mTower testbeam simulation

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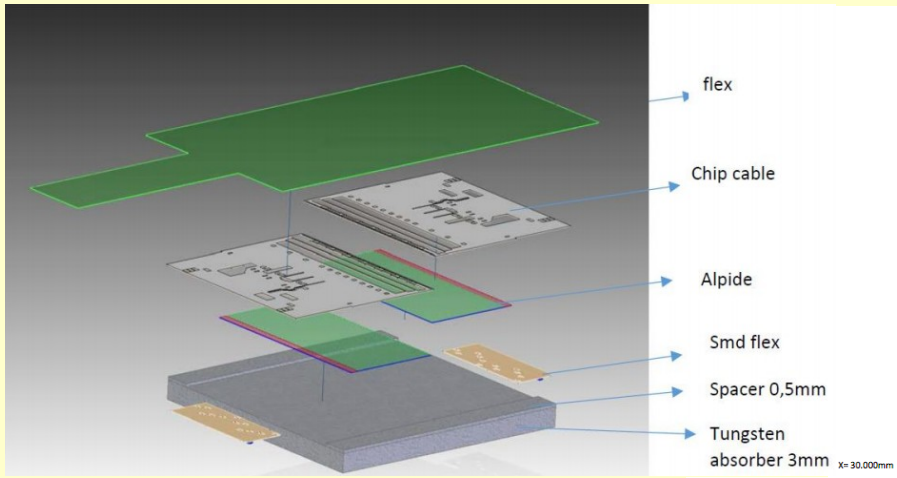
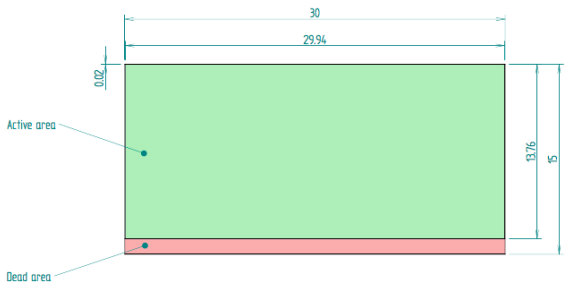
(+ NKW)

mTower TB simulation

- Based on Allpix² code from Naomi



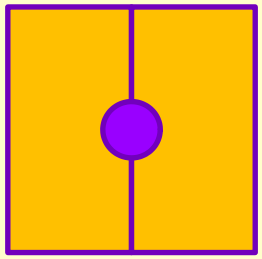


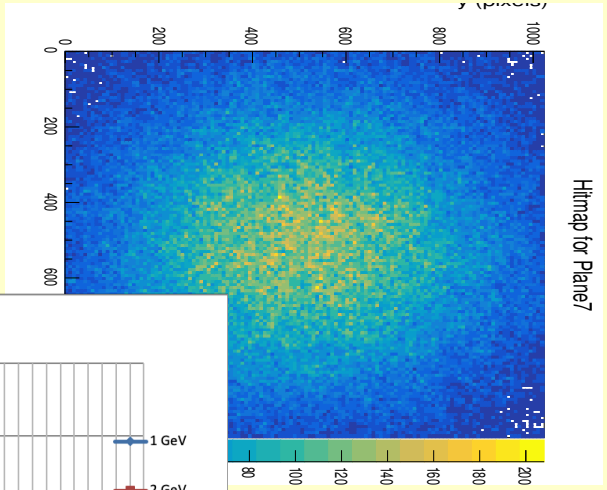

```
type = "monolithic"
number_of_pixels = 1024 1024
pixel_size = 29.24um 26.88um
implant_size = 3um 3um

sensor_thickness = 50um
sensor_excess_top = 50um
sensor_excess_bottom = 1208um
sensor_excess_left = 30um
sensor_excess_right = 30um

chip_thickness = 5um
```

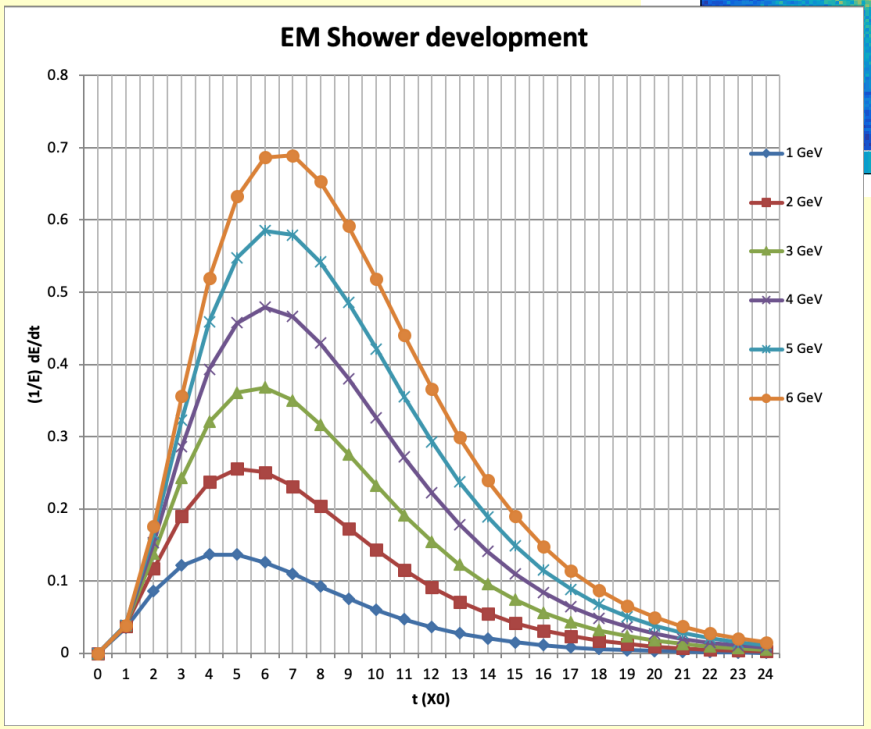
```
[support]
location = "sensor"
thickness = 0.060mm
size = 40mm 40mm
material = "aluminum"
#Tungsten spacer 2


[support]
location = "sensor"
thickness = 0.5mm
size = 4mm 35mm
offset = -18mm 0mm
material = "tungsten"
#Tungsten spacer 1
```

```
[support]
location = "sensor"
thickness = 0.5mm
size = 4mm 35mm
offset = 18mm 0mm
material = "tungsten"
# Kapton

[support]
thickness = 145um
size = 30mm 20mm
location = "sensor"
material = "kapton"
#Tungsten plate

[support]
location = "chip"
thickness = 3mm
size = 40mm 35mm
material = "tungsten"
```

5 GeV, 7mm beam, layer 1-21, x=0mm

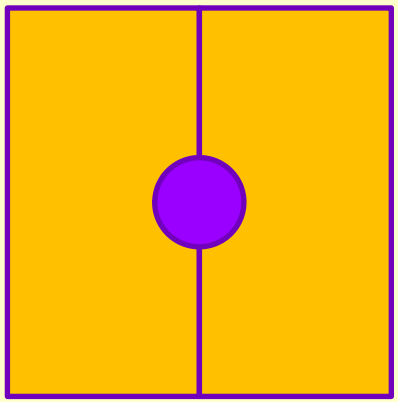




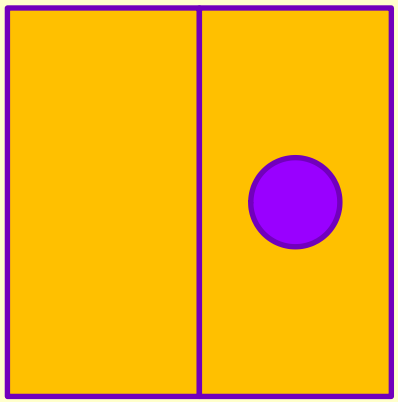


5 GeV, shower max in layer 6 or 7

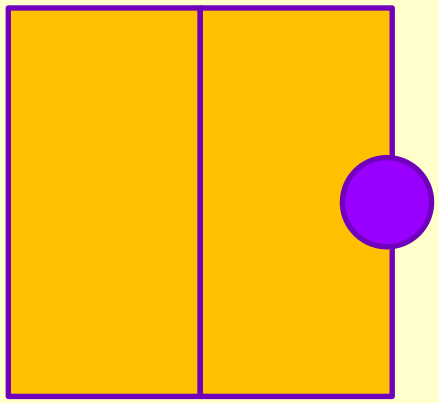
5 GeV, 7mm beam, layer 7, x=0mm



5 GeV, 7mm beam, layer 7, x=7.5mm



5 GeV, 7mm beam, layer 7, x=15mm



Sum Nhits, all layers, central beam

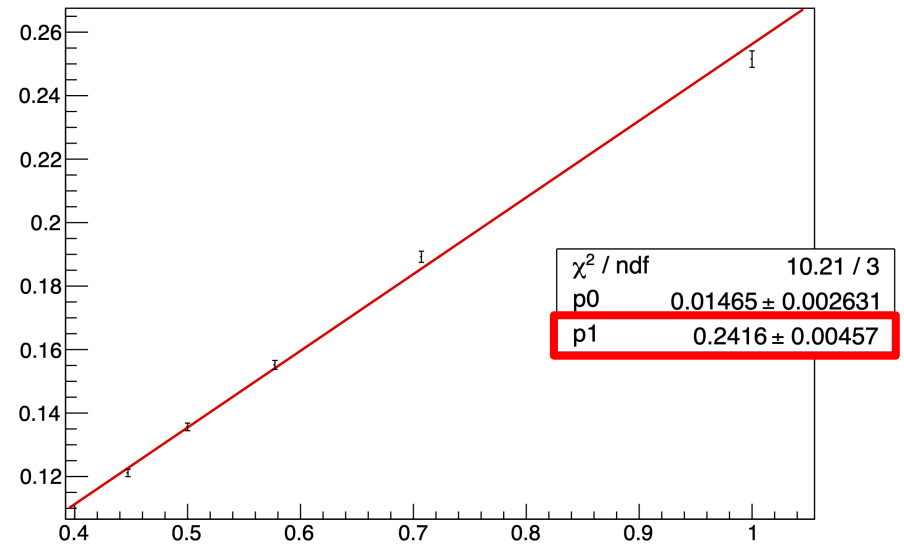
5 GeV

3 GeV

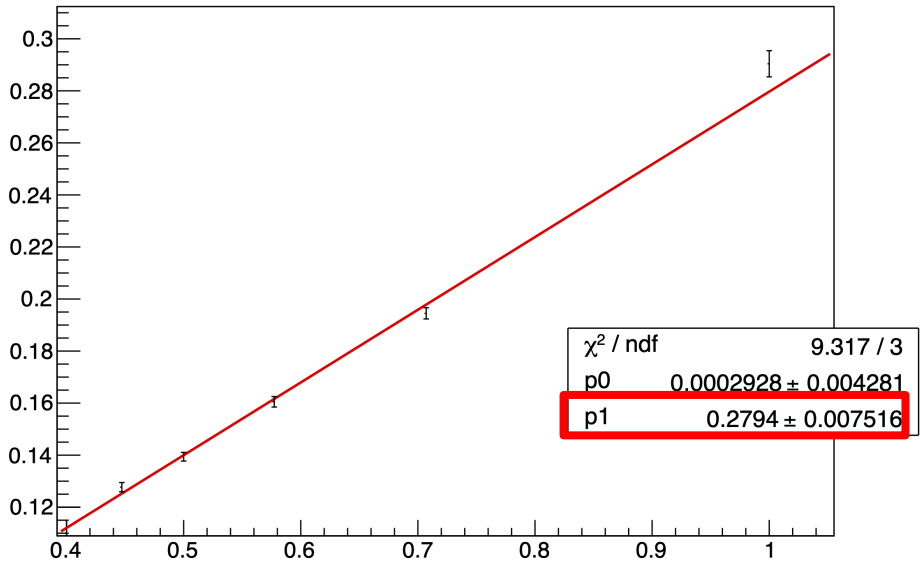
1 GeV

Resolution plots

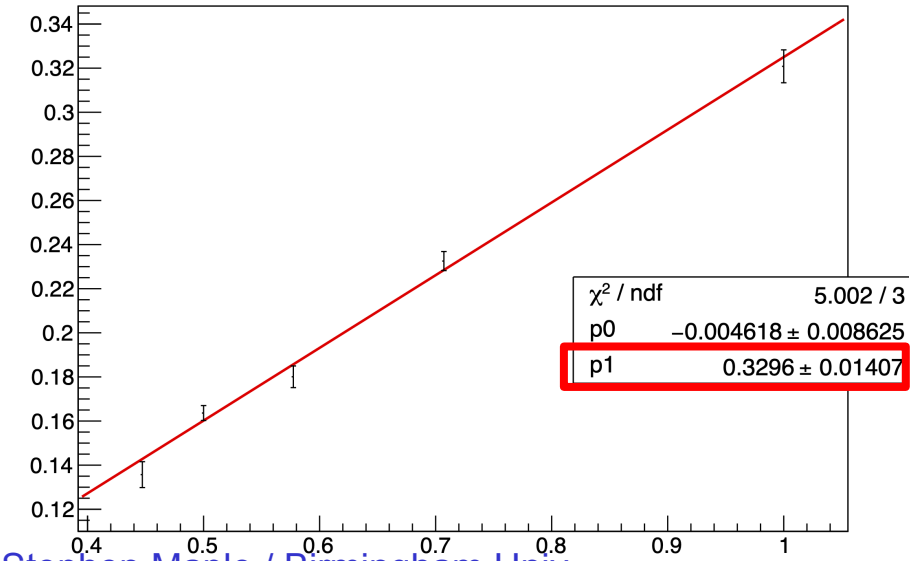
Alpide 7mm beam Central Resolution plot



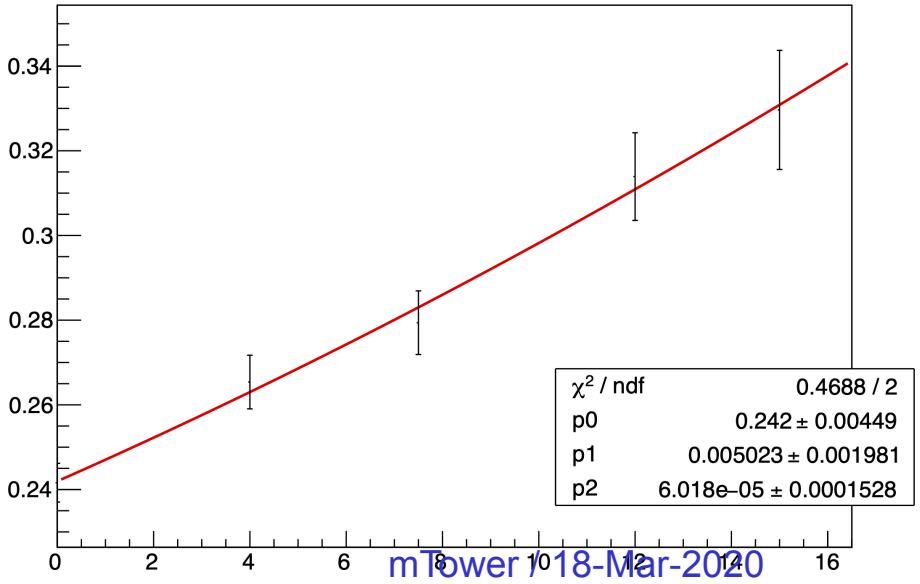
Alpide 7mm beam Offset 7.5mm Resolution plot



Alpide 7mm beam Offset 15mm Resolution plot



Stochastic term vs beam offset in mm



Next steps/summary

- Full AllPix^{2}model of Alpide, derived from Naomi/Simon Spannagel example
- Includes per layer model
- Contained showers
  - Resolution stochastic term ~ 24%/\sqrt{E}
- Variation with beam position/leakage seems plausible!
- Variation of resolution with angle, sim running, results a.s.a.p.!