

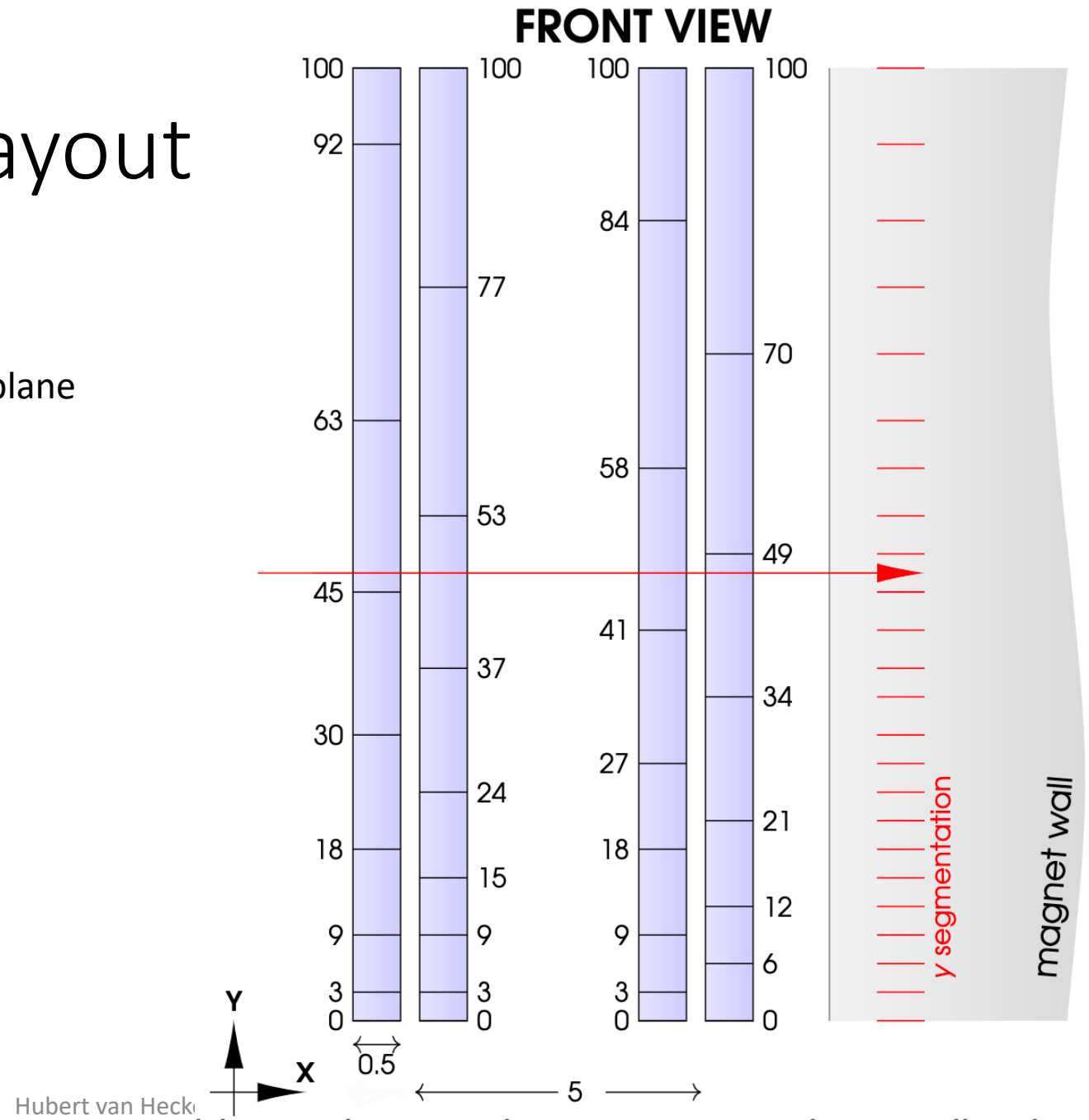
Panel assembly and plans

Hubert van Hecke

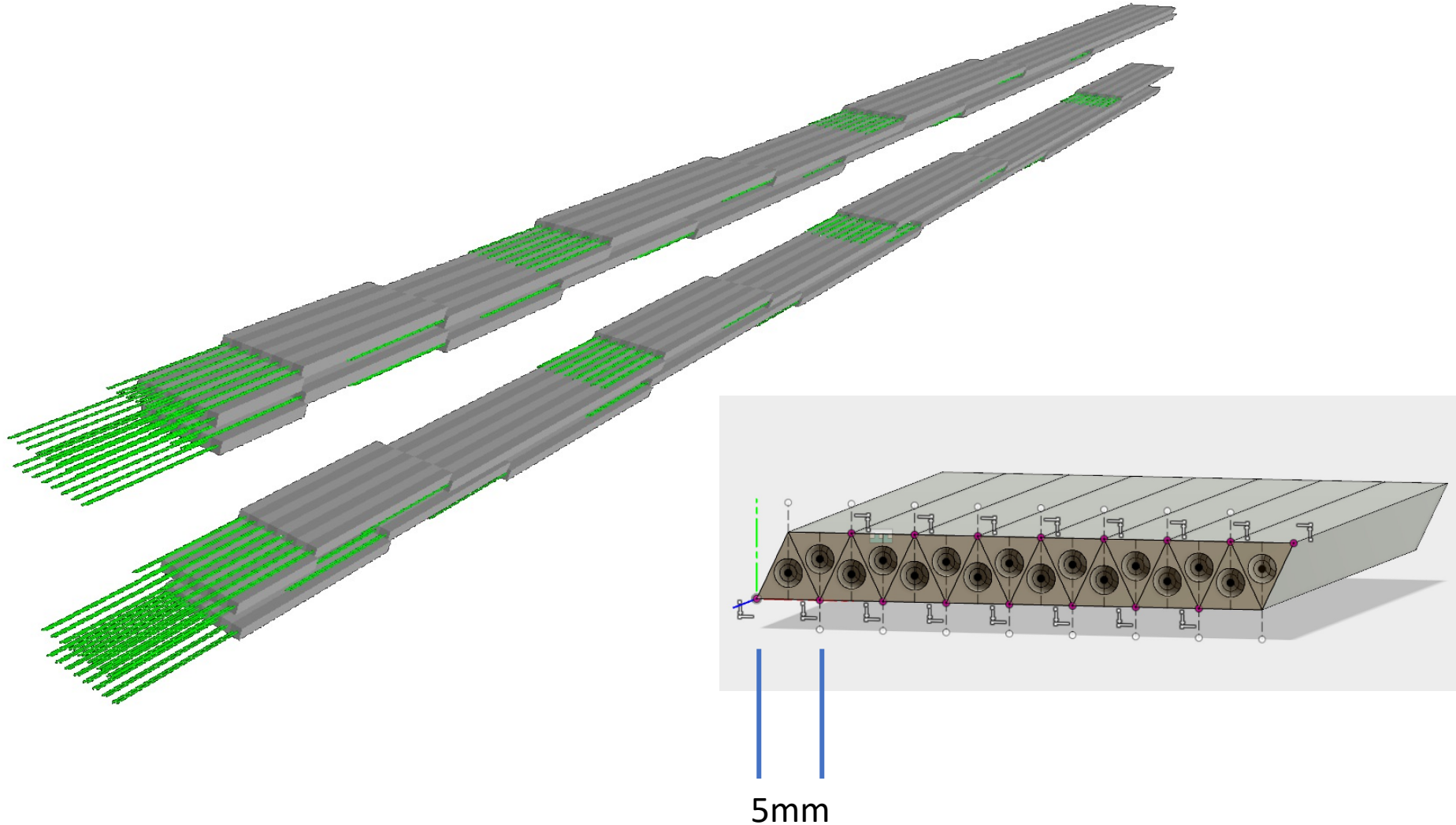
Los Alamos

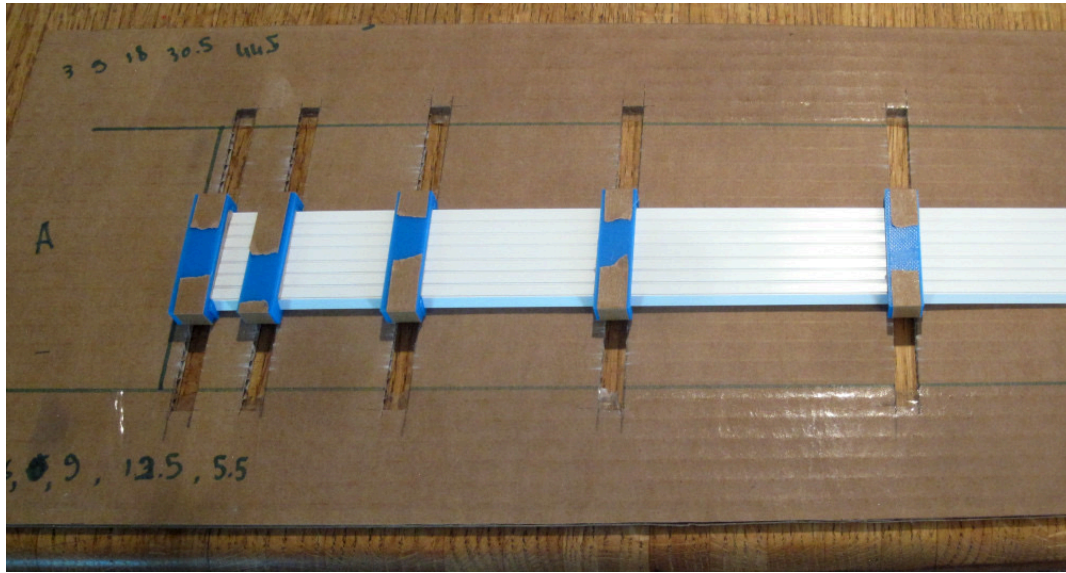
50 cm prototype layout

4 layers, 2 pairs separated by 5 cm
Element size decreases toward center plane



16-bar units

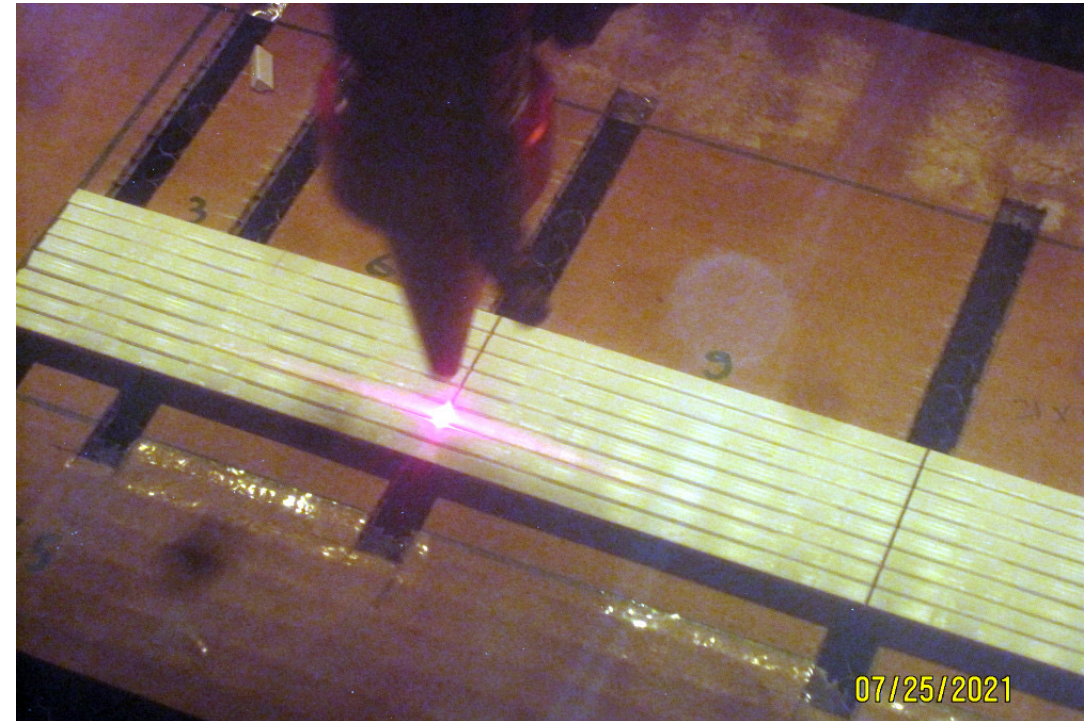




Assemble 16 50-cm bars, hold with blue clamps
Apply stripes of glue

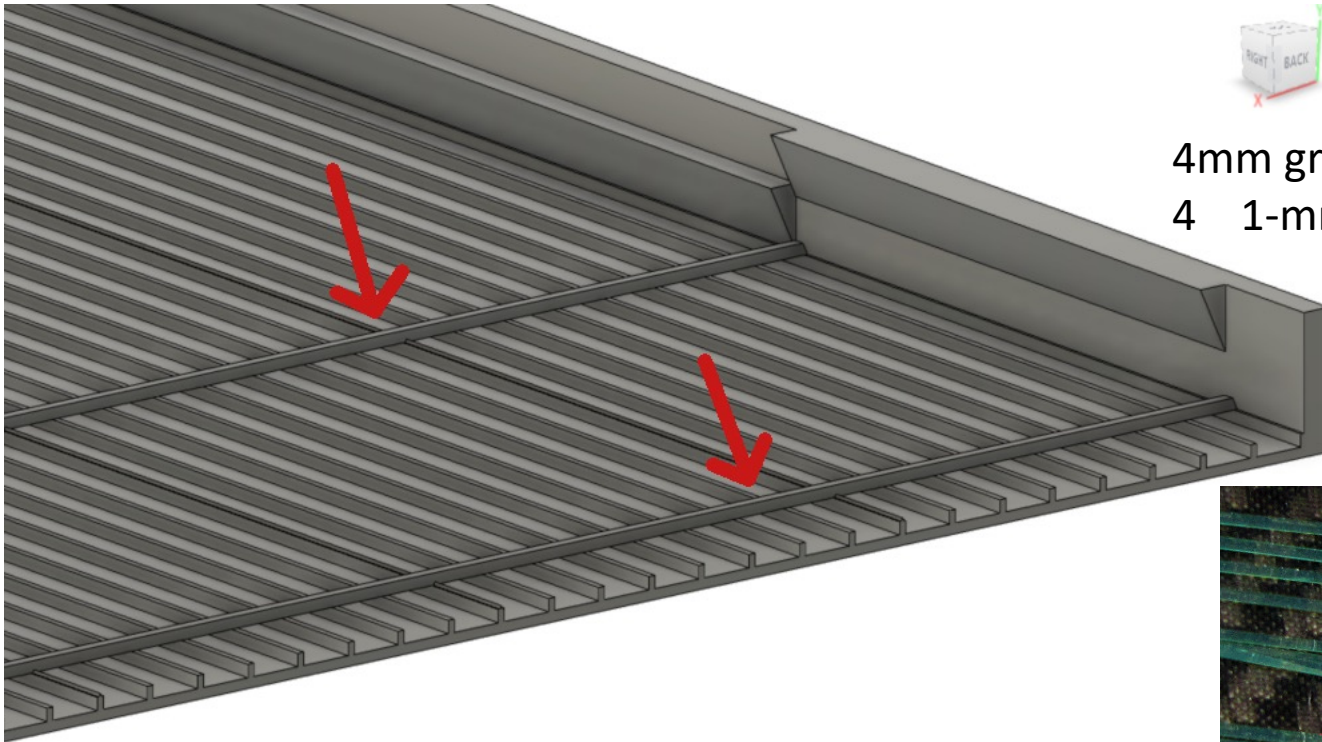
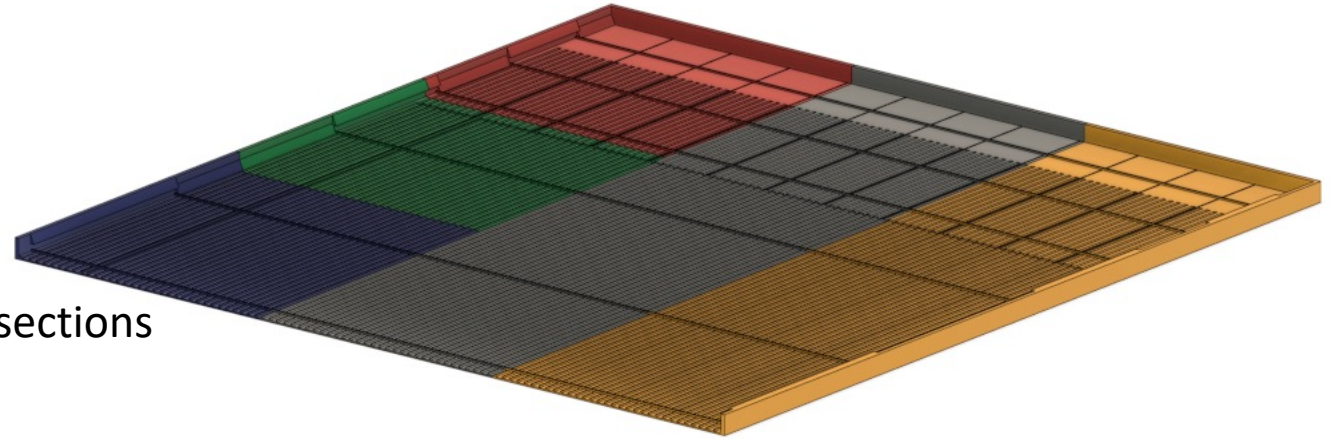
Remove blue clamps
Laser-cut into blocks

Enough to construct
4 50 x 50 cm layers



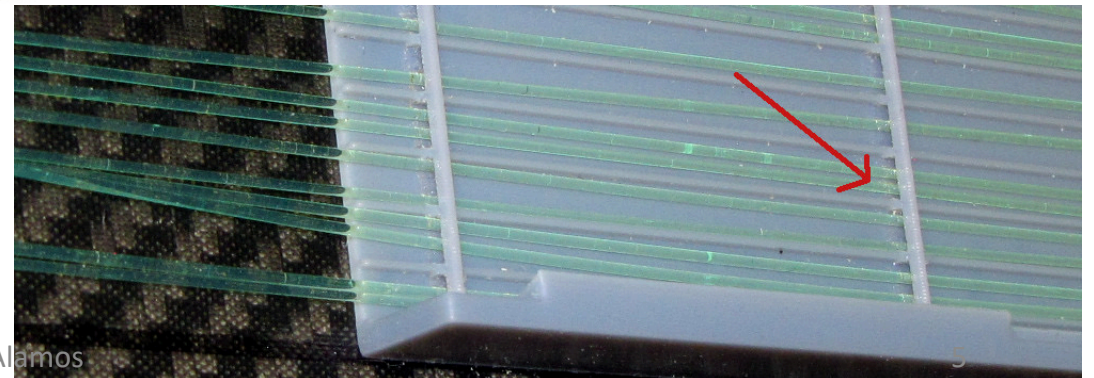
Assembly tray

~50 x 50 cm tray printed in 9 sections

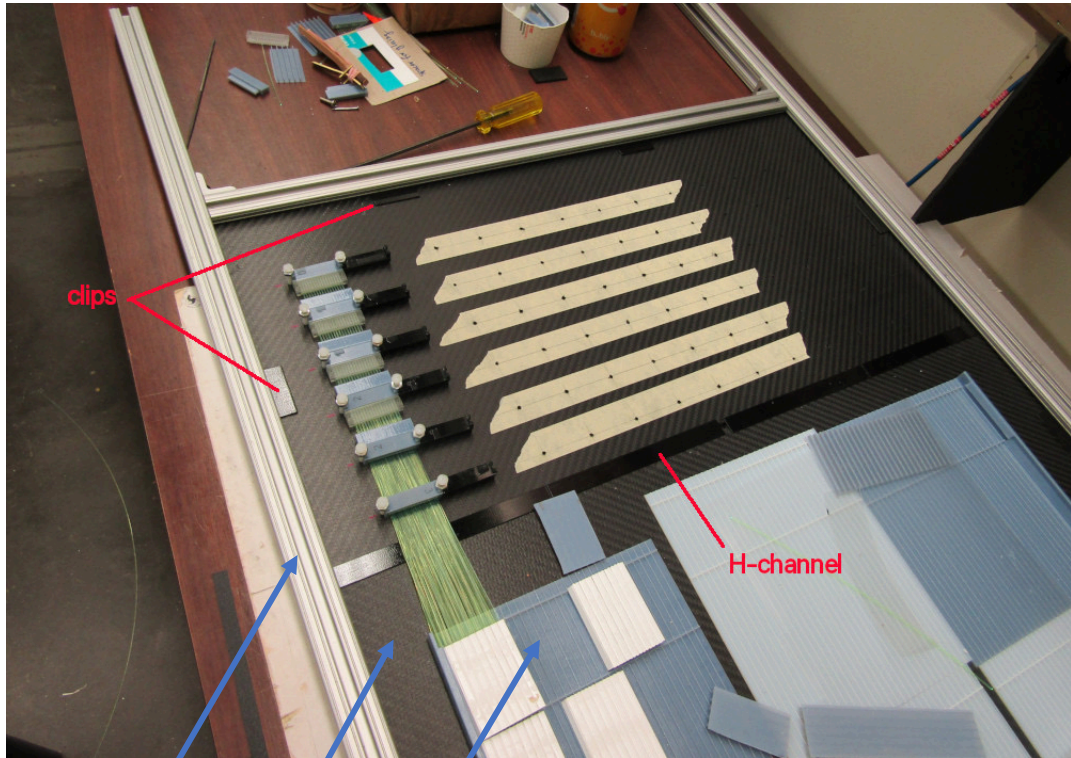


4mm grooves every 5mm to hold
4 1-mm fibers

Fibers pass under bridges



Assembly frame



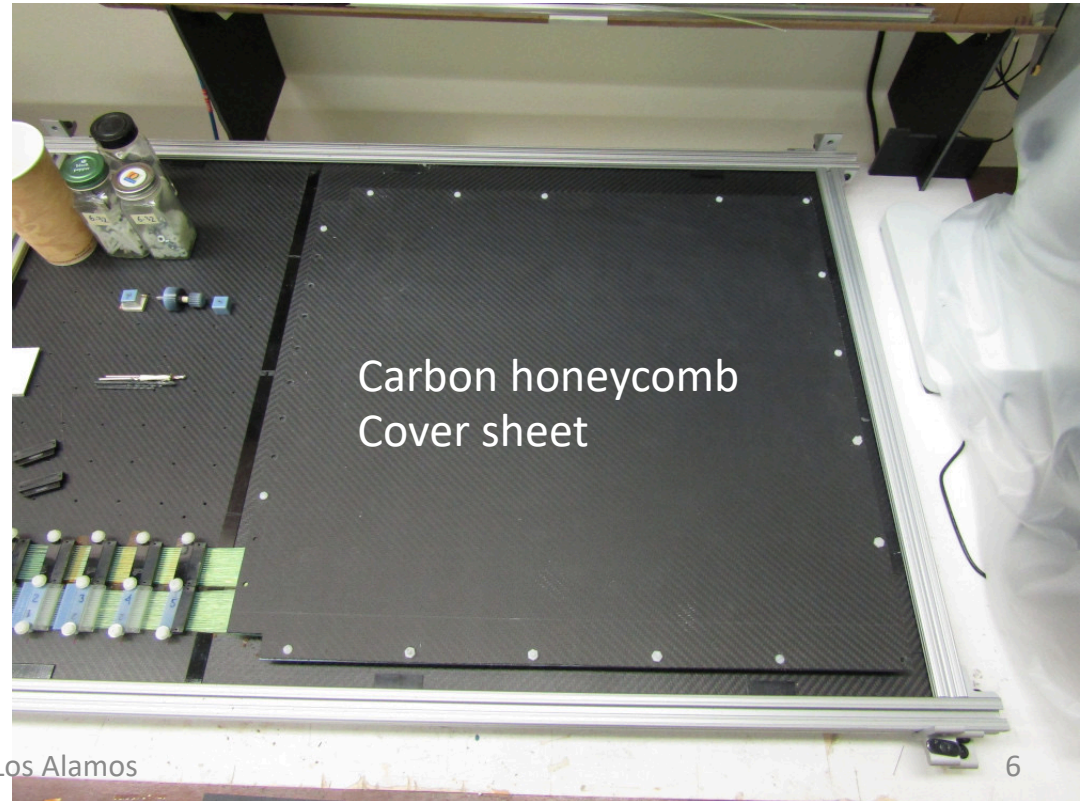
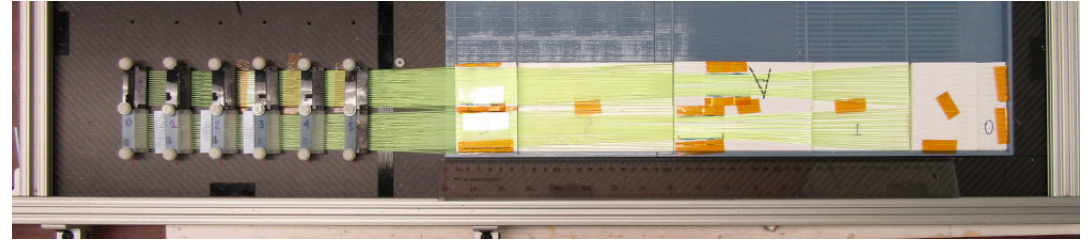
clips

H-channel

Tray glued to carbon

3mm carbon-fiber-honeycomb sheet

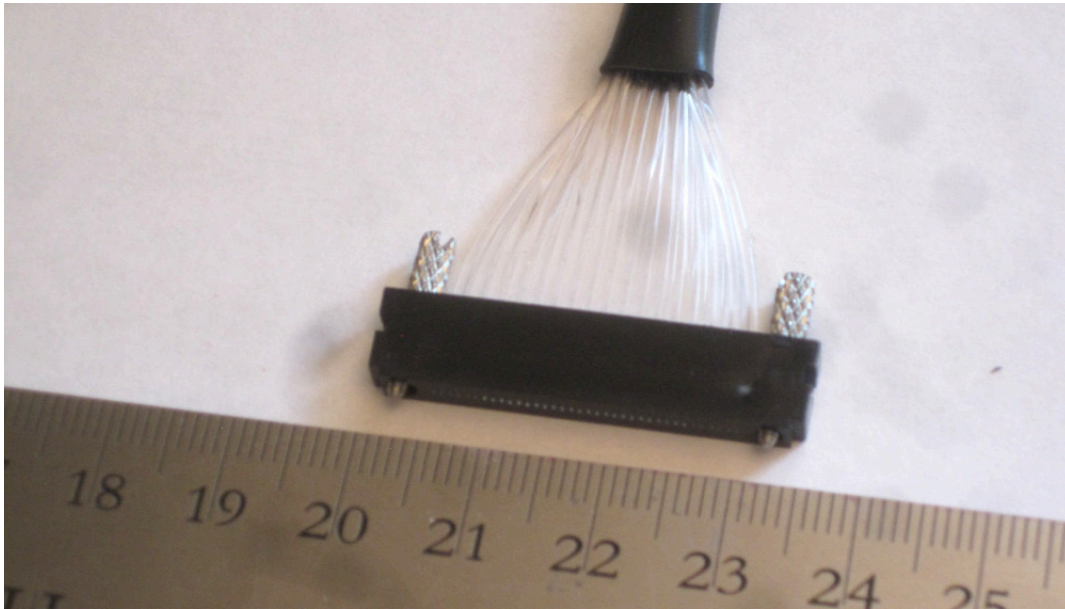
80-20 Aluminum frame



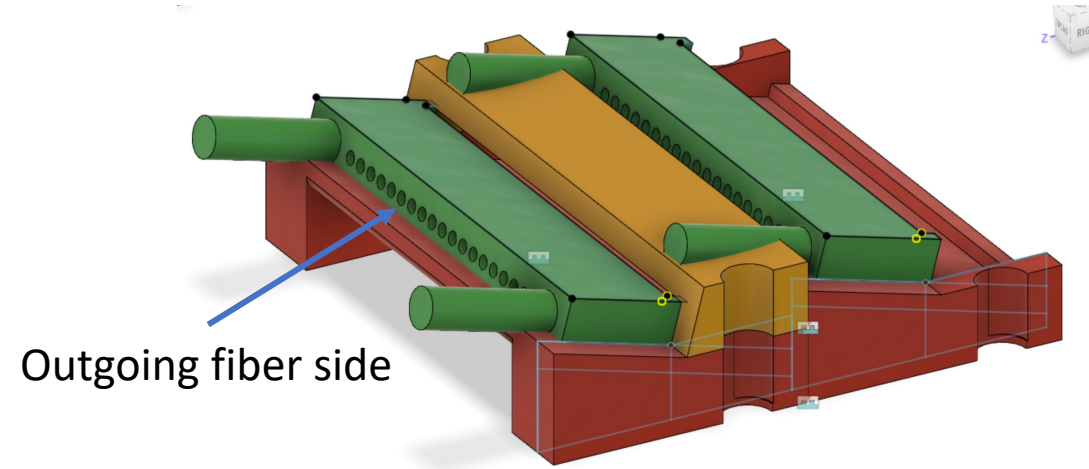
Carbon honeycomb
Cover sheet

Fiber couplers

At Fermilab, we saw these couplers:

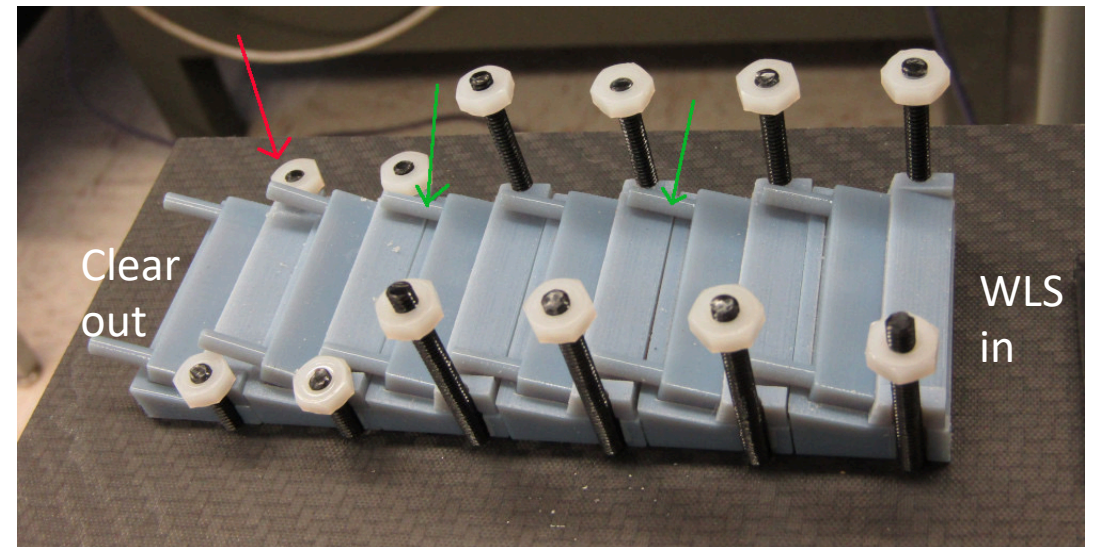


18 1mm fibers
35 mm wide (<50)
Polished face



Outgoing fiber side

Mock them up, and design holders



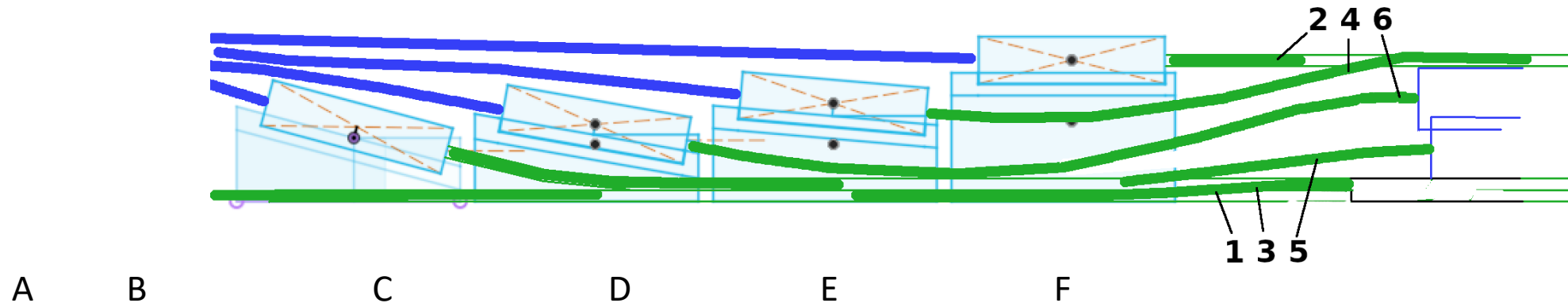
Clear out

WLS in

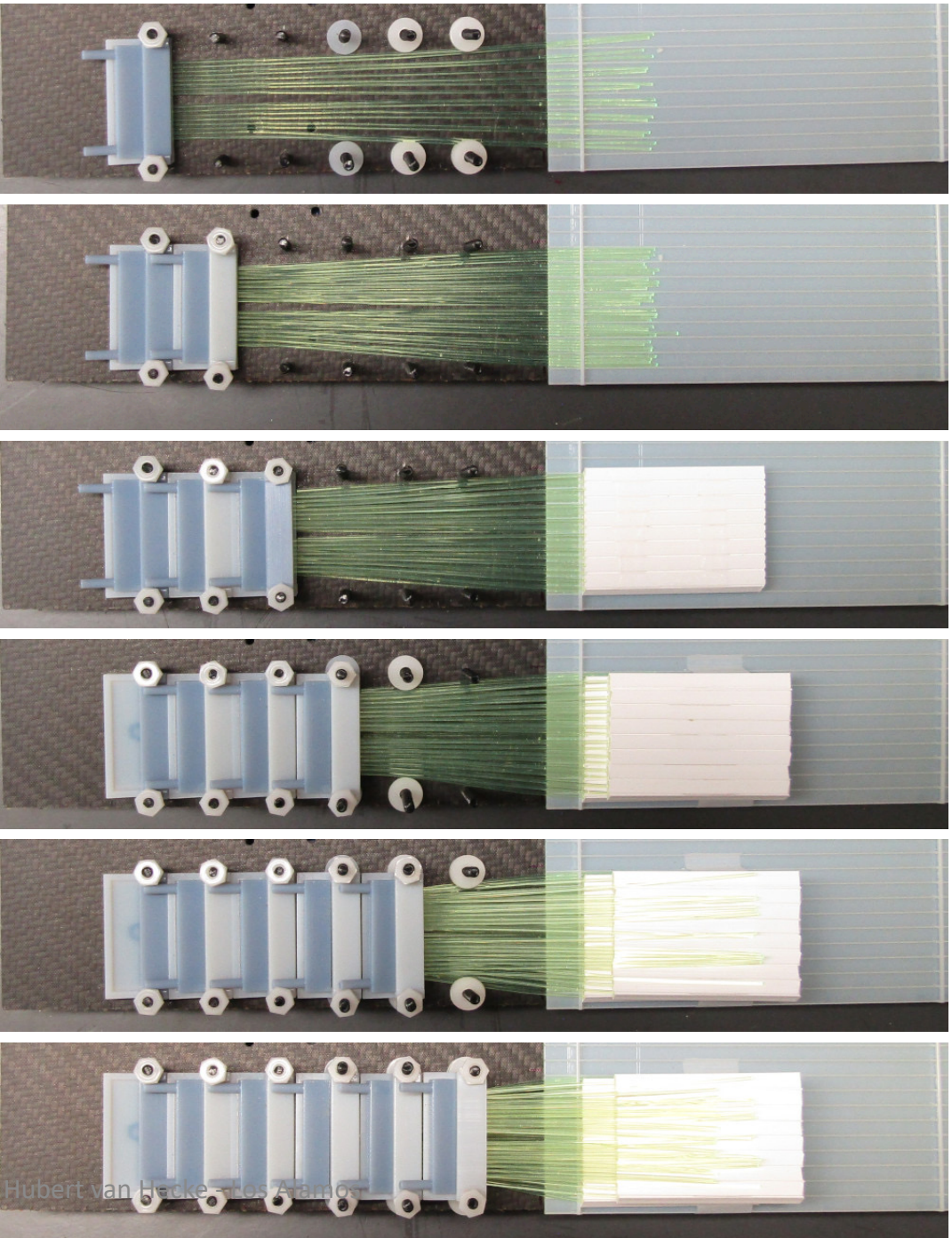
Here, all WLS fibers come in on the bottom

Modify last 3 holders

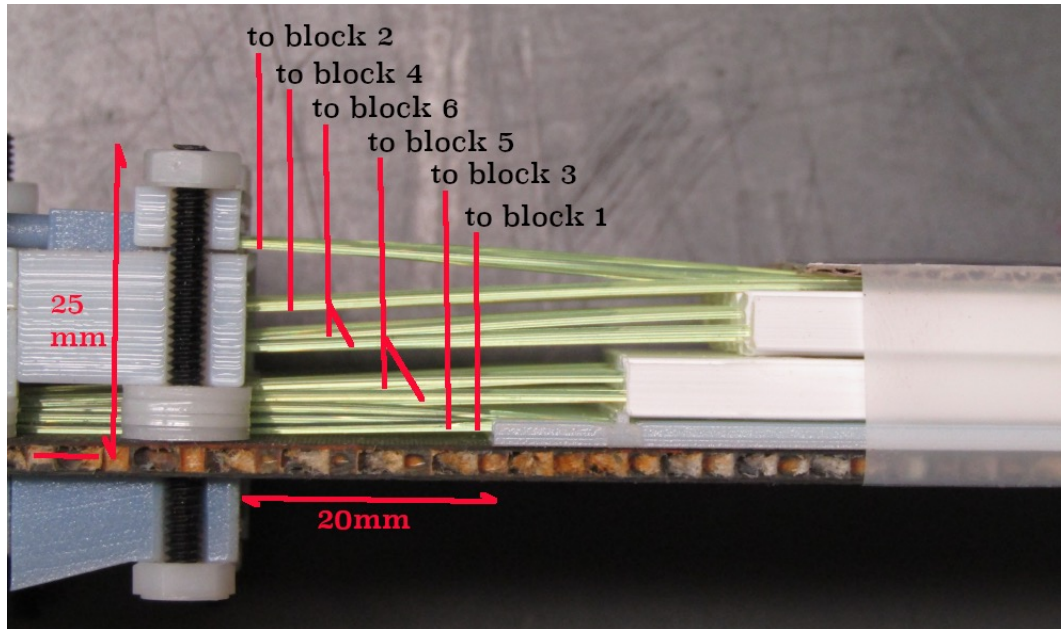
Fibers from connectors A, B, C go low
Fibers from D, E, F go high



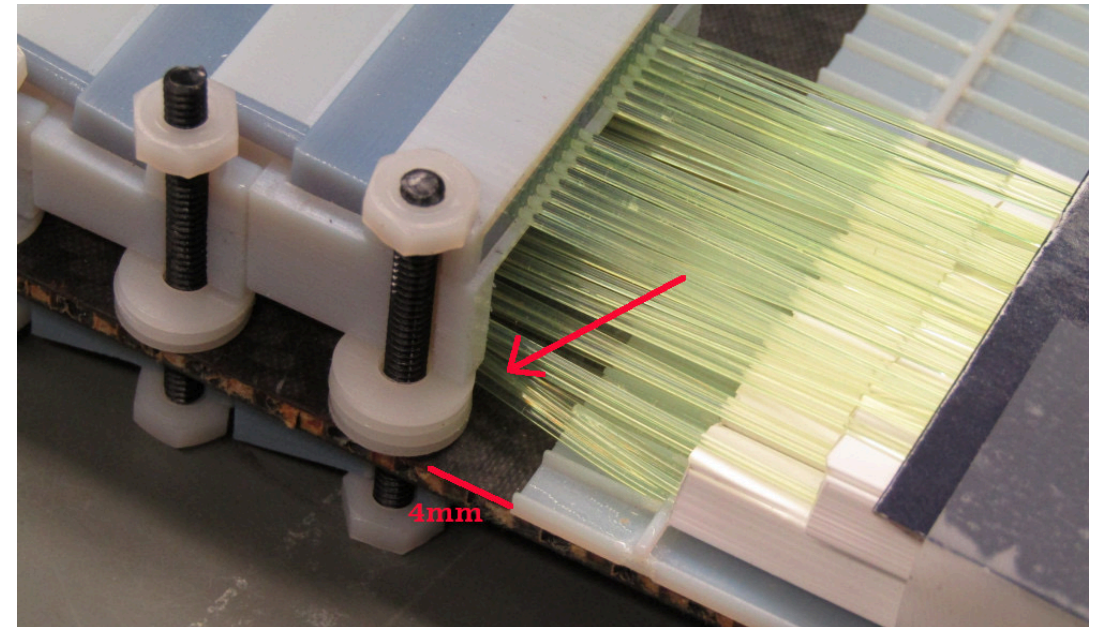
Test assembly



Moving connectors closer



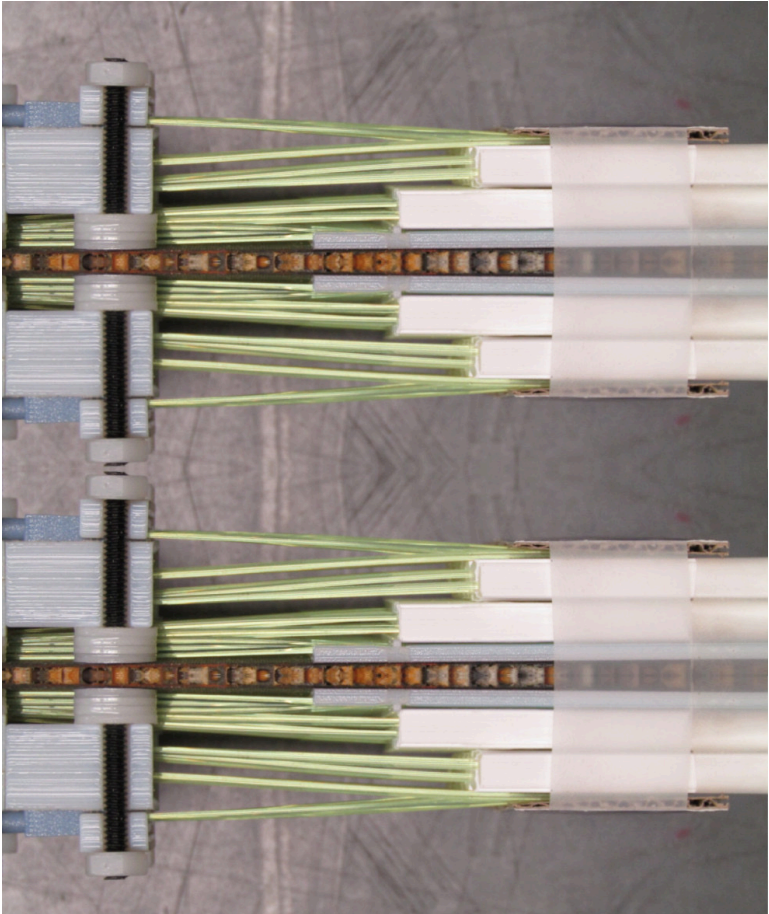
With new holders, vertical bends are gentle,
And we can move them closer to the tray



But then there is a bad horizontal bend
Modify the last connector holder to give
These fibers more room

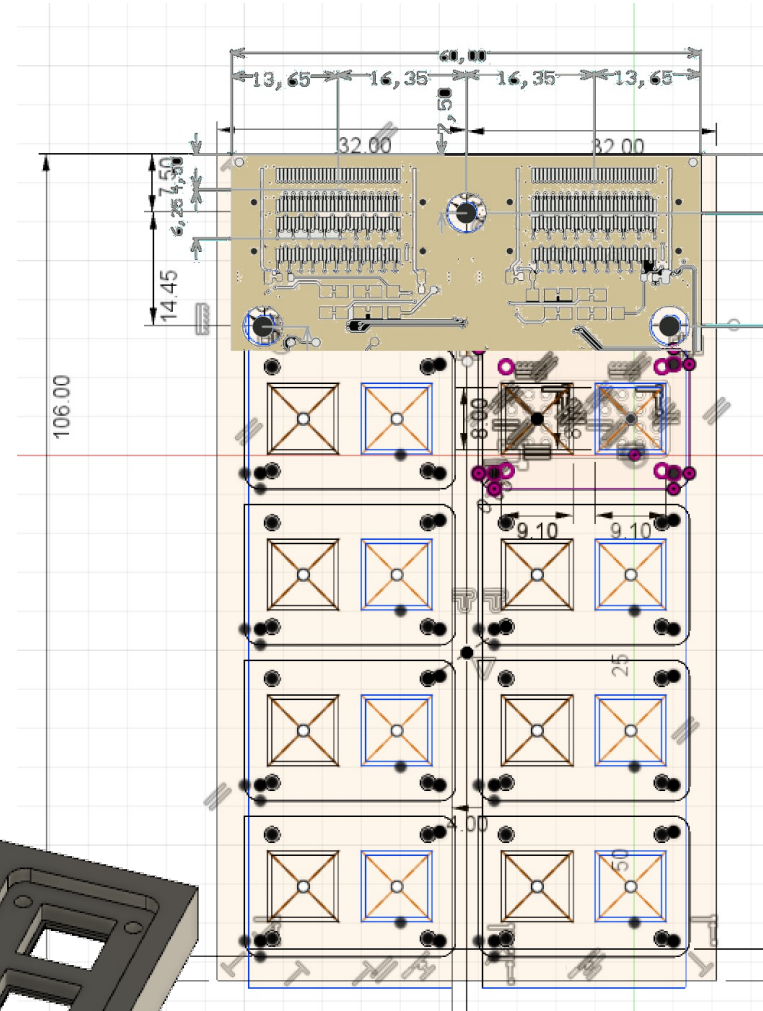
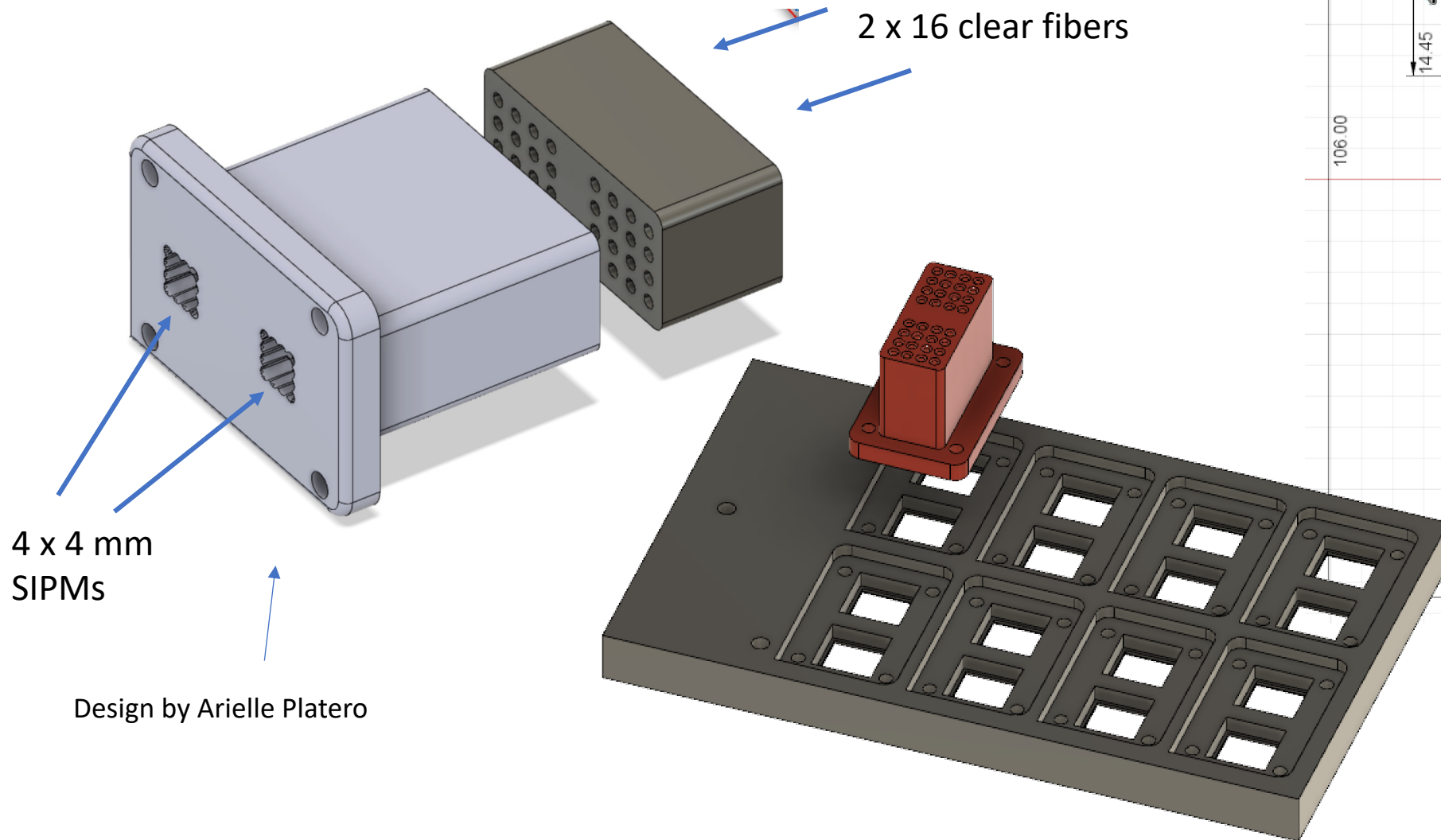
Now connectors can be pushed all the way
Against the tray – minimal space used (12 cm)

4 layer close fit



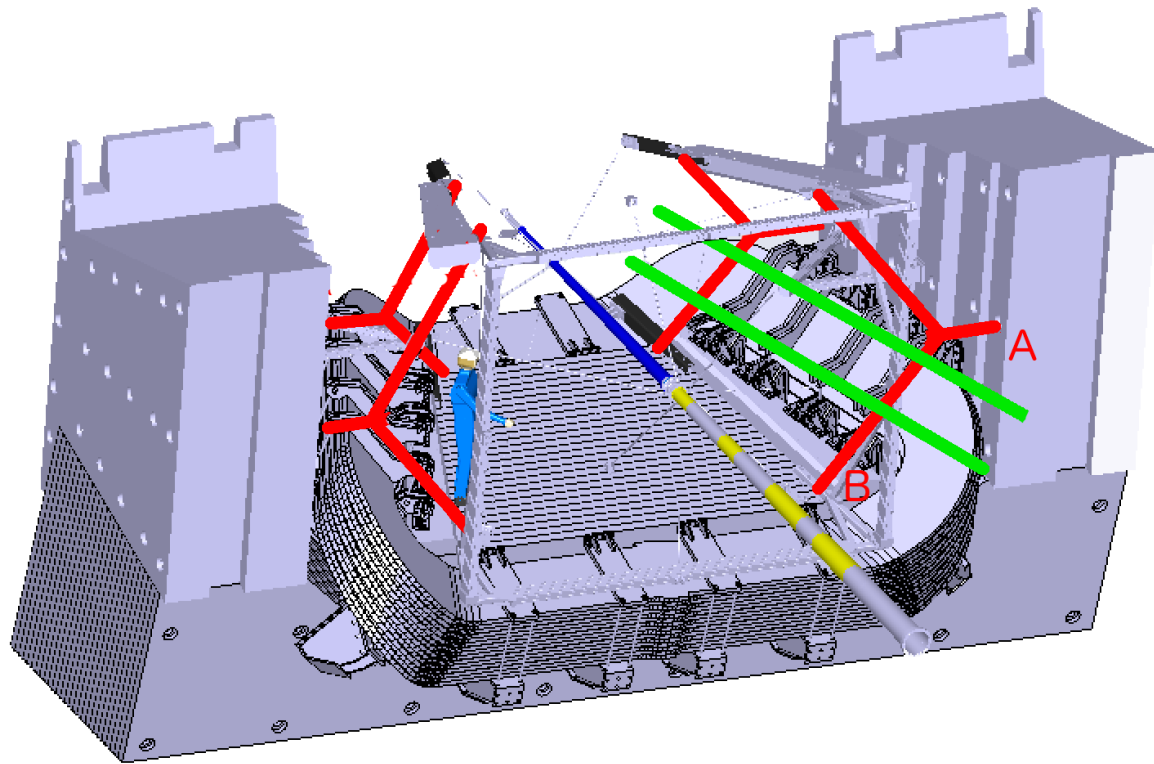
5 cm

On the readout end



Connector holder block matches PC board



How to install?



Y-shaped brackets (red) hold
pairs of rails (green)

Fiber routing, cable trays

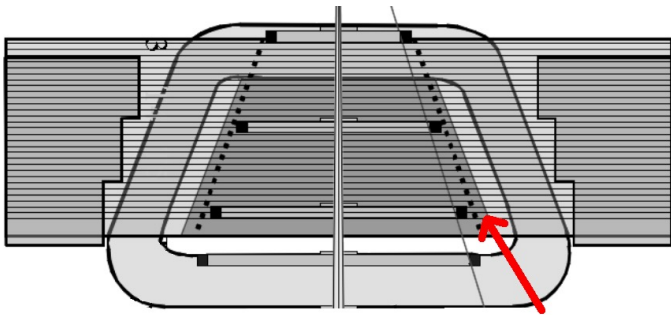
Next

- Is there enough light to read out with 1/2mm fibers?
 - Yield down by 4, probably enough
 - 1/2mm fibers are much more flexible – ease of installation
- Obtain connectors
 - Depends on (1)
- 3D print or injection-mold components
 - Quantities are small (48 for some, 144 for others) for this prototype
 - Printing can keep up with assembly
- Go from  to 
 - Needed for the 1-meter version
 - Simplify construction

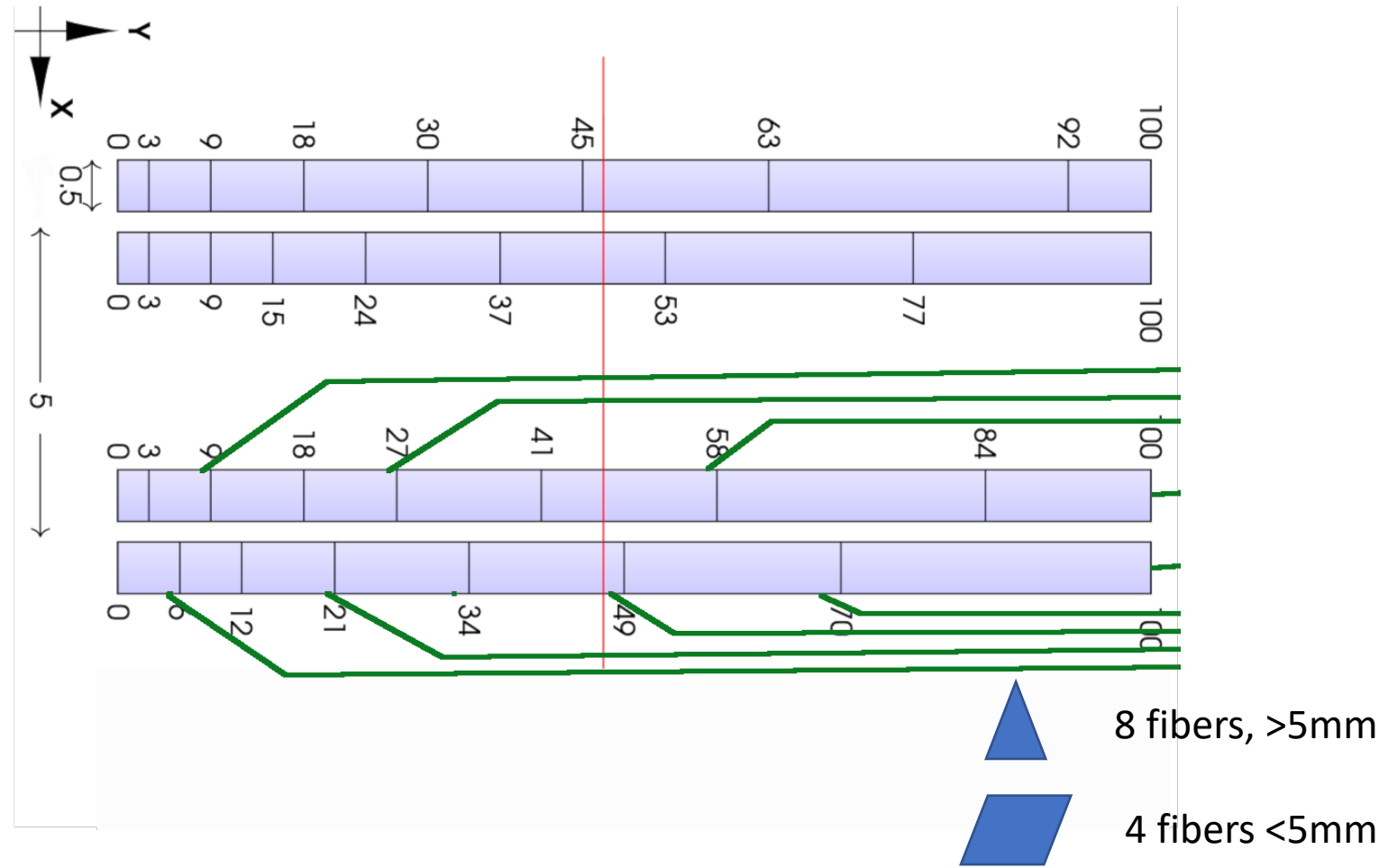
backup



Mount point



Ease of construction



end