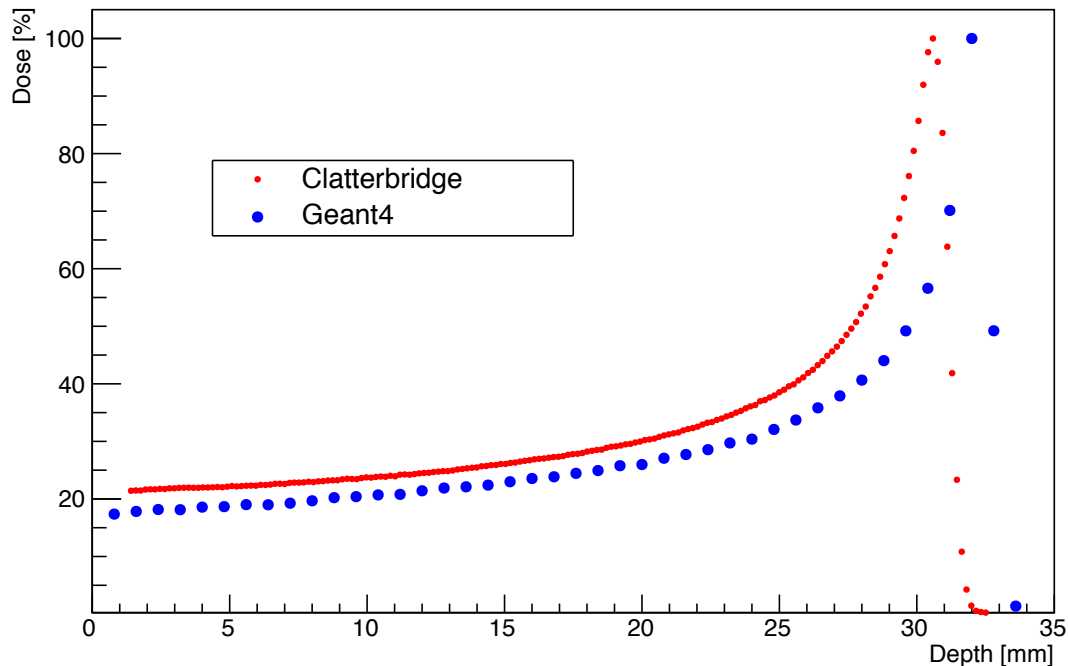- Modified ProtonPB tutorial:
  - Simple proton pencil beam at **62 MeV**
  - Straight into detector
  - Comparing water and scintillator detector volumes
  - Detector box dimensions: 4 cm x 4 cm x 4 cm
  - Both plotted against "Clatterbridge data" in ClatterbridgeData.txt which was recorded at 60 MeV
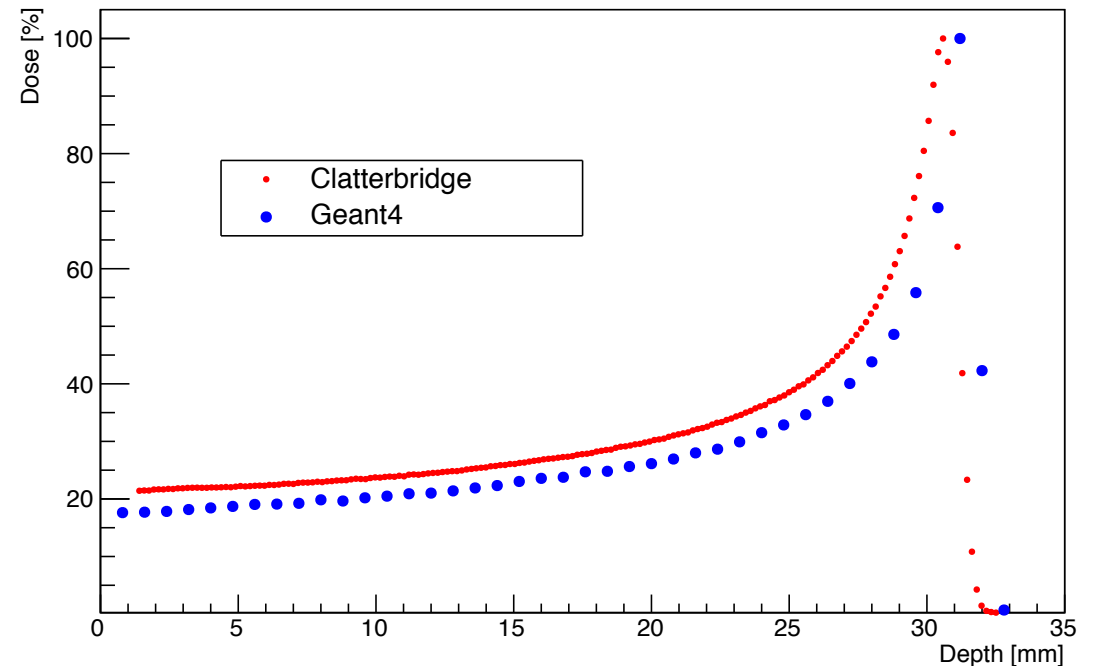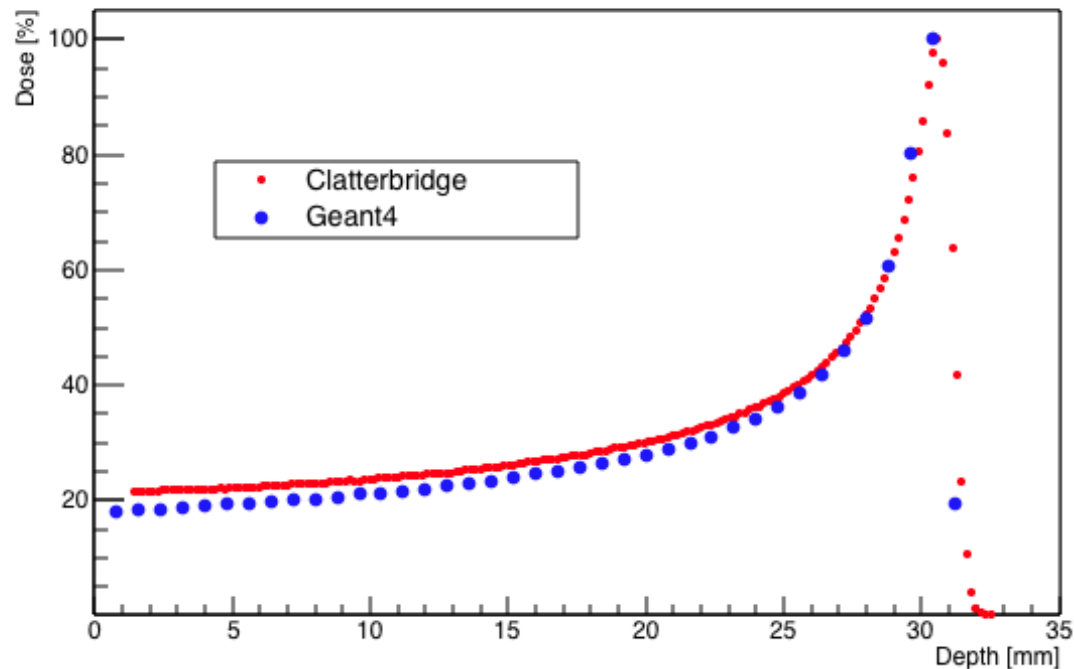
Water

Scintillator (PVT)

- Modified ProtonPB tutorial:
  - Simple proton pencil beam at **60 MeV**
  - Straight into detector
  - Comparing water and scintillator detector volumes
  - Detector box dimensions: 4 cm x 4 cm x 4 cm
  - Both plotted against "Clatterbridge data" in ClatterbridgeData.txt which was recorded at 60 MeV
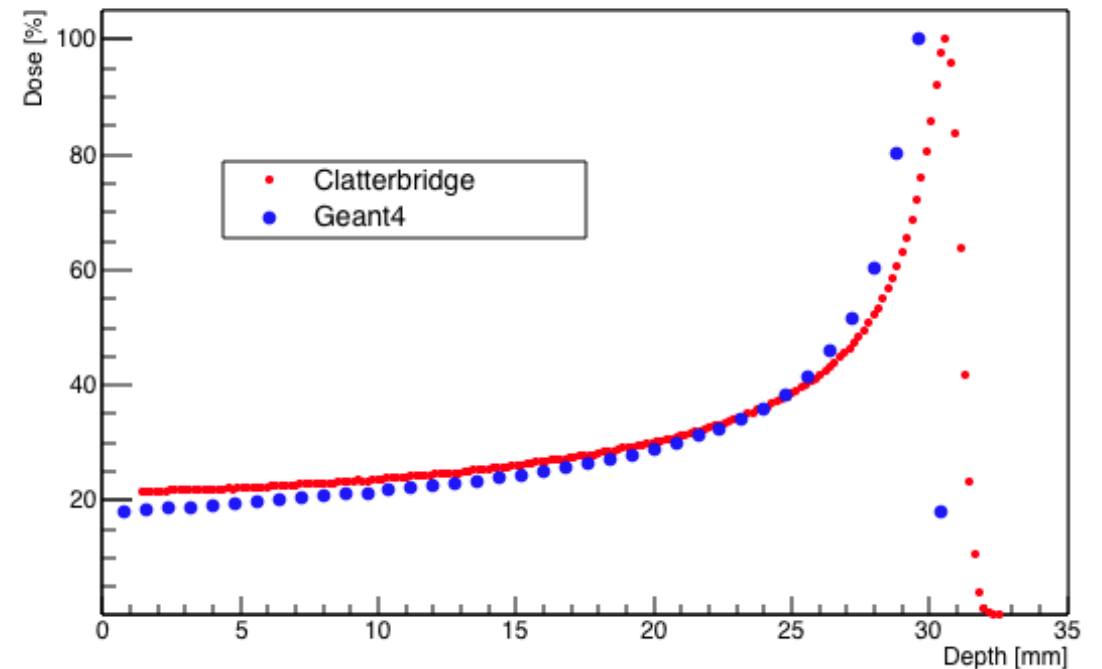
Water   **Scintillator (PVT)**
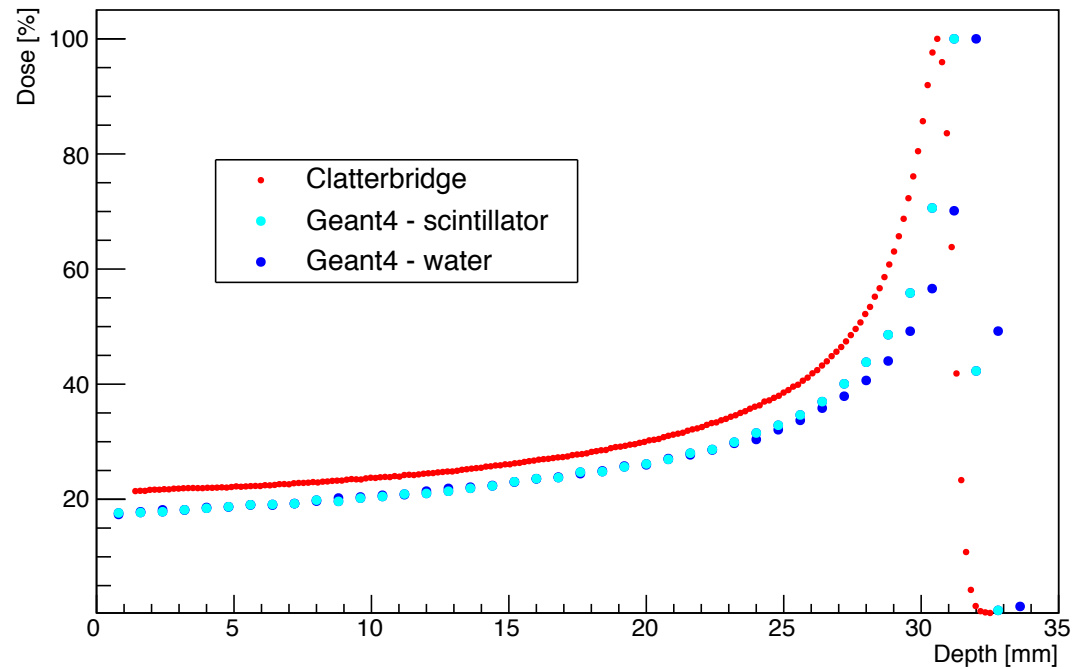
Superposition of the plots from the two last slides

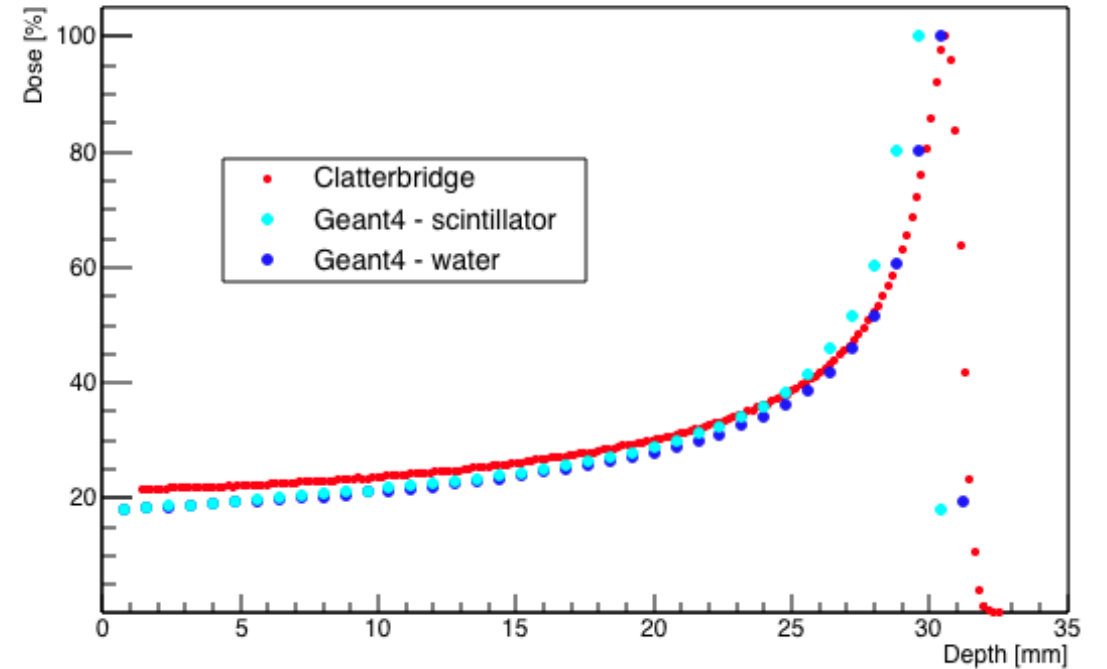**62 MeV**

60 MeV

Next, tried to replicate Clatterbridge simulation including the proper geometry.

The source is placed at -420.0 cm which corresponds to the wall on the right.

Added a scoring mesh in the same location as the detector at -243.15 cm with the same dimensions --> detector location on next slide

```
# proton.mac
#
/control/verbose 2
/run/verbose 2
/tracking/verbose 0
/run/particle/verbose 1
/run/particle/dumpList
#
# set geometry
/protonPB/det/setMat Scintillator
/protonPB/det/position 0. 0. -226. cm
/protonPB/det/setSizeXY  10 cm
/protonPB/det/setSizeZ 10 cm
/protonPB/det/setSliceSizeXY 10 cm
/protonPB/det/sliceNumber 50
#
# define longitudinal scoring mesh
# along the beam
/score/create/boxMesh scintMeshlongitudinal
/score/mesh/boxSize 10. 10. 10. cm
/score/mesh/nBin 1 1 50
/score/mesh/translate/xyz 0. 0. -226. cm
#/score/quantity/energyDeposit energyDeposit
/score/quantity/doseDeposit doseDeposit
/score/close
#
# define lateral scoring mesh
# centered at the Bragg peak
/score/create/boxMesh scintMeshlateral
/score/mesh/boxSize 10. 10. 0.05 cm
```

```
/score/mesh/nBin 50 1 1
/score/mesh/translate/xyz 0. 0. -243.15 cm
/score/quantity/energyDeposit energyDeposit
/score/quantity/doseDeposit doseDeposit
/score/close
#
# set physics process
/protonPB/phys/addPhysics QGSP_BIC_EMY
#/protonPB/phys/addPhysics emlivermore
#/protonPB/phys/addPhysics empenelope
#
# production tresholds (recommended range
#cut off not bigger than 10% of slice thickness)
/protonPB/phys/setCuts 0.2 mm
#/protonPB/phys/setGCut 1 um
#/protonPB/phys/setECut 1 um
#/protonPB/phys/setPCut 1 um
#
# initialize
/run/initialize
#
# visualisation
/control/execute visualisation.mac
#
#
/gun/particle proton
/gun/energy      60 MeV
/protonPB/gun/position 0. 0. -420. cm
/gun/direction  0. 0. 1.
#
```

Detector

y

1 m

z   x

1 m   1 m
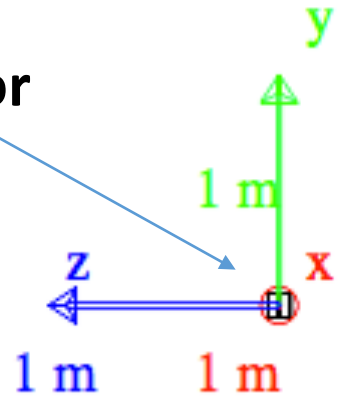
Unfortunately still getting errors and nothing actually happens in the detector…

Source