Test status

tkLayout developers meeting

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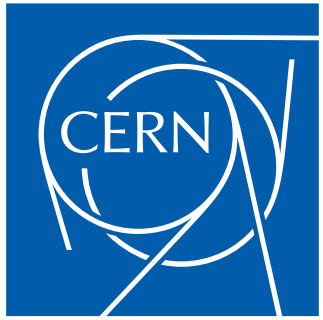


February 4, 2015

Testing algorithm

1. Build test case with controlled amount of material
2. Get elements coordinates
   $\rightarrow$ from tklayout run
3. Build model with expected material in each element
4. Identify areas in η with same effect
   $\rightarrow$ where same object are superimposed in η
5. Calculate weight in radiation length
6. Correlate tklayout output with expected calculation

Compute expected material for g/m unit

Cylinder, L g/mm of material M

$$\frac{X_0}{X_{0M}} = \frac{L}{2\pi r \cdot X_{0M}} \cdot \frac{e^{\eta} + e^{-\eta}}{2}$$

Disk, L g/mm of material M

$$\frac{X_0}{X_{0M}} = \frac{L}{\pi(r_1 + r_2) \cdot X_{0M}} \cdot \frac{e^{2\eta} + 1}{e^{2\eta} - 1}$$

- ✓ For layers rods, L is:
  - → the set material multiplied by the number of rods
- ✓ For disks "rods", L is:
  - → the set material multiplied by the number of modules of the first ring

Compute expected material for *mm* unit

Cylinder, *L mm* of material M

$$\frac{X_0}{X_{0M}} = \frac{L \cdot \rho_M}{X_{0M}} \cdot \frac{e^{\eta} + e^{-\eta}}{2}$$

Disk, *L mm* of material M

$$\frac{X_0}{X_{0M}} = \frac{L \cdot \rho_M}{X_{0M}} \cdot \frac{e^{2\eta} + 1}{e^{2\eta} - 1}$$

- ✓ For layers and disks rods, *L* is:
  - → the set material (not replicated for rod or modules)
- ! new discovered bug, corrected but still need to rerun tests
  - before, each mm definition where replicated by rods

Compute expected material for g unit

Cylinder, L g of material M

$$\frac{X_0}{X_{0M}} = \frac{L}{2\pi r(z_2 - z_1) \cdot X_{0M}} \cdot \frac{e^{\eta} + e^{-\eta}}{2}$$

Disk, L g of material M

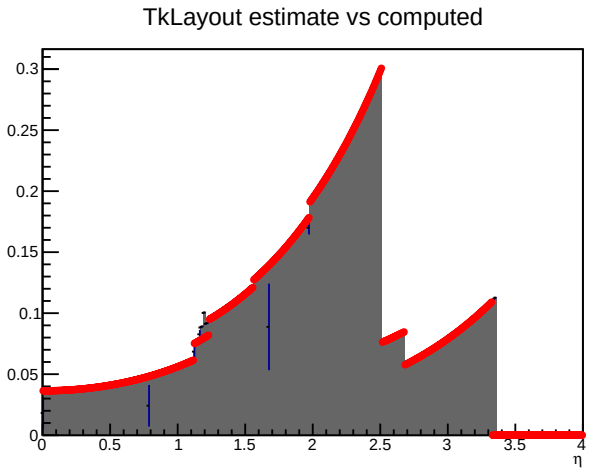
$$\frac{X_0}{X_{0M}} = \frac{L}{\pi(r_2^2 - r_1^2) \cdot X_{0M}} \cdot \frac{e^{2\eta} + 1}{e^{2\eta} - 1}$$

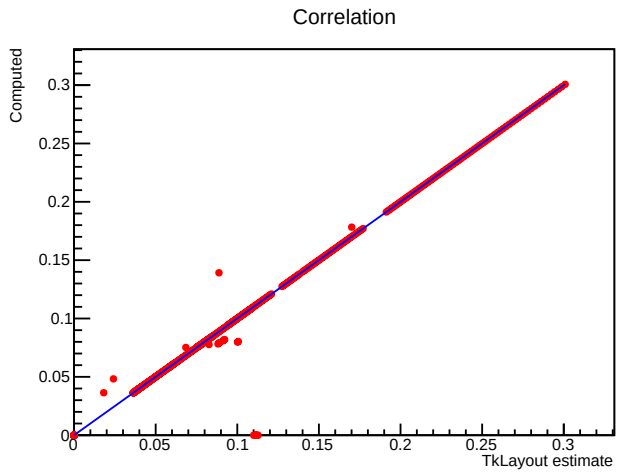
- ✓ Unit g can't be used for rods in layers and disks

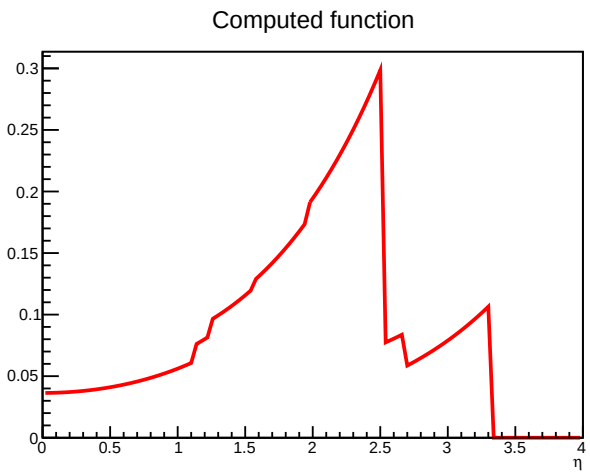
Test1a

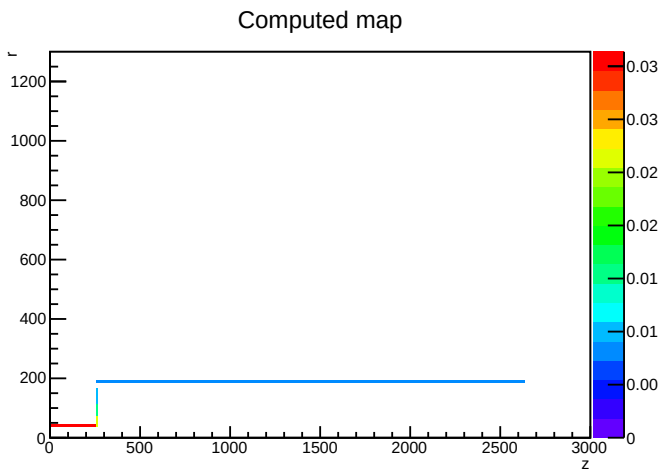
$100g/m$ of Cu in the rods of the first layer of the pixel barrel

- ✓ 12 rods
- ✓ $L = 1200$ for every element





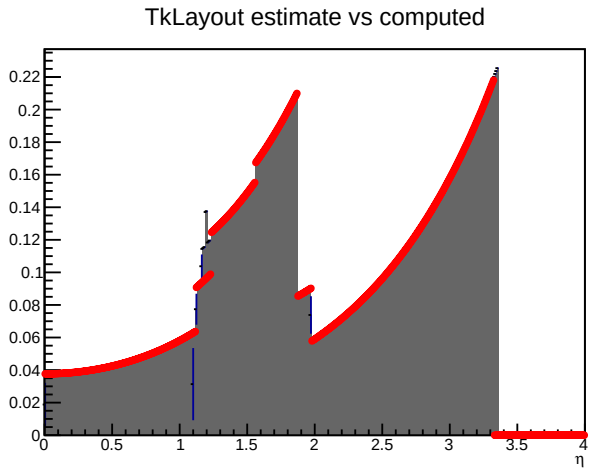


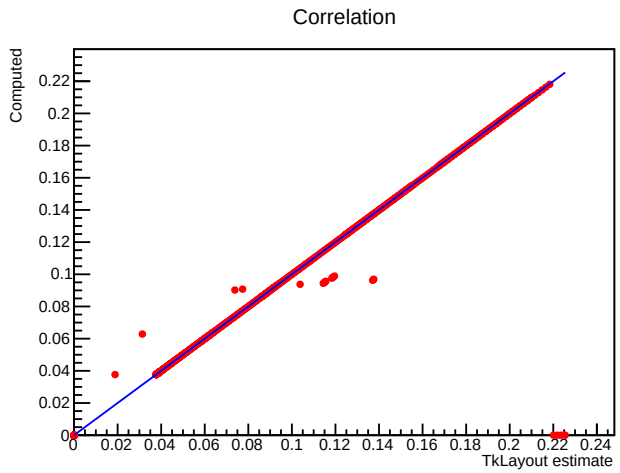


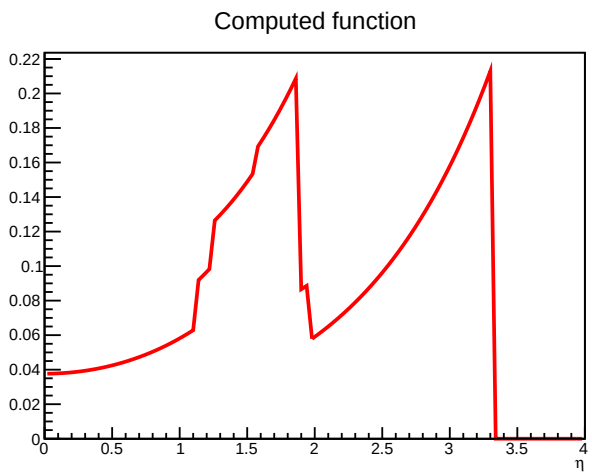
Test1b

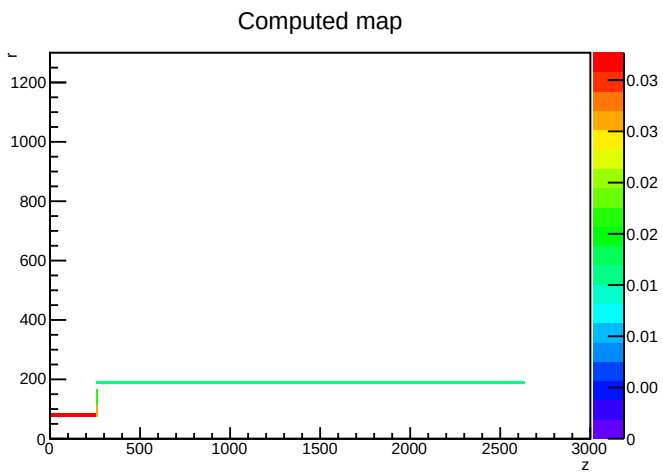
$100g/m$ of Cu in the rods of the second layer of the pixel barrel

- ✓ 24 rods
- ✓ $L = 2400$ for every element





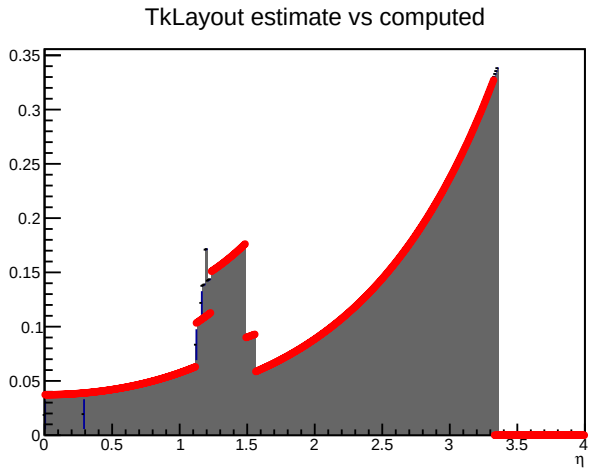


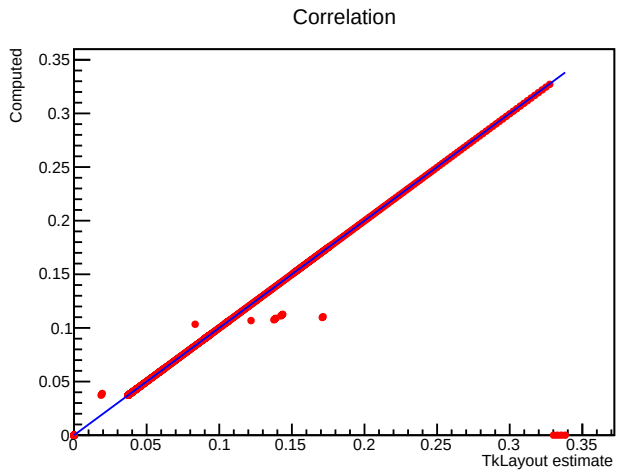


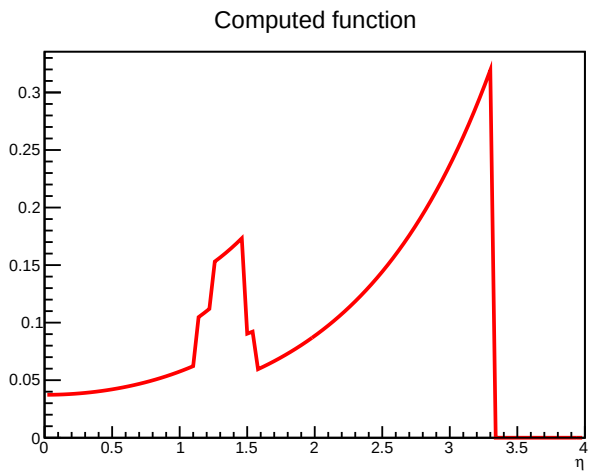
Test1c

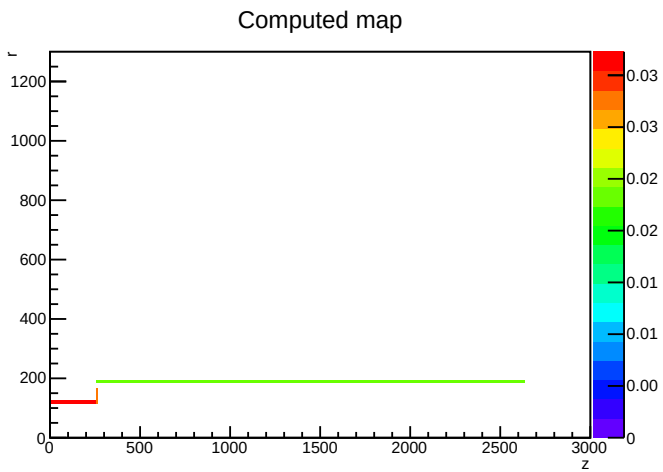
$100g/m$ of Cu in the rods of the third layer of the pixel barrel

- ✓ 36 rods
- ✓ $L = 3600$ for every element





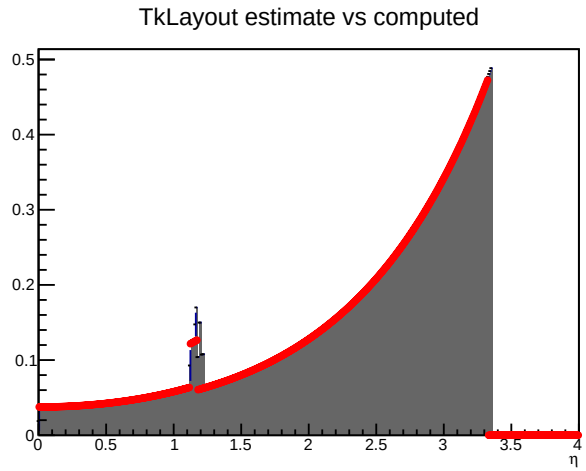


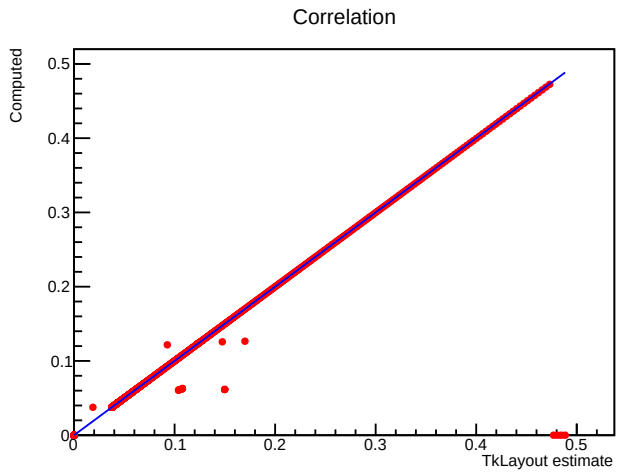


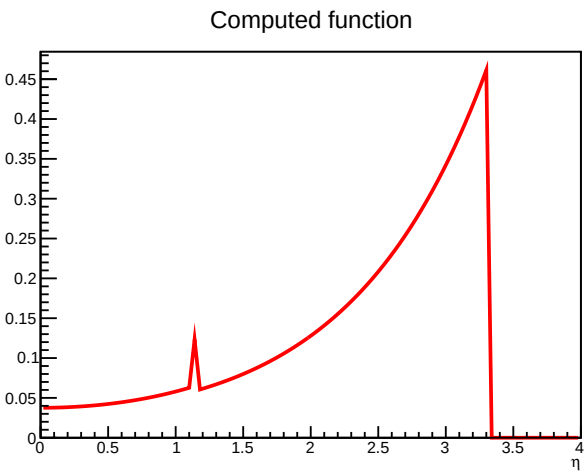
Test1d

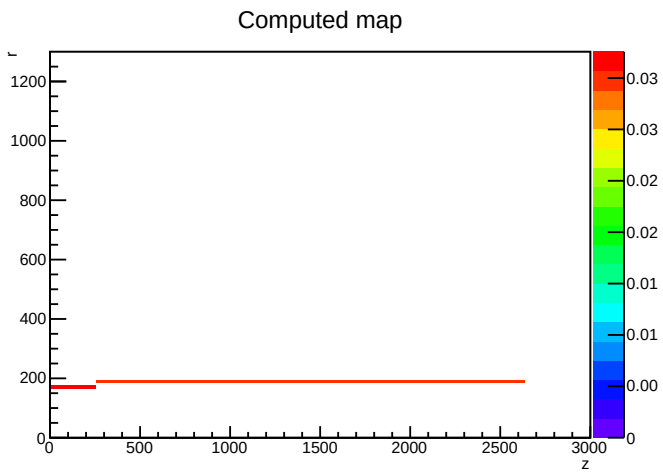
$100g/m$ of Cu in the rods of the fourth layer of the pixel barrel

- ✓ 52 rods
- ✓ $L = 5200$ for every element





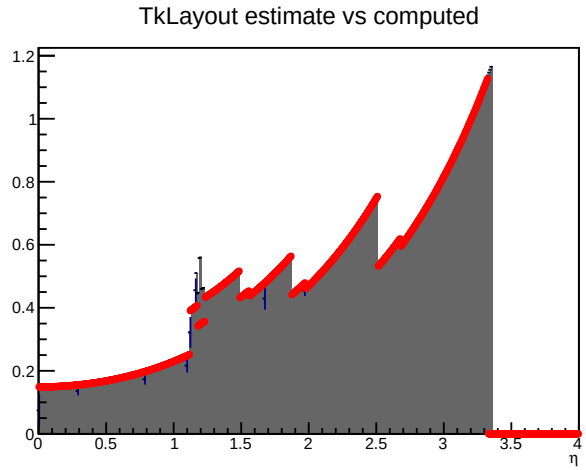


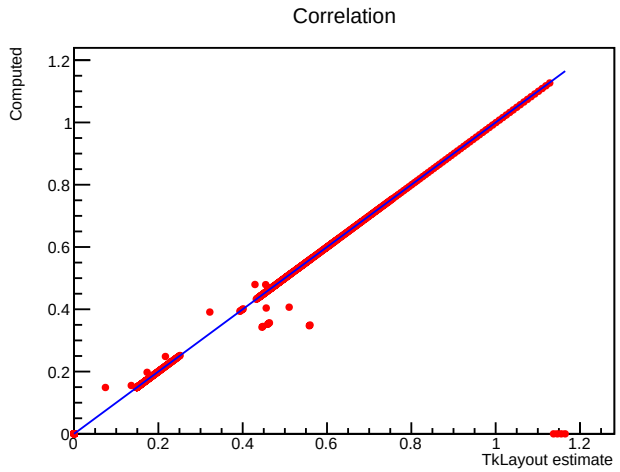


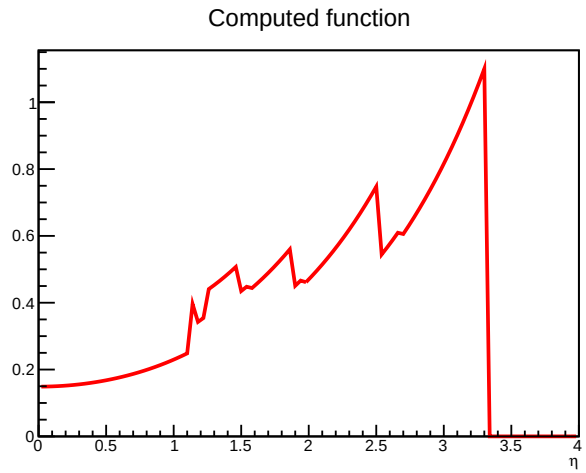
Test2

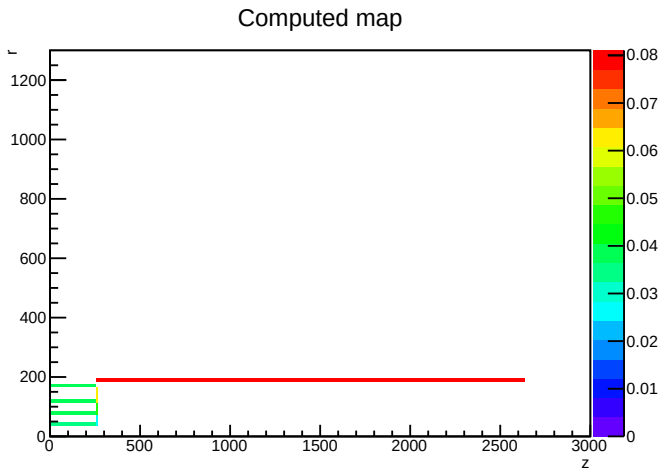
$100g/m$ of Cu in the rods of all the layers of the pixel barrel

- ✓ $L = rods * 100$ for layers
- ✓ $L = L_{attachedlayer} + L_{attacheddisk}$ for disks and last cylinder





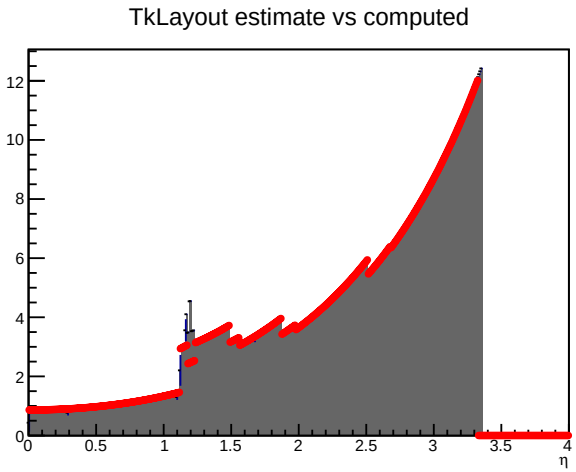


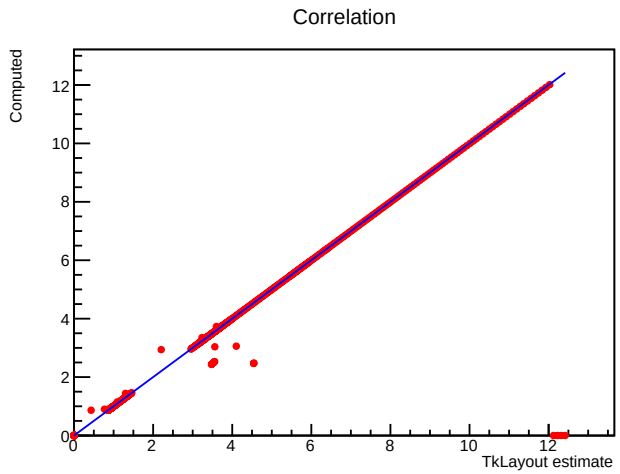


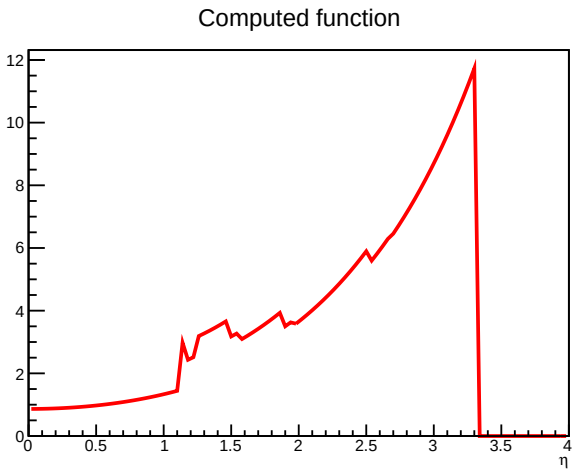
Test3 WILL CHANGE WITH BUGFIX

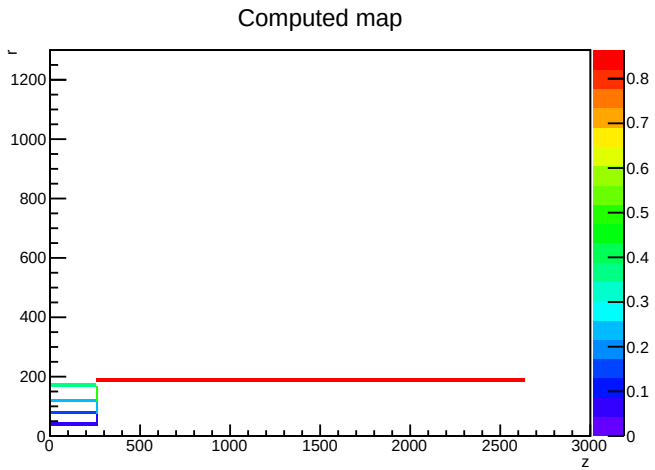
$0.1mm$ of Cu in the rods of all the layers of the pixel barrel

- ✓ $L = rods * 0.1$ for layers
- ✓ $L = L_{attachedlayer} + L_{attacheddisk}$ for disks and last cylinder





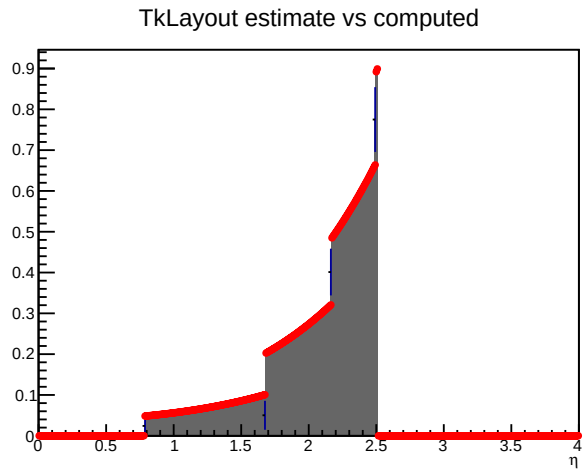


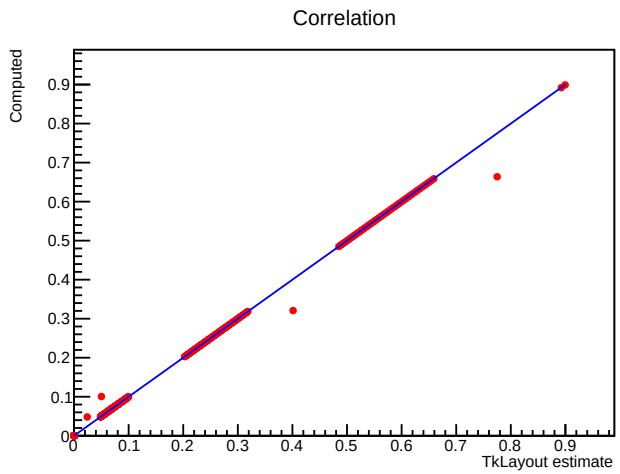


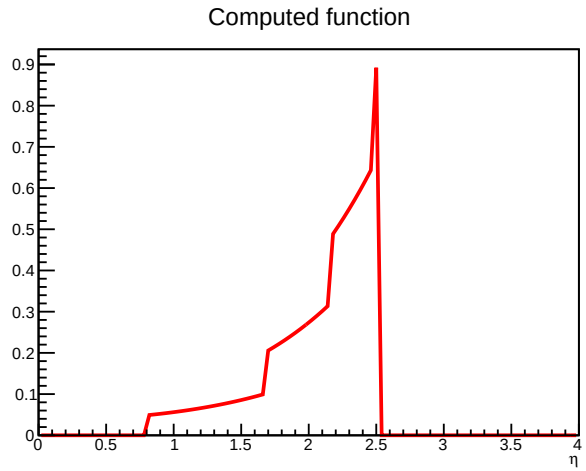
Test4

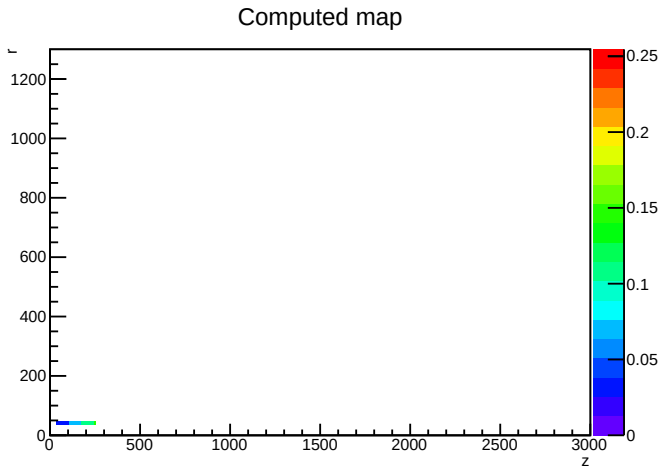
$100g/m$ of Cu exiting from modules of the first layer of the pixel barrel

- ✓ $L = (rods * 100) + Lpreviouscylinder$ for cylinders





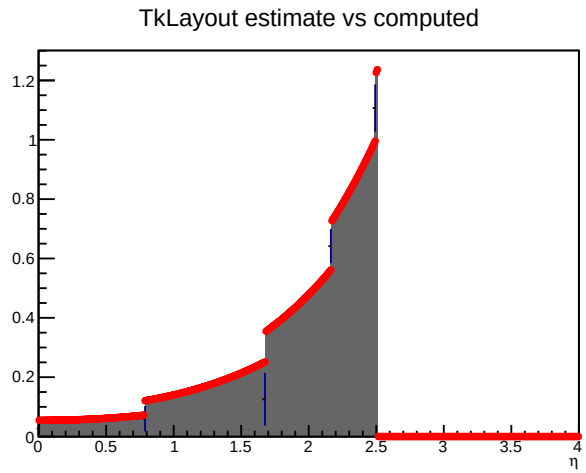


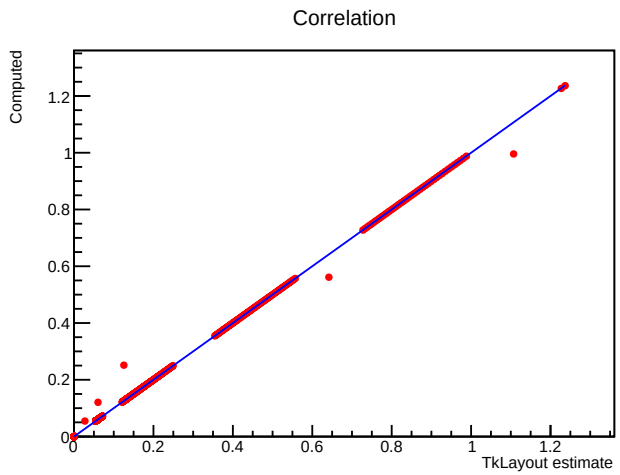


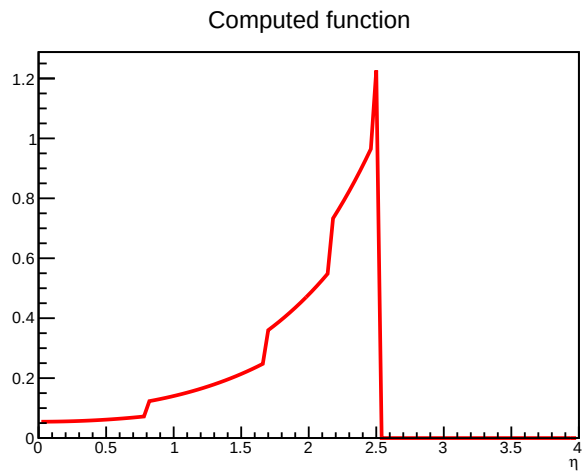
Test5

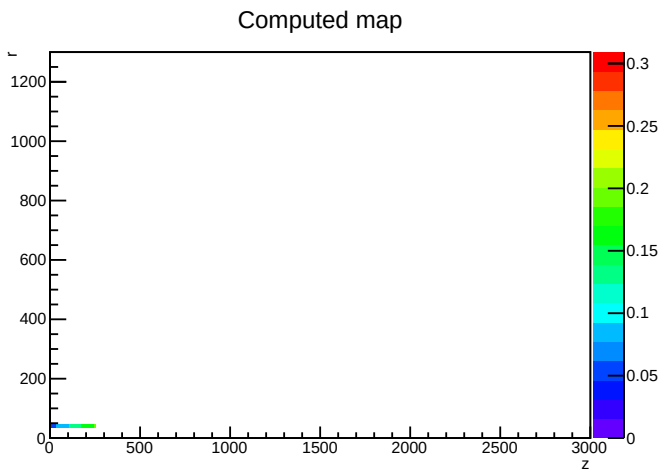
$100g/m$ of Cu exiting from modules and $150g/m$ in the rods

- ✓ $L = (rods * 100) + Lpreviouscylinder$ for cylinders
- ✓ $L = (rods * 150)$ in layer





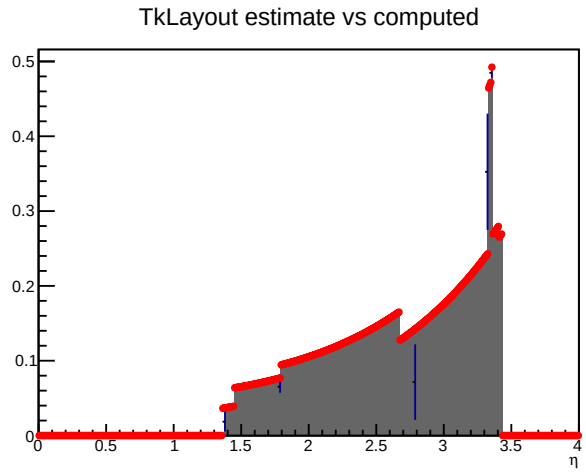


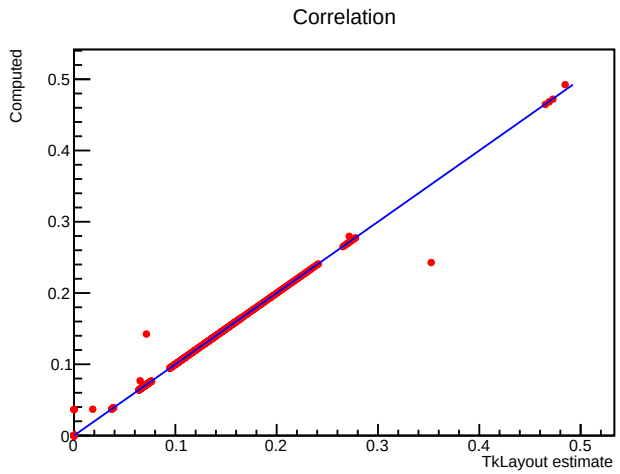


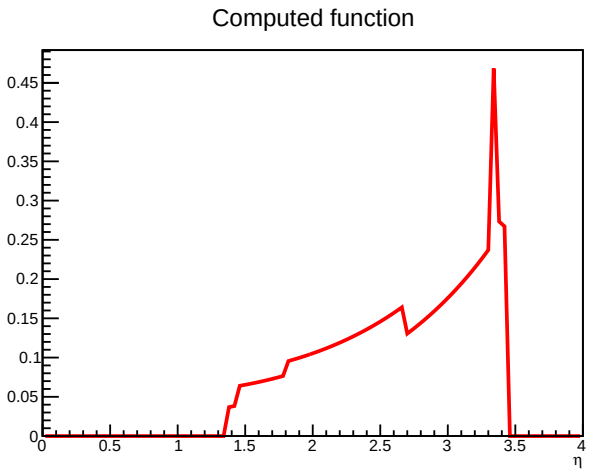
Test6

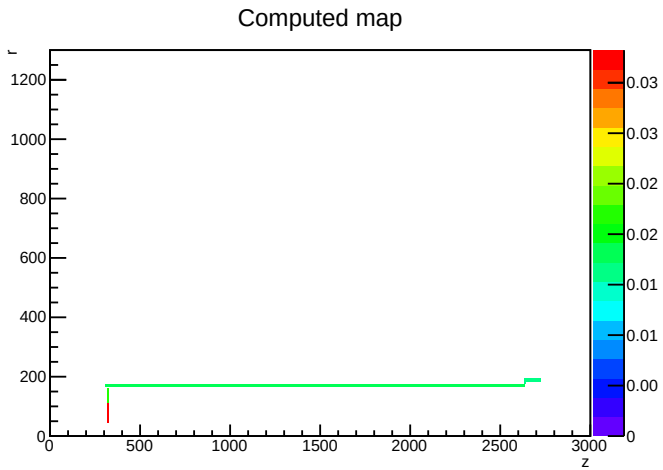
$100g/m$ of Cu in the first disk of pixel endcap

- ✓ 24 modules on first ring of disk
- ✓ $L = (24 * 100)$ in every element





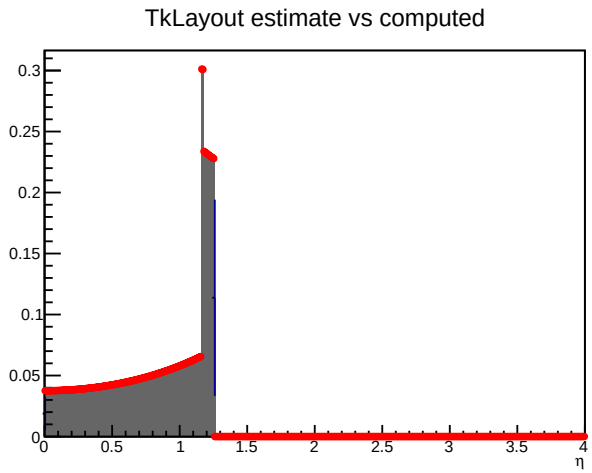


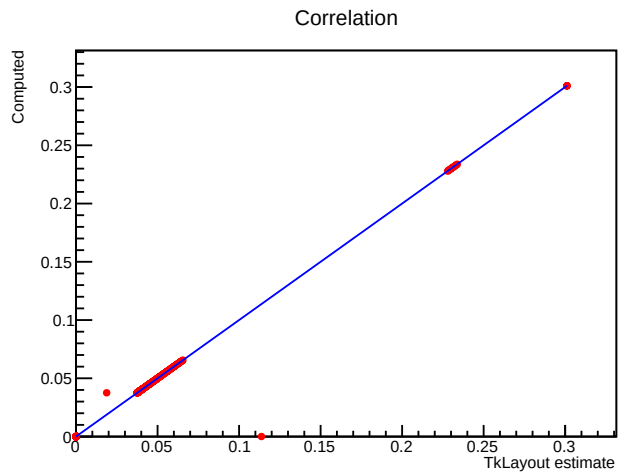


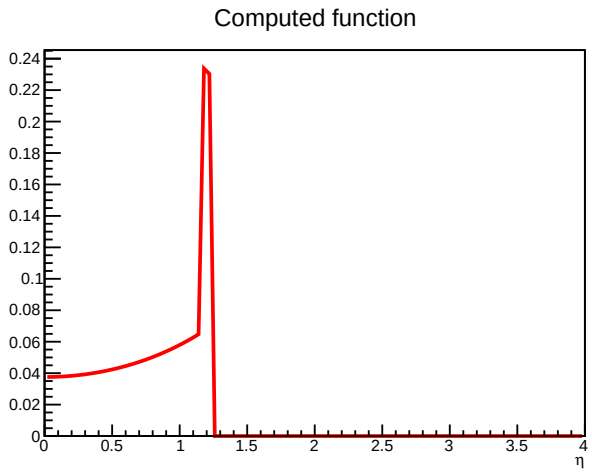
Test7

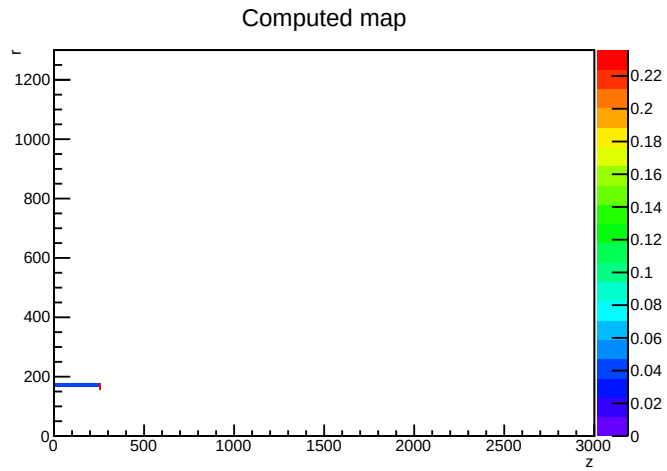
$100g/m$ of Cu in the fourth layer and conversion $1g/m \rightarrow 0.1g$ locally

- ✓ $L = (rods * 100)$ in layer
- ✓ $L = (rods * 100 * 0.1)$ in flange





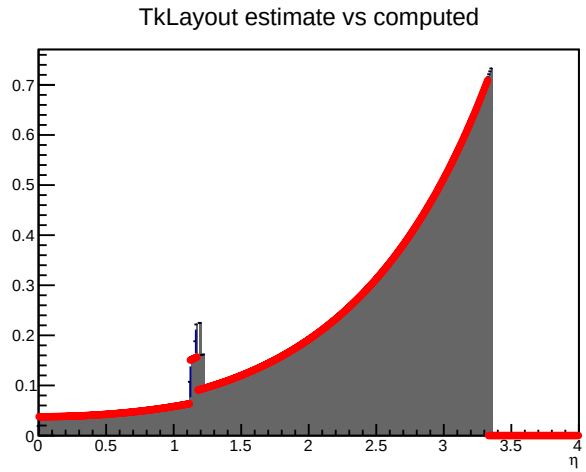


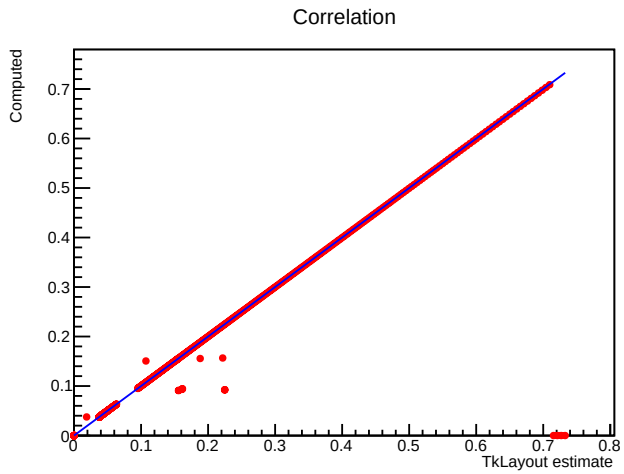


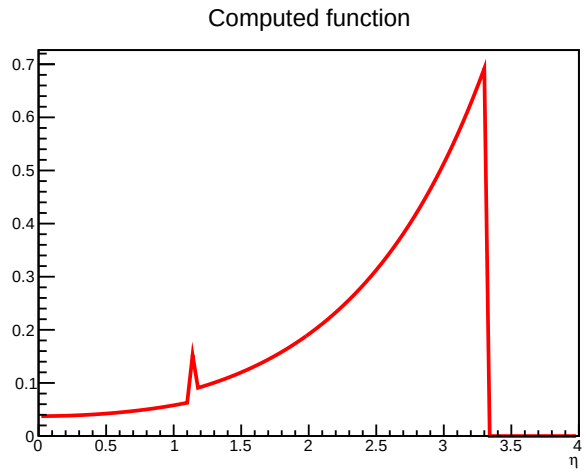
Test8

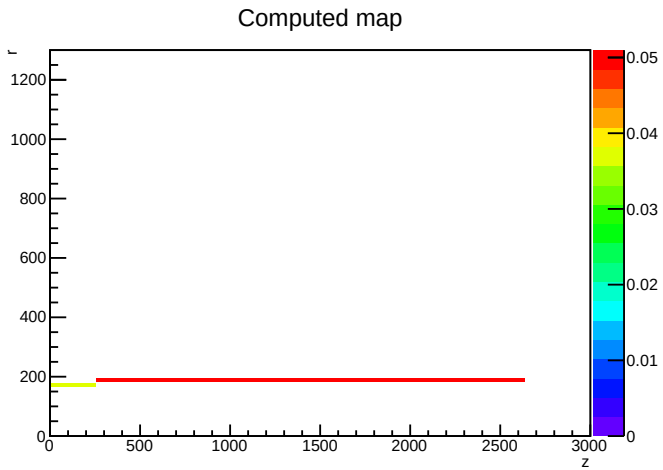
$100g/m$ of Cu in the fourth layer and conversion $1g/m \rightarrow 1.5g/m$ exiting

- ✓ $L = (rods * 100)$ in layer
- ✓ $L = (rods * 150)$ in second cylinder









- ✓ Is the testing procedure right?
- ✓ More kinds of tests?
- ✓ Bug with materials defined in mm
  - where replicated for each rod in barrel and each module of the first ring in endcaps
  - → corrected but need to be tested
- ✓ Some supports where defined in g/m in endcap
  - maybe cause of difference new-old material model?
  - → corrected converting them in mm, need to be validated