

Diploma theme

Straw modeling Garfield++

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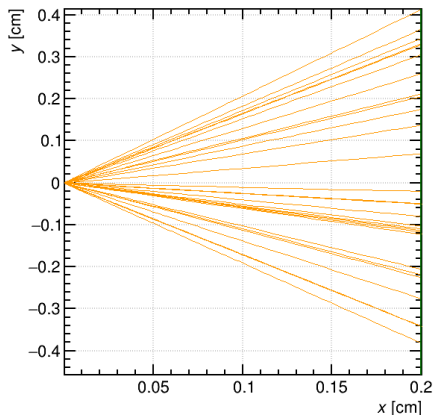
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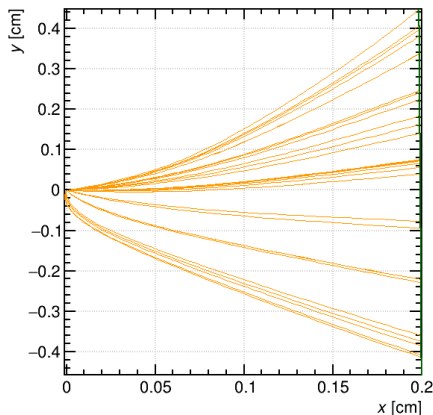
Simulation parameters (SPD setup)

- 1 Straw diameter: 10 mm
- 2 Anode diameter: 30 mkm
- 3 HV: 1750
- 4 Gas mixture: Ar+CO₂ / 70:30 [%]
- 5 Gas mix temperature: 20 celsius
- 6 Ionization particle: muon 1 GeV (later we'll add other particles)
- 7 Track angle α : 90, 14 degree. First, 90 degree, later add other trajectories
- 8 Magnetic field: 0, 1.0 Tesla – two setups
- 9 Penning effect is 0
- 10 Gas Gain is fixed $= 4.5 \cdot 10^4$

Drift Line Examples



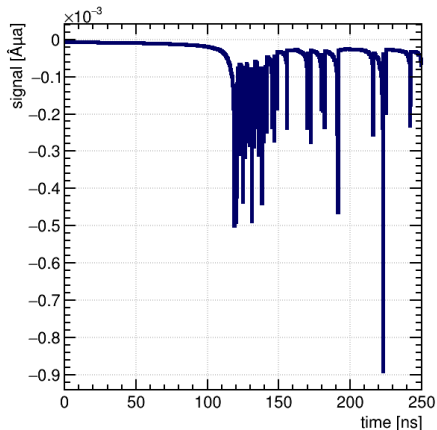
a)



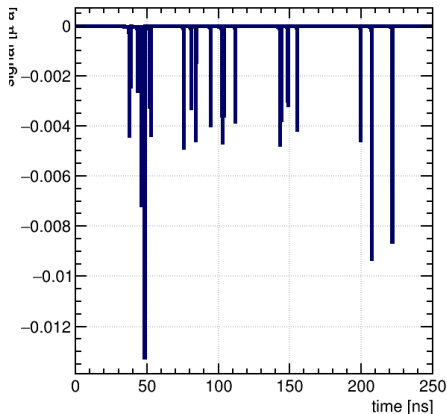
b)

Figure: (a) Drift lines for no field case (b) Drift lines for field case – 0.6 Tl, for example. Drift lines are twisted in magnetic field

Signal Examples



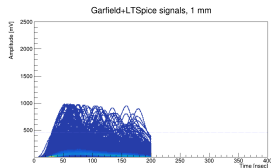
a)



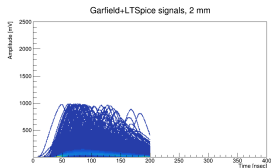
b)

Figure: (a) Signal induced on wire for no field case (b) Signal induced on wire for field case – 0.6 TI, for example

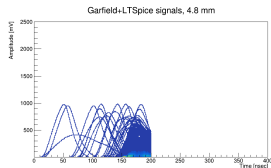
Set of signals before SPICE, no Magnetic, compare distance



a)



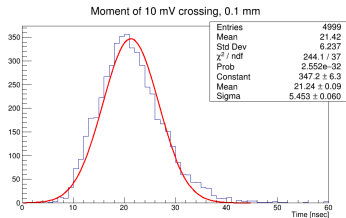
b)



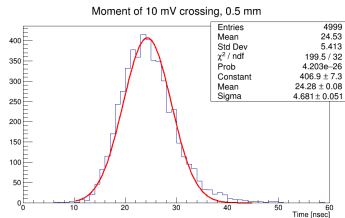
c)

Figure: (a) Distance 1 mm, (b) Distance 2 mm, (c) Distance 4.8 mm

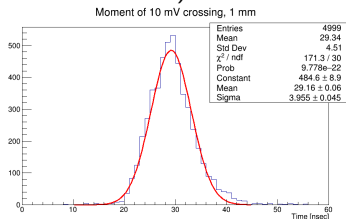
Moment of 10 mV crossing



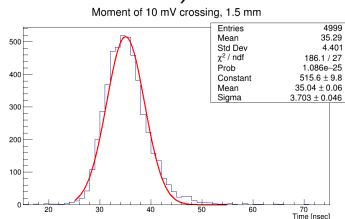
a)



b)



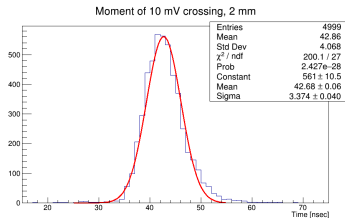
c)



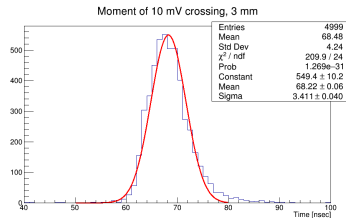
d)

Figure: (a) Distance 0.1 mm, (b) Distance 0.5 mm, (c) Distance 1 mm, (d) Distance 1.5 mm

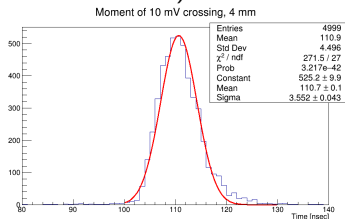
Moment of 10 mV crossing (continue)



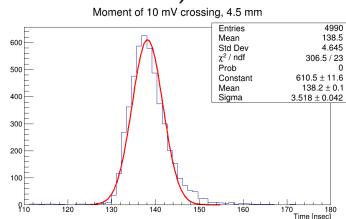
e)



f)



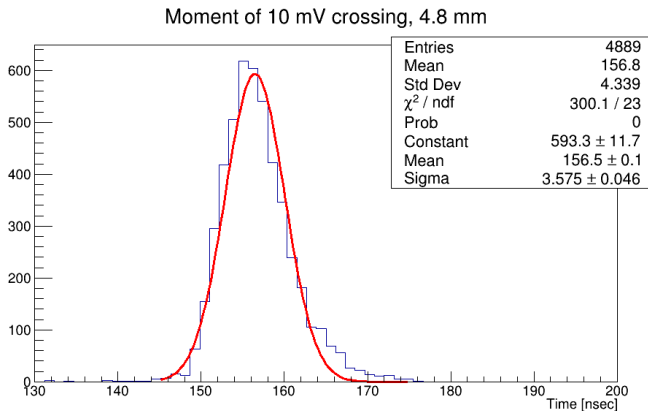
g)



h)

Figure: (e) Distance 2 mm, (f) Distance 3 mm, (g) Distance 4 mm, (h) Distance 4.5 mm

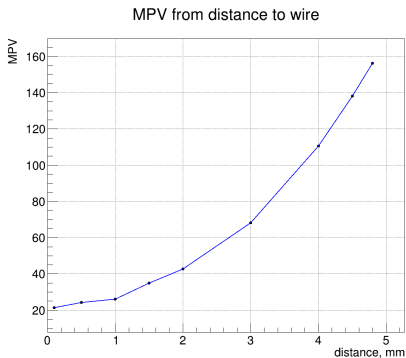
Moment of 10 mV crossing (continue)



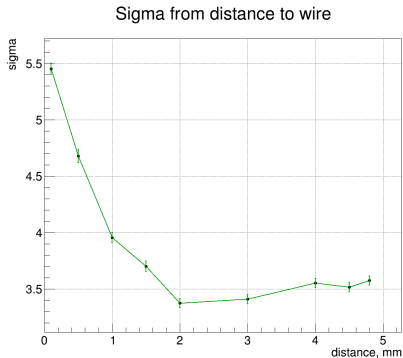
i)

Figure: (i) Distance 4.8 mm

MPV sigma from distance to wire



a)



b)

Figure: (a) MPV from distance to wire (b) Sigma from distance to wire
No mag. field, no angle case