

Proposal of mapping induced current

3rd meeting of SCT Digitization TF

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Proposal of mapping induced current

There are three major points for improvement:

- (1) Use Electric field based on FEM (instead of uniform field).
- (2) Use induced current (instead of hole charge arrived).
- (3) Follow the time sequence (instead of fixed threshold at 30 ns).

However, transportation of each electrons and holes in the bulk requires too much CPU time.

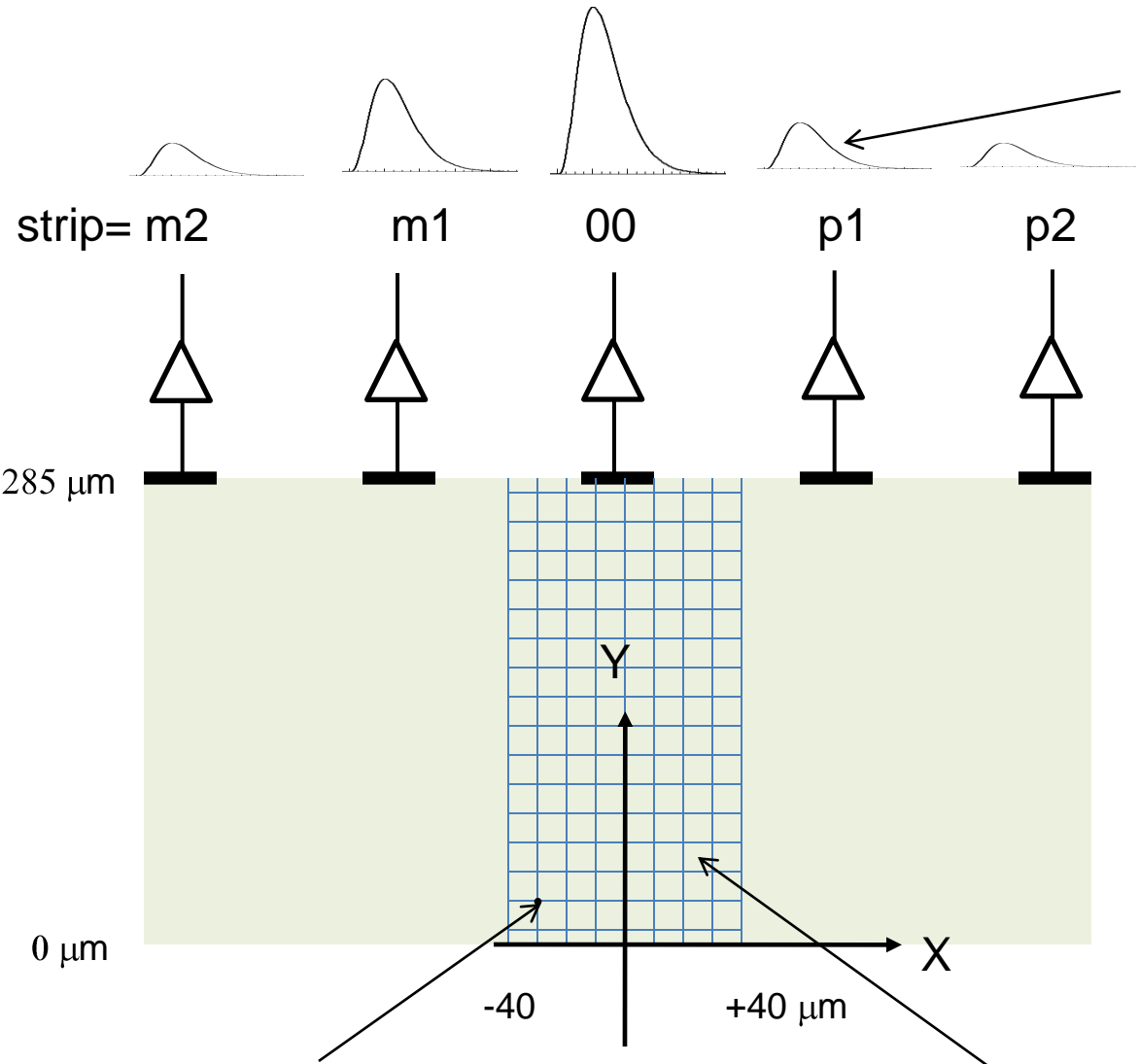
Proposal :

make a map of induced current at various points under one strip size.

Test point : $B=2$ tesla, $V_D=65V$, $V_B=150V$, $T=0^\circ C$

Map data and readout programmes can be picked up at
<http://atlas.kek.jp/si-soft/map/index.html>

Save time shapes for 5 strips
(1ns interval up to 50ns)



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Data array:
Pulse[5][17][57][50]
[5] : strips (m2,m1,00,p1,p2)
[17] : -40,-35, .....,+40 μm
[57] : 2.5, 7.5, .....,282.5 μm
[50] : 0, 1, 2, ....., 49 ns

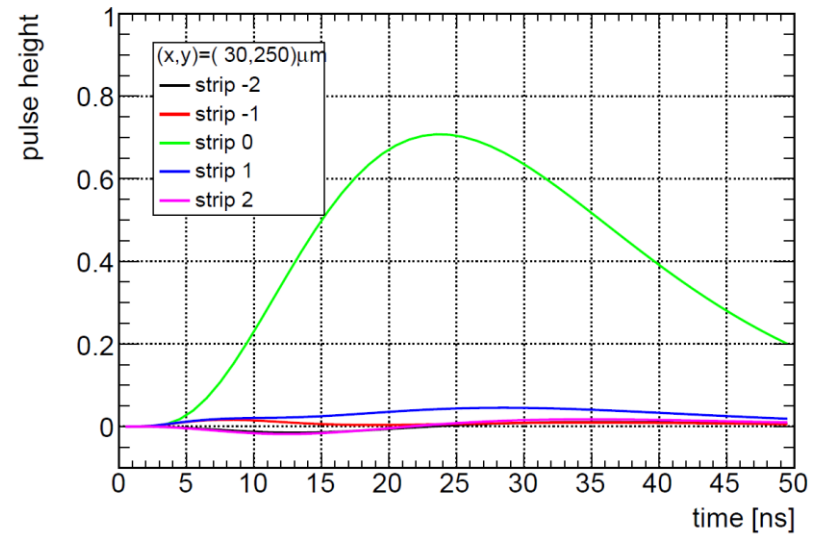
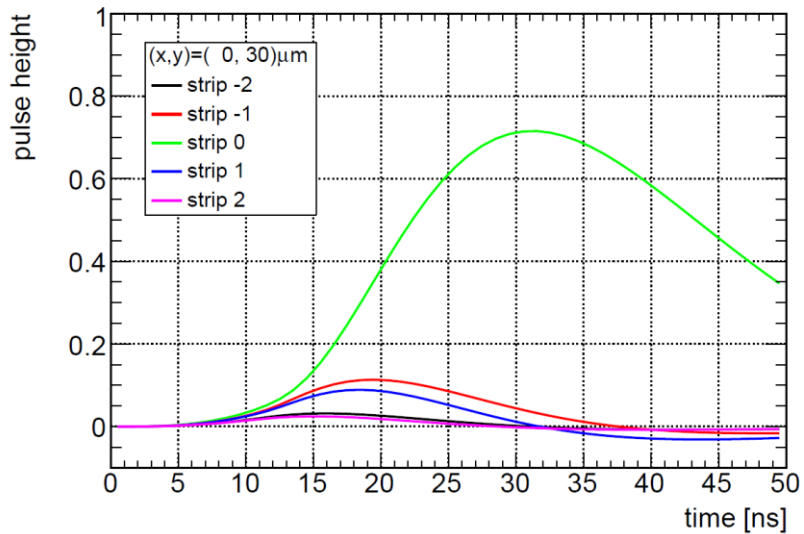
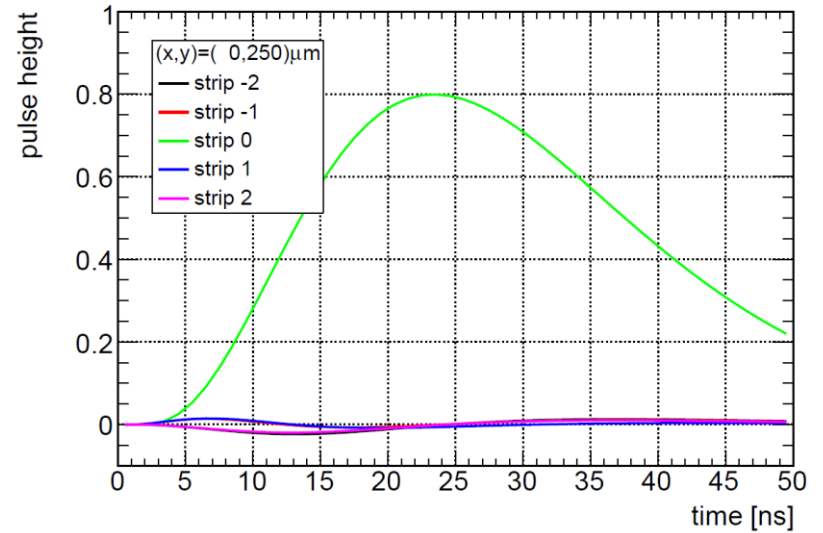
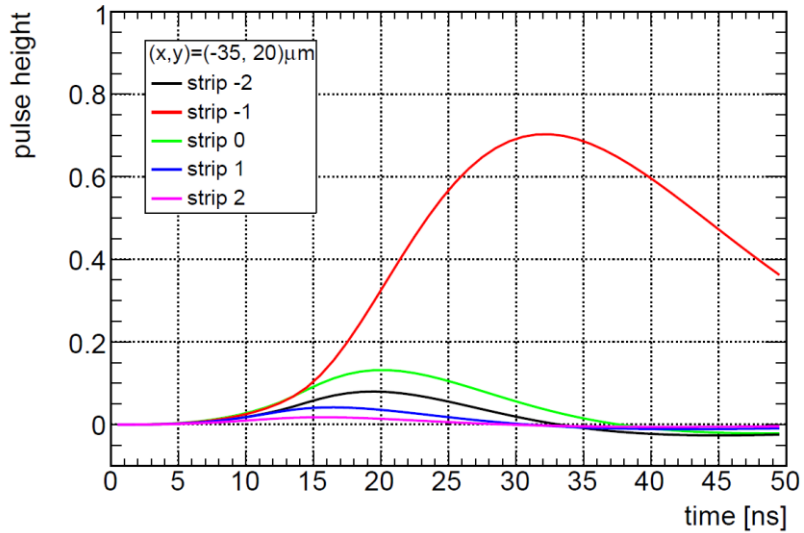
associated programmes:
inducedPulseArray(l,x,y,time)
init_inducedPulsesArray()
GetPulse150(l,j,k,l)

Interpolation for use:
inducedPulses (istrip,x,y,time)
  
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Calculate induced current for
17 x 57 mesh points every 5 μm.

Use interpolation of
adjacent 4 mesh points

Plot s of some sampling points



Some remarks

- Shaun pointed the space charge should not be included when the weighting potential is calculated. In fact, Hans-Günther Moser's review (Progress in Particle and Nuclear Physics 63 (2009) 186–237) says
"Only the geometry needs to be considered, no space charge is involved".

I updated my weighting potential accordingly.

- Map data and readout programmes can be picked up at <http://atlas.kek.jp/si-soft/map/index.html>
- Is it possible (for Richard ?) to link this mapping data to the current SCT digitization programme to see the differences due to induced current and timing ?