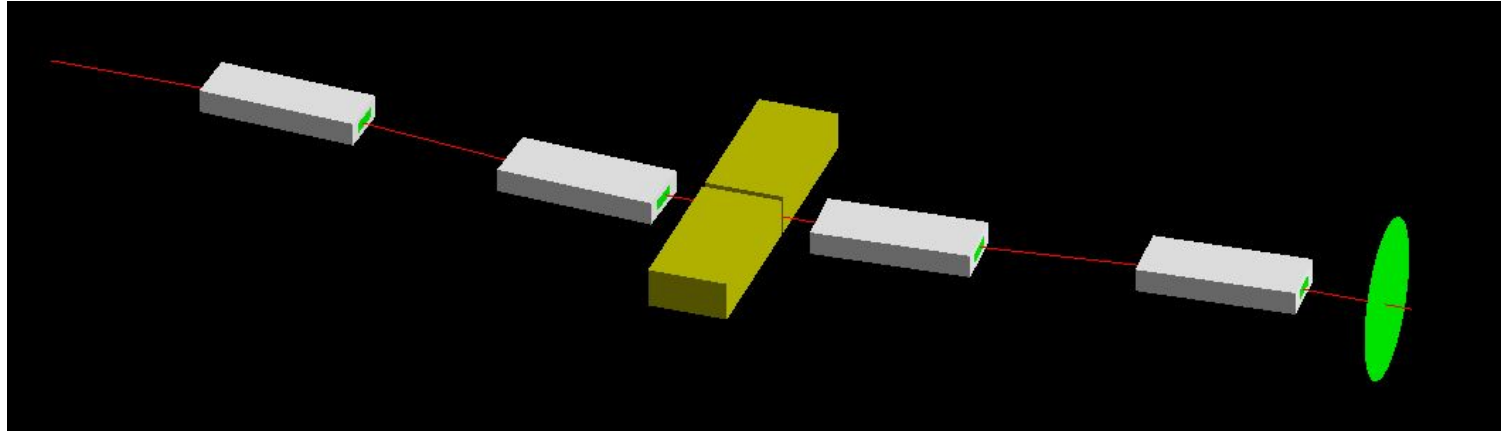




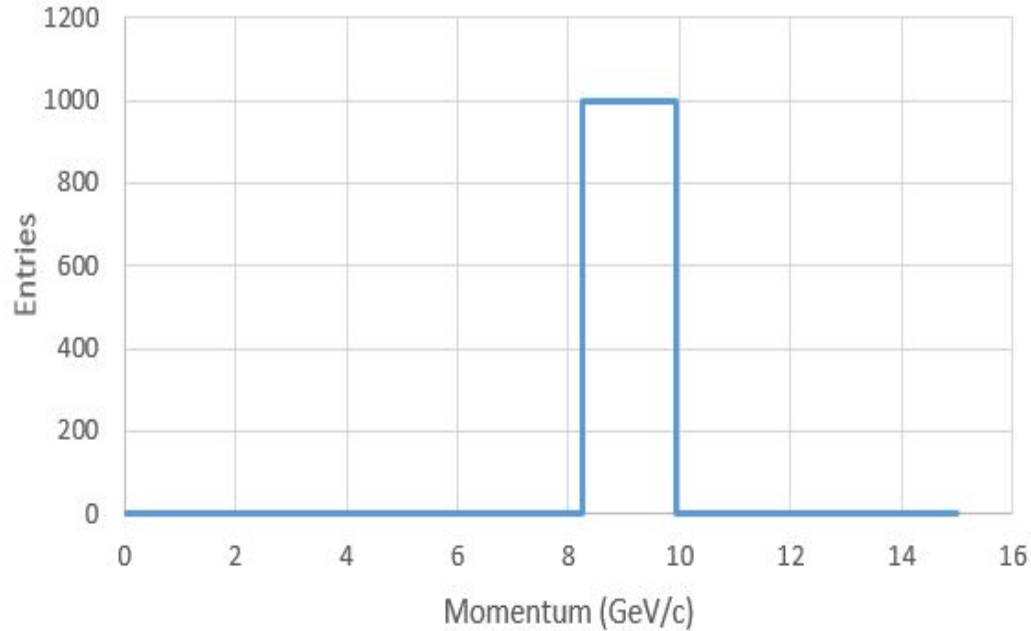
# Magnet



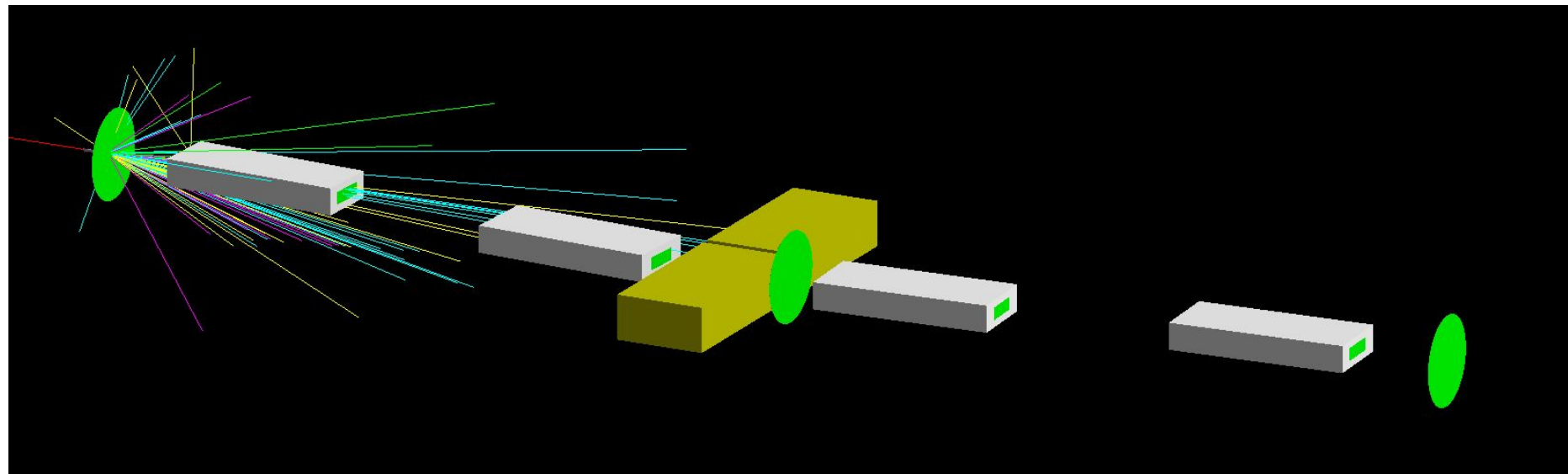
# A system



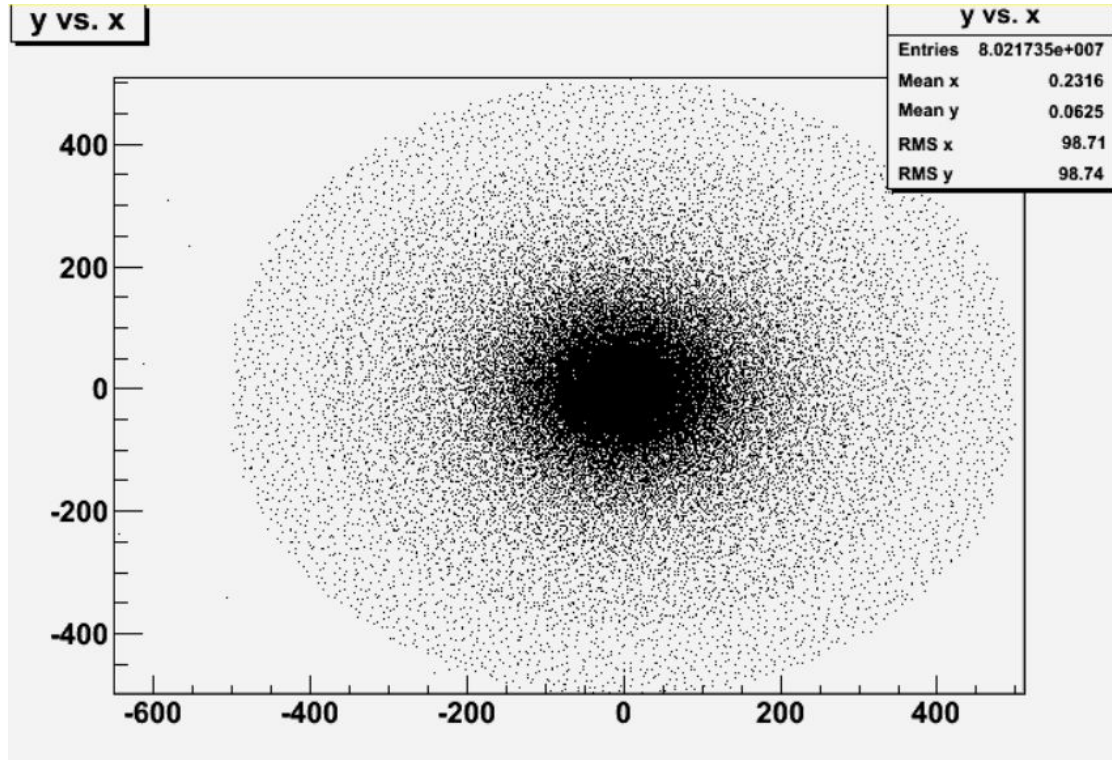
# Acceptance



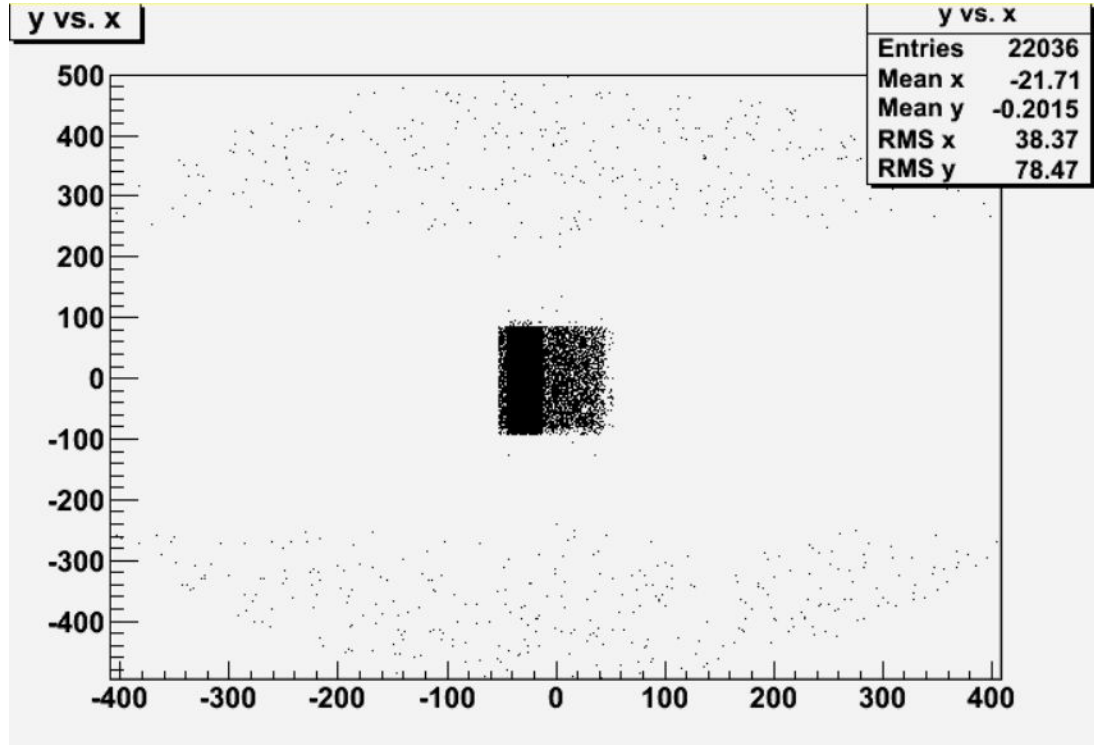
Acceptance=9GeV $\pm$ 8.84%



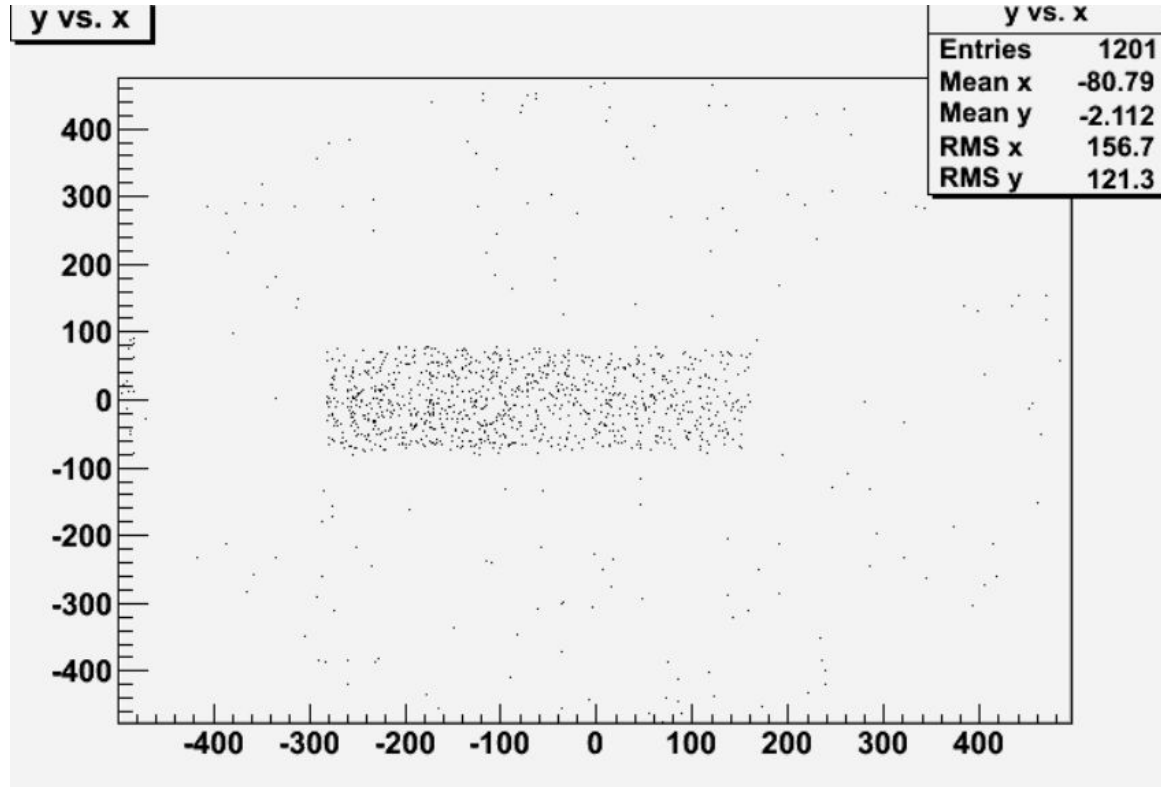
# Detector 1



# Detector 2



# Detector 3



How has it been?