

LArFCS Progress Report

Yichen, Sergey

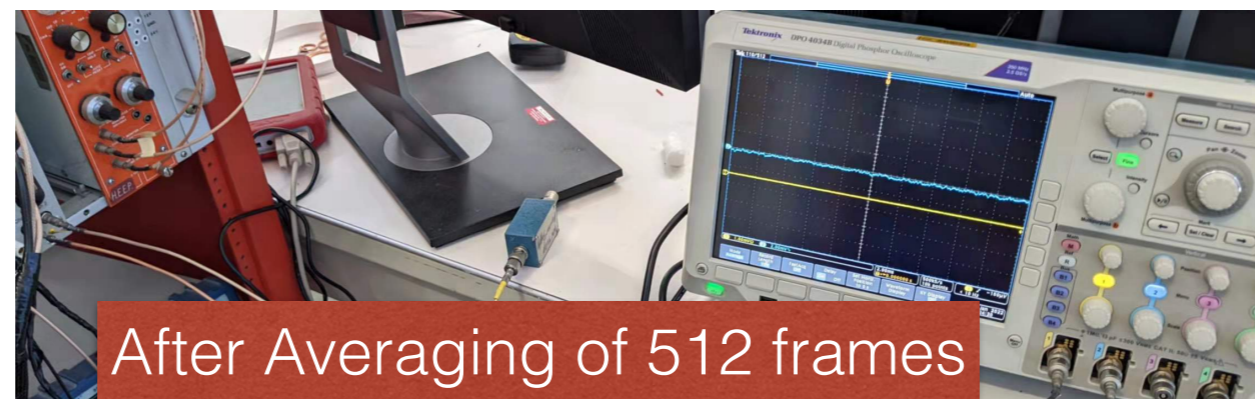
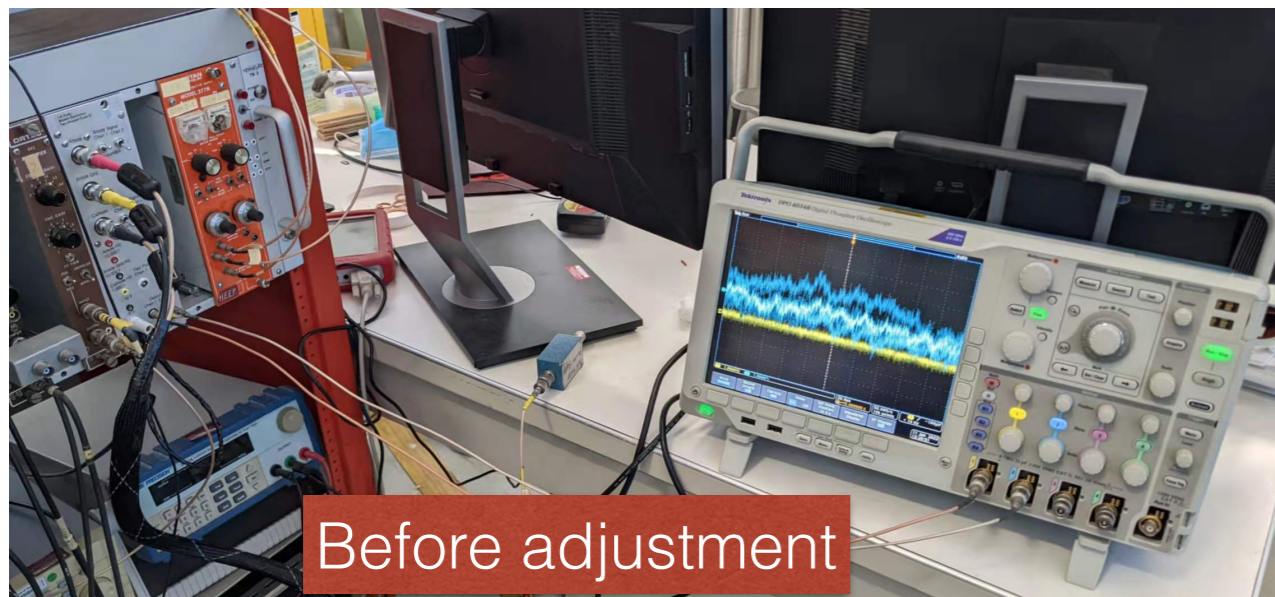
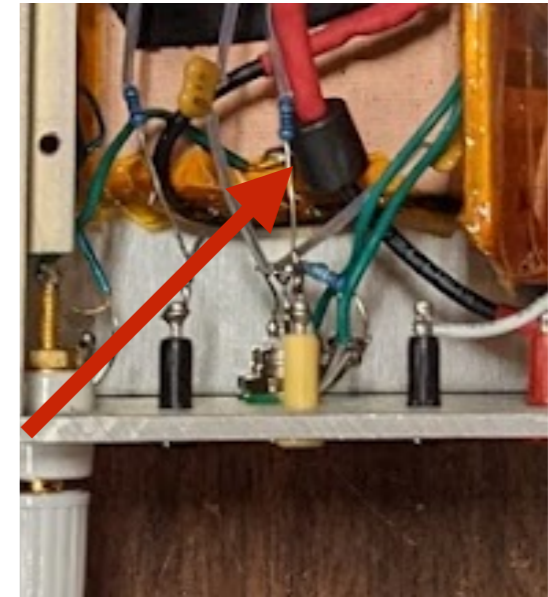
1/10/22



LArFCS Purity Run

► PrM bench test for functionality

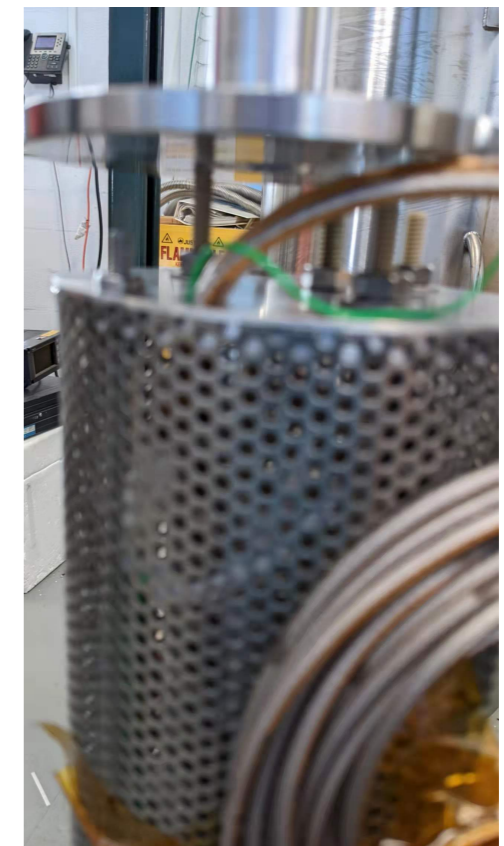
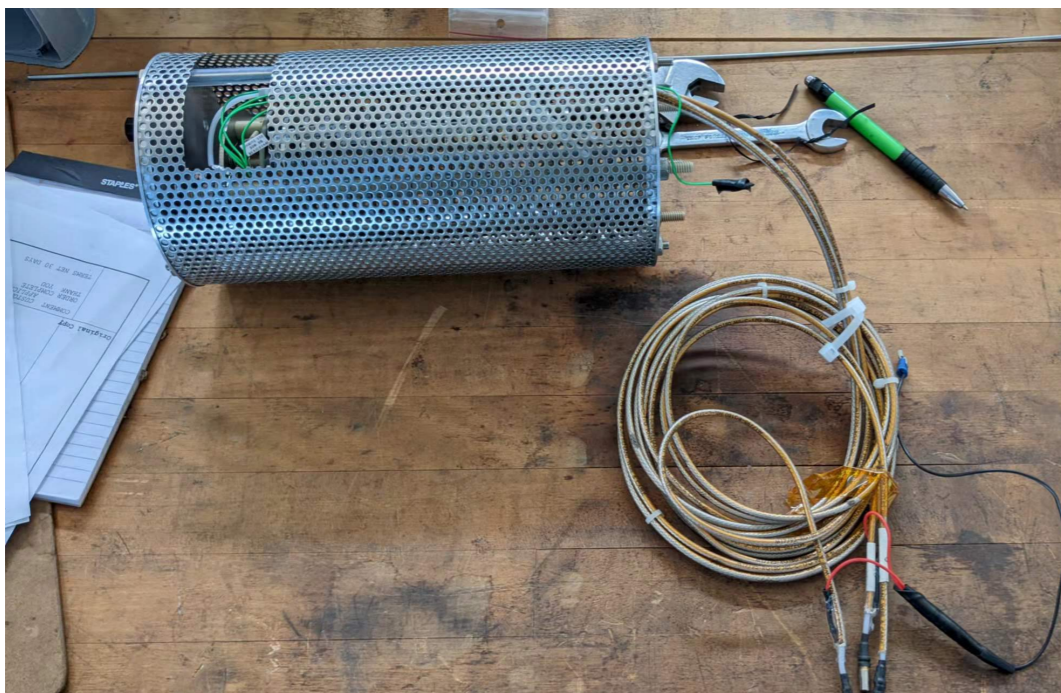
- PrM electronics box test with oscilloscope
- Signal cable plug in w/o HV bias
- Chanel 2 shows some baseline shifting behavior
 - Improved with adjusting the leads around the connector
 - Slightly noisy than channel 1
- Signal looks okay after averaging



LArFCS Purity Run

► PrM Assembly in LArFCS

- The hole resolved for the PrM stack mounting is on PEEK rods
- To avoid damaging the rods, Russ is making an adapter plate with Aluminum and longer rods for the field cage



LArFCS Purity Run

► Preparation for the purity run with gas analyzer

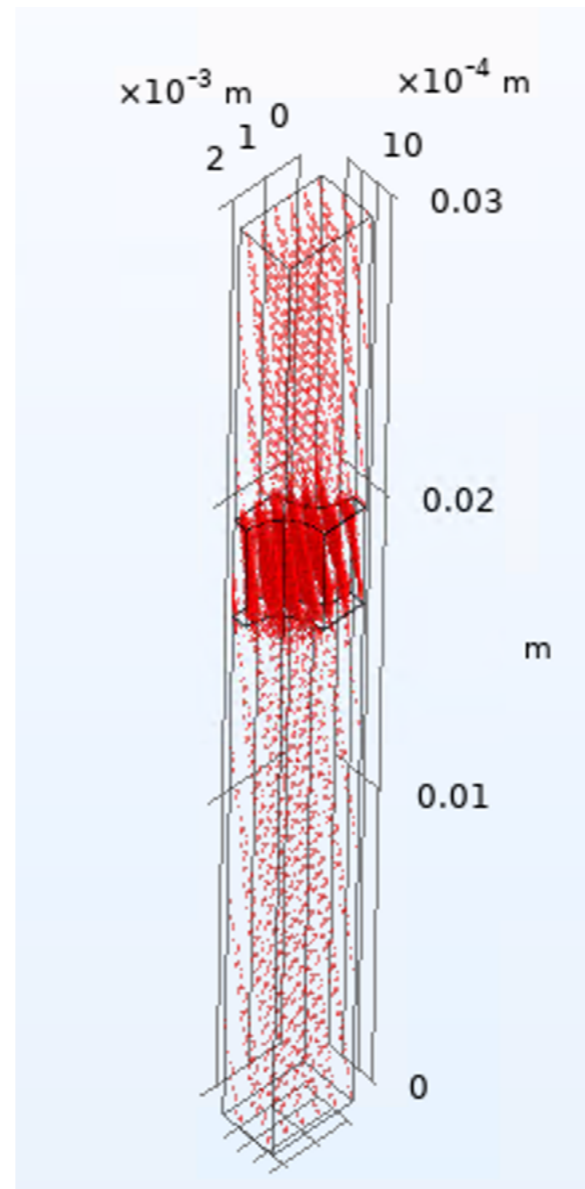
- Finish the plumbing (this and next week)
 - Top flange assembly
 - System Leak check
 - Finalize the sampling tubes plumbing
 - PrM stack mocking up installation
- Activation of the purifier scrubber next week
 - The activation gas ordered before the holidays not delivered yet
 - The activation is expected to take ~3 days
 - Another check of the functionality of the gas analyzers
- System debugging before filling
- Plan to start the fill by Jan. 31th.
 - Filling with inline filter
 - Run for ~2 weeks to demonstrate the purity performance of the LArFCS system
 - 2nd Purity run with PrM after Xenon delivery at the end of Feb.

January						
Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

COMSOL Simulation for FR

► 3D Weighting field of signal cell

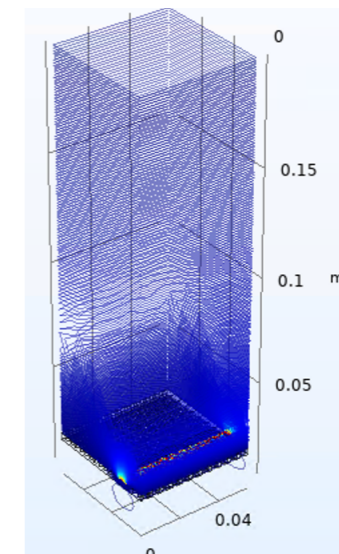
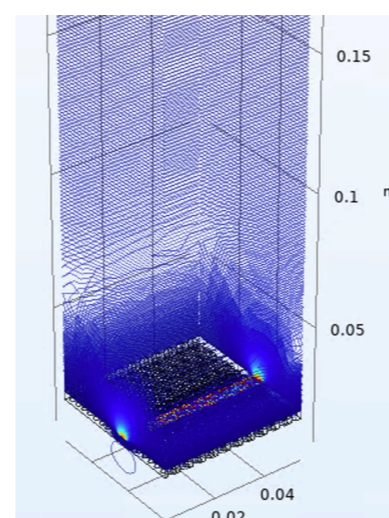
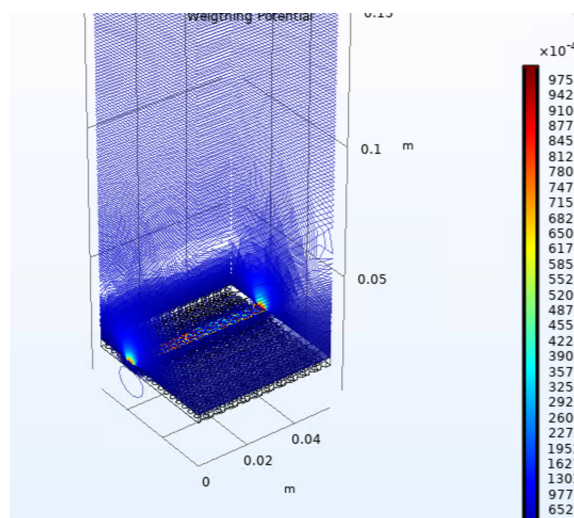
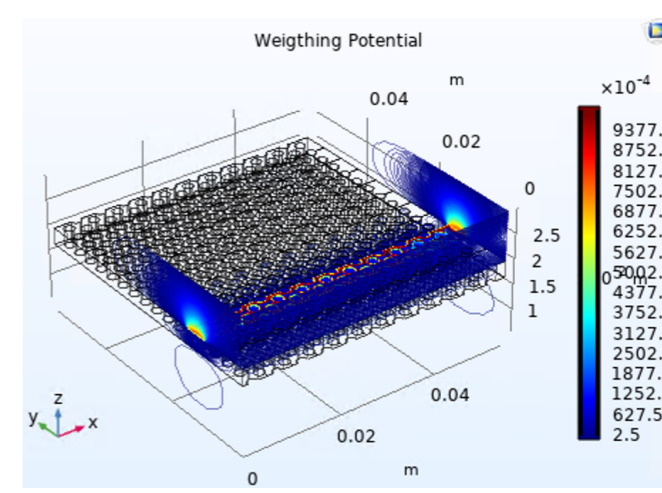
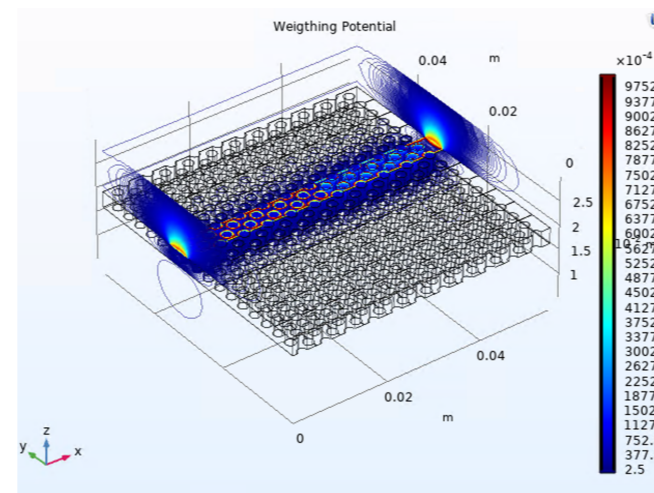
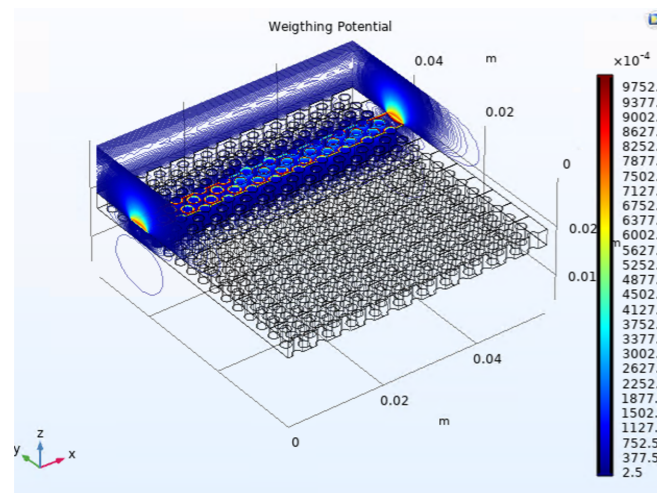
- 3D drift filed with 2.5mmx1.67mm box with 200mm in Zaxis (already have it) and 30mm (same voltages can be used)
- One Drive folder PCB_collection/3D_nominal_30mm.txt



COMSOL Simulation for FR

► 3D Weighing field of central ± 3 strips

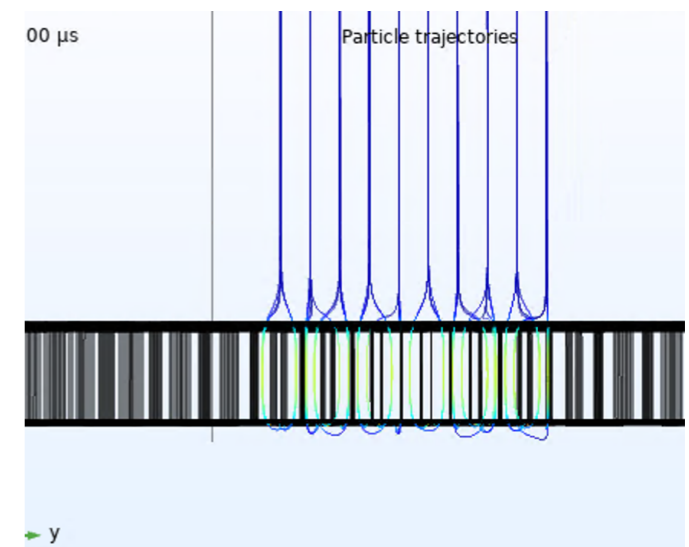
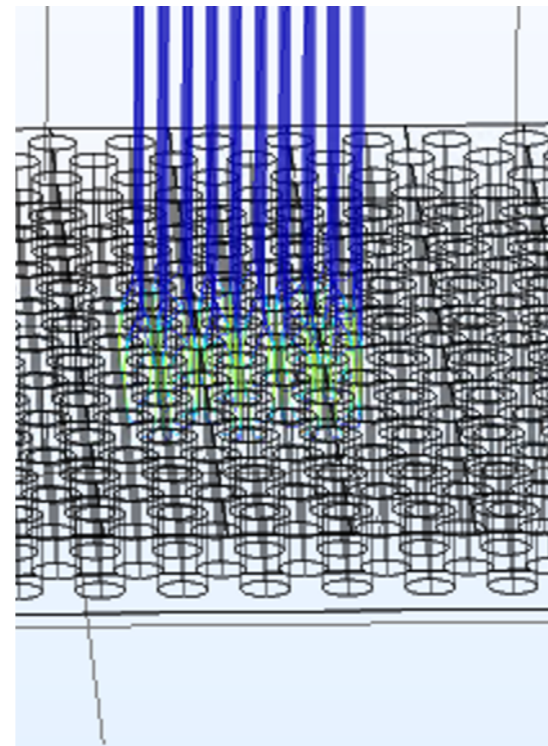
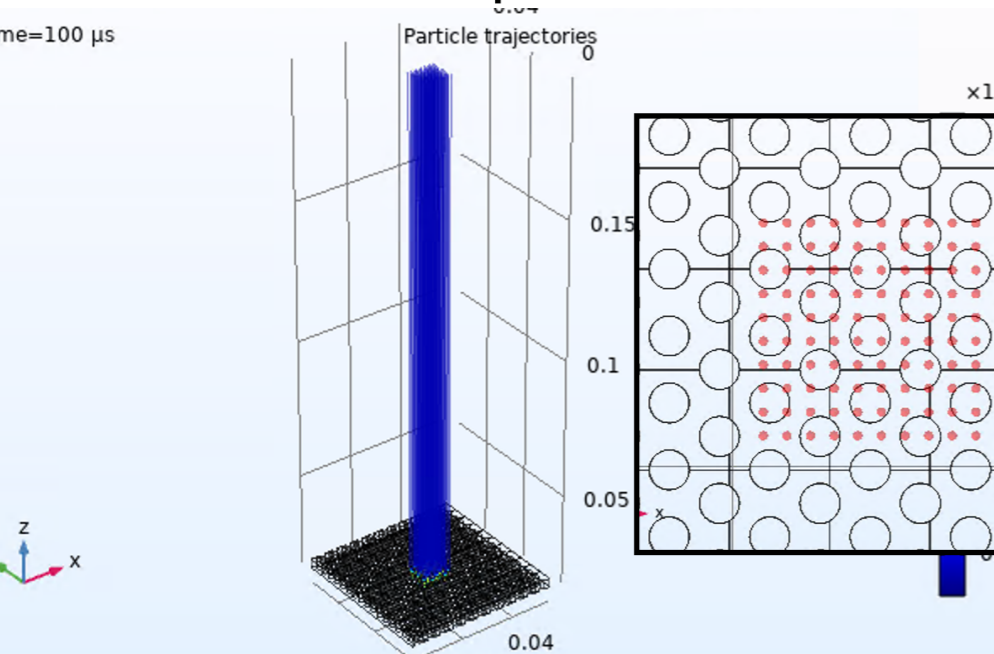
- 3D weighting field with top strip at 1V and ± 3 strips on each side. Also two data sets with 200mm and 30mm in Zaxis (The geometry with small hole sizes)
- On OneDrive folder PCB_collection/3D_nominal_200mm(or 30 mm)_wf_ind_X.txt
- Simulation with 2 mm hole size take longer time, runtime is 7-8 hrs for 7 strips



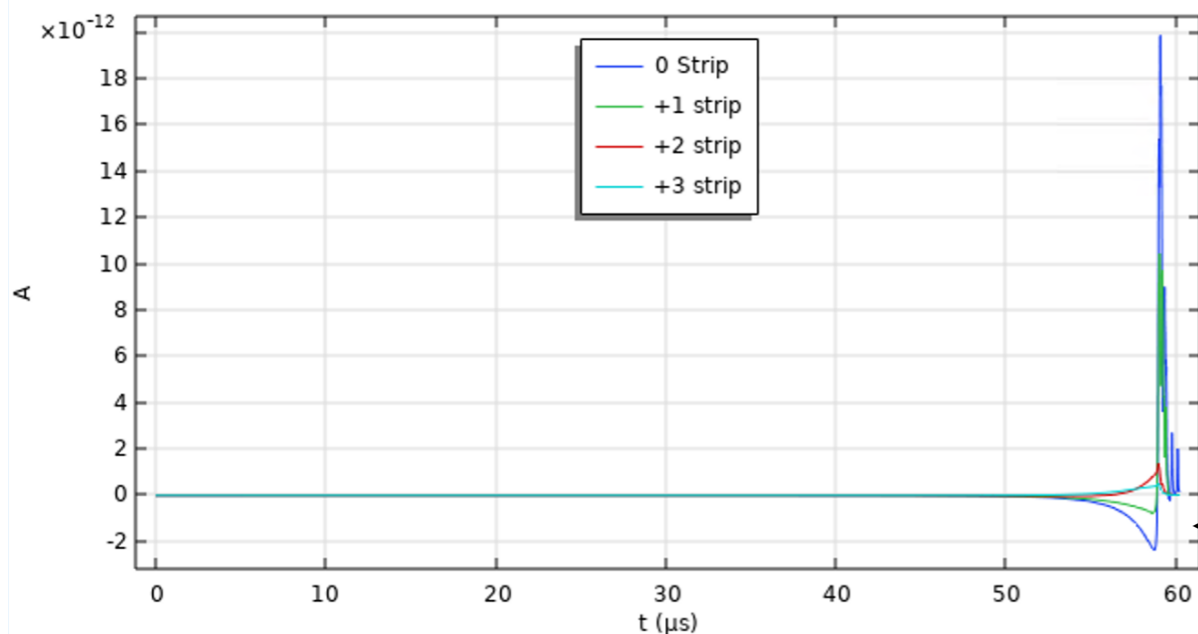
COMSOL Simulation for FR

► 3D Field Response for neighboring wires

- 100 electrons covering across 3 strips simulated, runtime 2 hours
- Induction signal on the top layer for 3 neighboring strips calculated for comparison

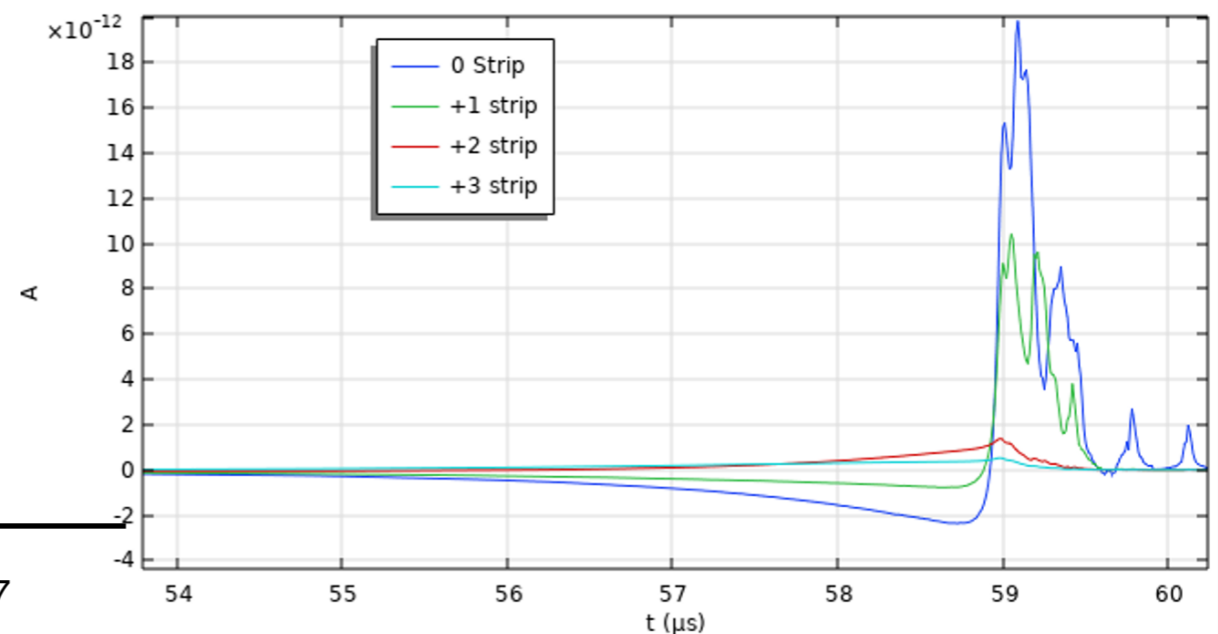


Field Response Comparison on the Neighboring Strips



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Field Response Comparison on the Neighboring Strips



COMSOL Simulation for FR

► 2D Weighting field of central ± 10 strips

- 2D weighting field with top strip at 1V and ± 10 strips. Also two data sets with 200mm and 30mm in Zaxis. (The geometry with small hole sizes)
- Questions: hole arrangement in 2D?

