

Starting simulation for Fcal testbeam 2020

- A. T. Neagu



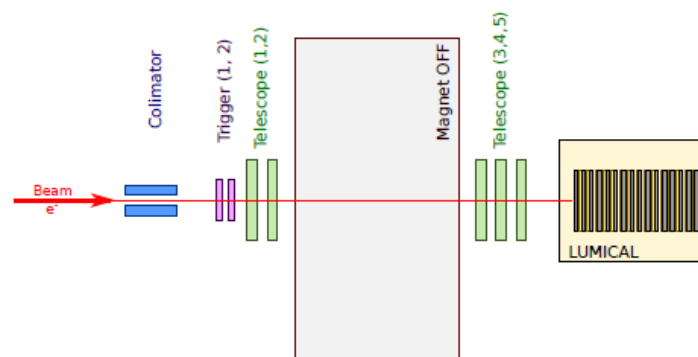
2020 TESTBEAM SETUP & FLAME DATA

Szymon Bugiel

TESTBEAM SETUP – REGULAR CONFIGURATION

01.04.2020

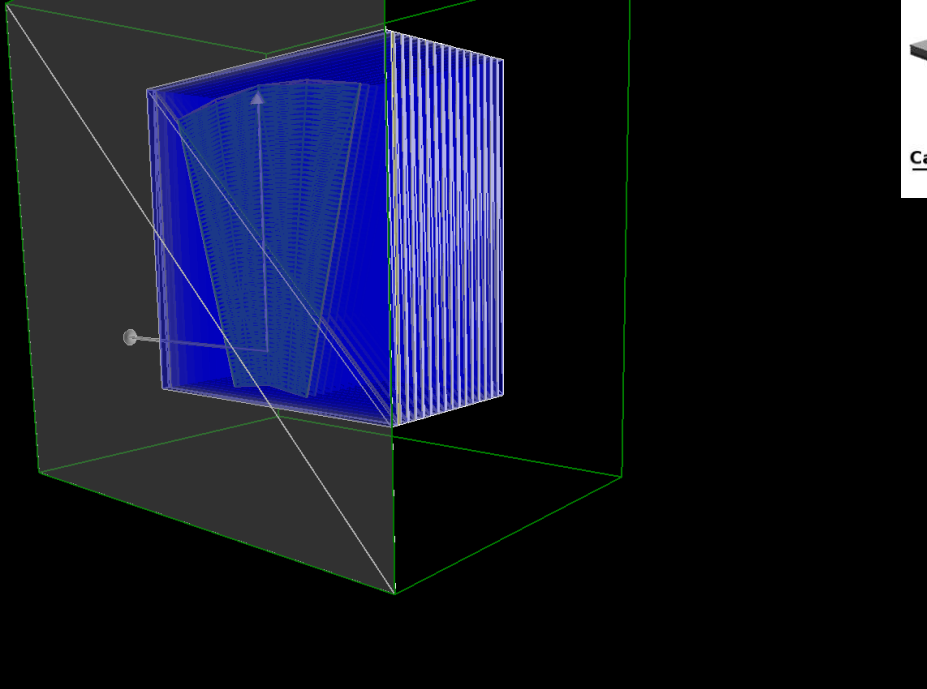
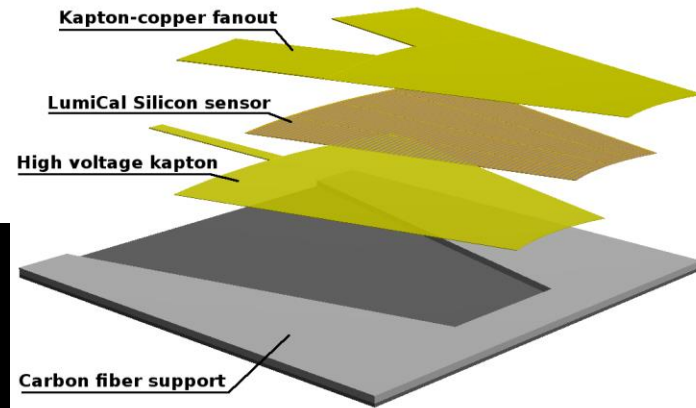
2020 Flame TestBeam | Szymon Bugiel



- Beam spot after the collimator ~5mm x 5mm
- Two scintillator triggers operating in coincidence mode
- 5 telescope planes – 2 before and 3 after the magnet
- Magnet switched OFF
- LumiCal placed on movable table

2020 Fcal TB geometry and materials in Geant4

Lumical sensors



LumiCal Module components

Module Component	part components	Thickness (µm)			
		Min	Max	Average	
Kapton fan-out ¹	polyimide	12.7	130	160	150
	adhesive	25.4			
	copper (partly etched)	35.56			
	polyimide	25.4			
	copper (not in sensor area)	12.7			
	adhesive	12.7			
epoxy glue ²		10	15	10	
Si sensor	Al	20	360	360	360
	Si	320±15			
	Al	20			
conductive glue ³		20	50	40	
HV kapton ¹	ENG	0.1	90	90	90
	copper	24.9			
	polyimide	75			
epoxy glue ²		20	20	20	
Carbon-fiber support ⁴		110	120	115	

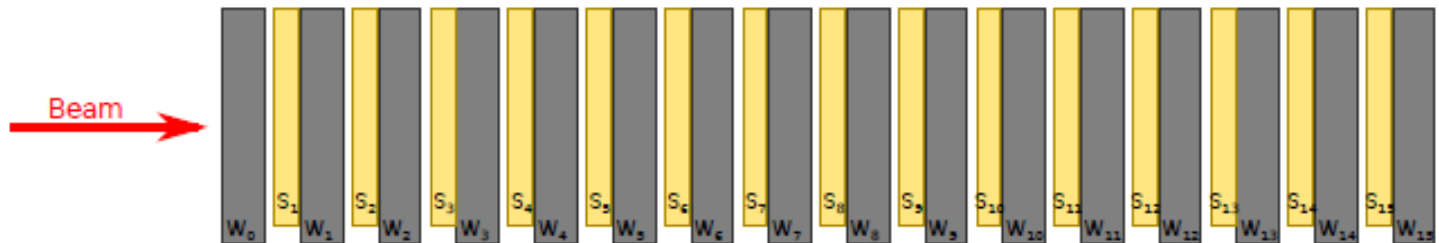
Kapton¹ There was another version, where kapton thickness was 20 um less. It was used for modules 20 and 21.

epoxy glue² Araldite Part A Bisphenol A epoxy resin
Part B N(3-dimethylaminopropyl)-1,3-propylenediamine
Mixed 1:1

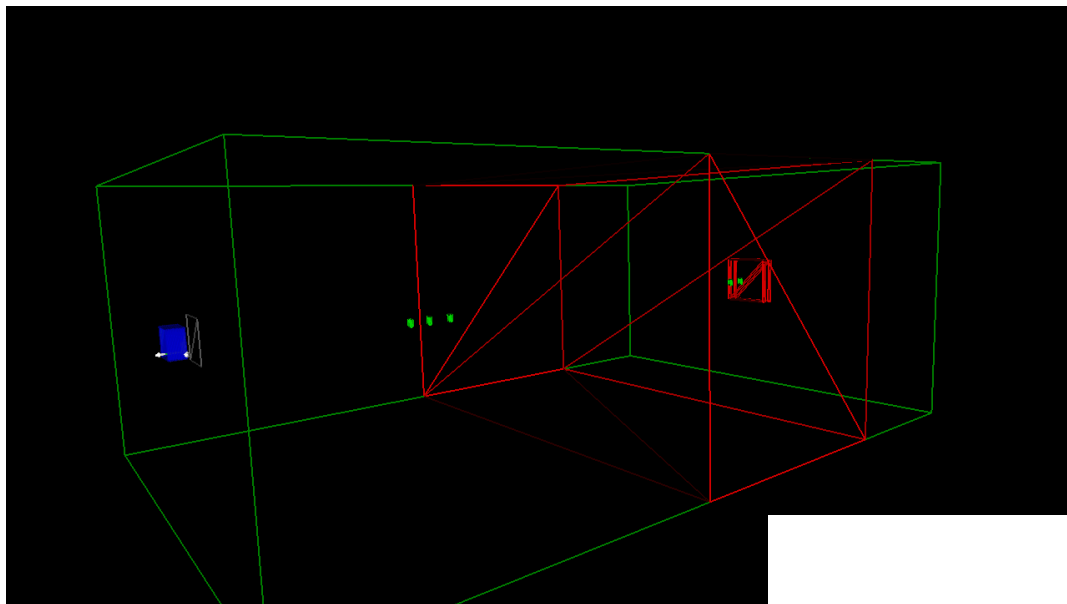
conductive glue³ TRA-DUCT 2902 epoxy with silver filling
<http://bondingsource.com/techdata/TRA-DUCT%202902-EN.pdf>

Carbon-fiber support⁴ 700-750 um thick outside sensor area

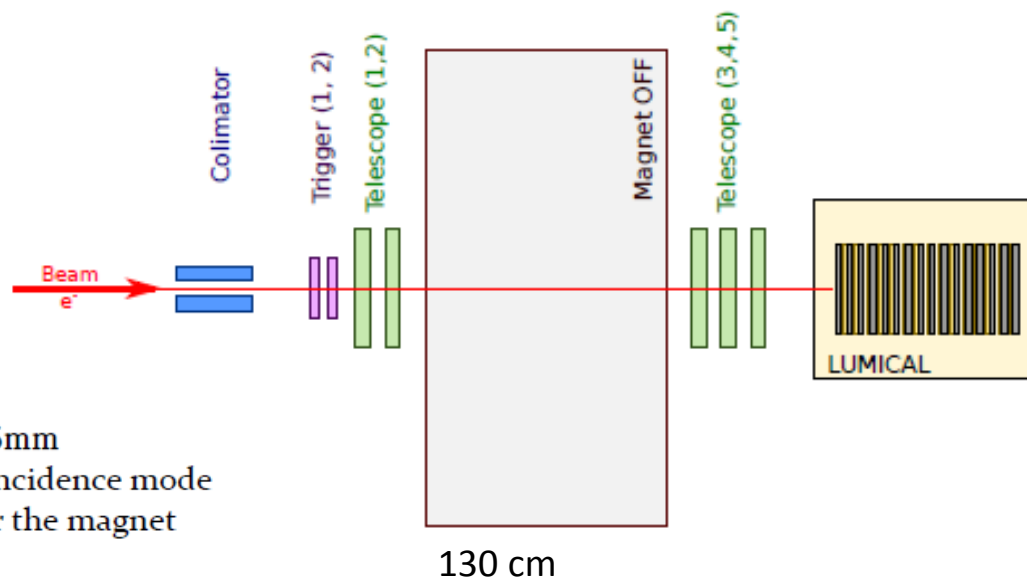
Geant4 – Lumical sensors- TB 2020



2020 test-beam set-up in Geant4



- W plate - composition and dimension
- distances from sensor to collimator



- Beam spot after the collimator ~5mm x 5mm
- Two scintillator triggers operating in coincidence mode
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- Magnet switched OFF
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- ***Geant 4 simulation conditions***

Physics list

-PAI for the e+, e-, gamma interaction with silicon sensors and standard EM model for the interaction with tungsten plates and other materials

Beam

- e-, 5GeV, uniform distribution inside a square: of $5 \times 5\text{mm}^2$

- **TO DO**

- the geometry of 2020 TB implemented in Geant4 (right dimension)
- simulated the energy deposition on every sensor pad
- determine the energy deposition on sensors
- determine the longitudinal shower development
- ?
- ?