sPHENIX INTT - Beam Test 2021

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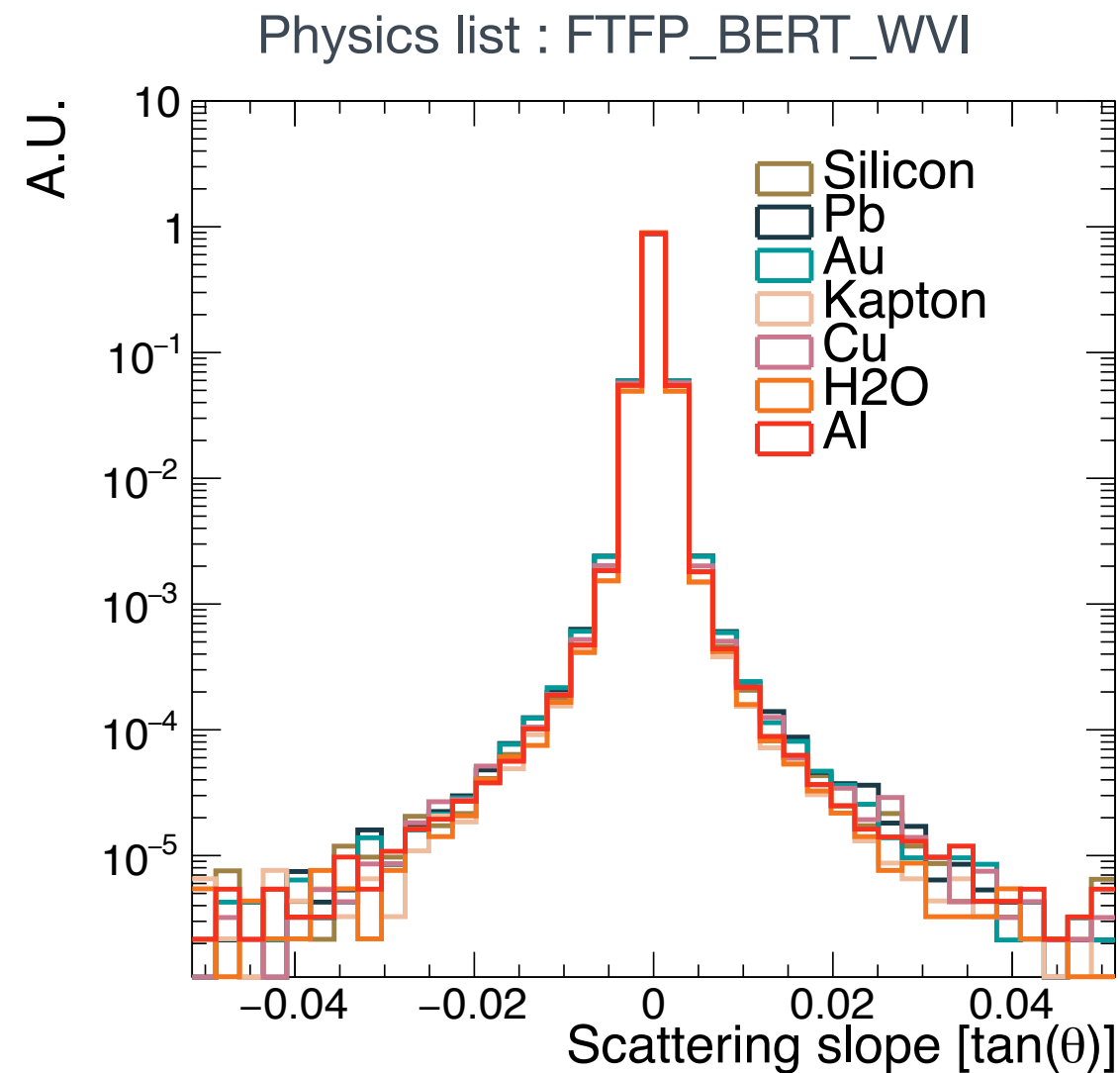
Test material

Detector plane

Physics list : FTFP_BERT_WVI
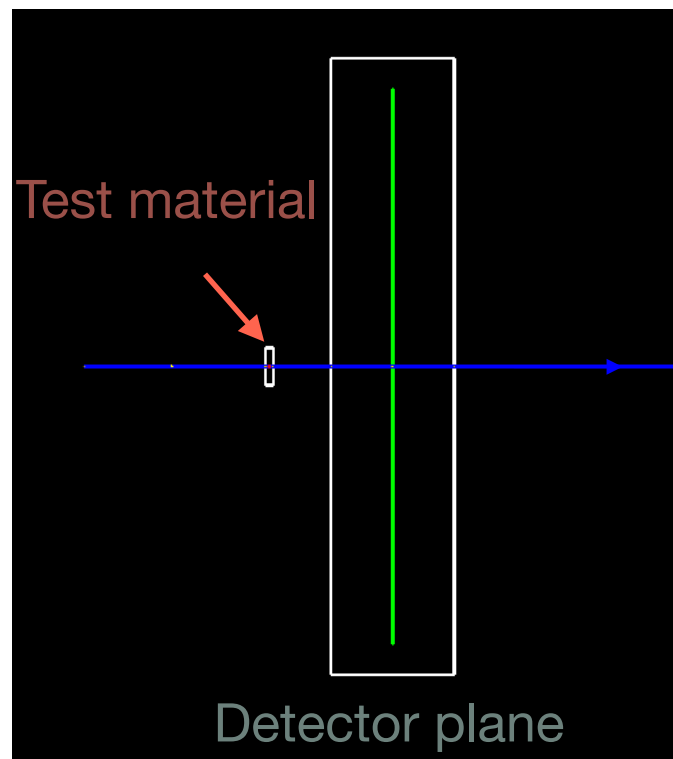
	radiation length (cm)	thickness (um)
Silicon	9.370	320.000
Lead Pb	0.5612	19.166
Gold Au	0.3344	11.420
Kapton	28.57	975.710
cooper Cu	1.436	49.042
water	36.08	1232.188
Aluminum	8.897	303.846

The distributions are quite similar to each other

Possibility of simulating charge sharing

Reply from the tracking group about the charge sharing

Hello Cheng-Wei,

In:

https://github.com/sPHENIX-Collaboration/coresoftware/blob/master/simulation/g4simulation/g4intt/PHG4InttHitReco.cc

lines 284-397 is an attempt to mimic charge sharing. The diffusion was just made up without any real basis, so you could try changing that.

Let me know if you have querstions.

Best regards
Tony

Github link

```
178     // Intt digitization
179     //===========
180     // these should be used for the Intt
181     /*
182        How threshold are calculated based on default FPHX settings
183        Four part information goes to the threshold calculation:
184        1. In 320 um thick silicon, the MIP e-h pair for a nominally indenting tracking is 3.87 MeV/cm * 320 um / 3.
185        2. From DOI: 10.1016/j.nima.2014.04.017, FPHX integrator amplifier gain is 100mV / fC. That translate MIP vo
186        3. From [FPHX Final Design Document](https://www.phenix.bnl.gov/WWW/fvtx/DetectorHardware/FPHX/FPHX2_June200
187        4, From [FPHX Final Design Document](https://www.phenix.bnl.gov/WWW/fvtx/DetectorHardware/FPHX/FPHX2_June200
188        The result threshold table based on FPHX default value is as following
189        | FPHX Register Address | Name           | Default value | Voltage - Vref (mV) | To electrons based on cali
190        |-----------------------|----------------|---------------|---------------------|---------------------------
191        | 4                     | Threshold DAC 0 | 8            | 32                  | 2500
192        | 5                     | Threshold DAC 1 | 16           | 64                  | 5000
193        | 6                     | Threshold DAC 2 | 32           | 128                 | 10000
194        | 7                     | Threshold DAC 3 | 48           | 192                 | 15000
195        | 8                     | Threshold DAC 4 | 80           | 320                 | 25000
196        | 9                     | Threshold DAC 5 | 112          | 448                 | 35000
197        | 10                    | Threshold DAC 6 | 144          | 576                 | 45000
198        | 11                    | Threshold DAC 7 | 176          | 704                 | 55000
199        DAC0-7 threshold as fraction to MIP voltage are set to PHG4InttDigitizer::set_adc_scale as 3-bit ADC thresho
200     */
```

Backup