BabyMIND geometry in the simulation

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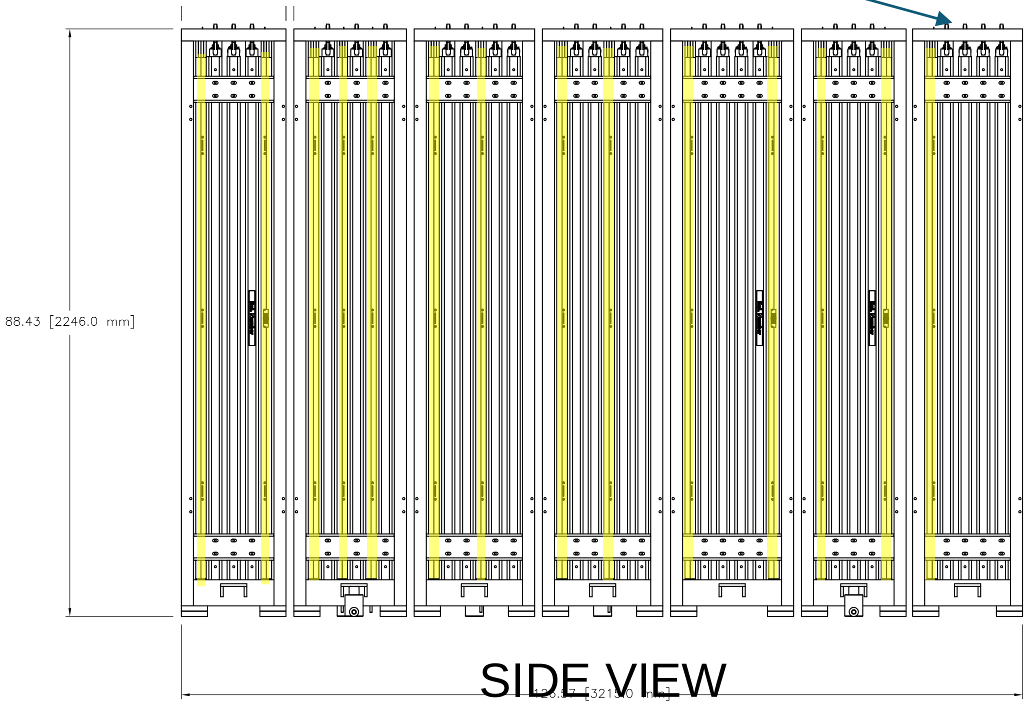
Implementation strategy

- For a flexible implementation, the BabyMIND geometry is built in the simulation from a string parsed from the configuration file:
- E.g: `|MMMMD||DMMMD||DMMMMD||MMDMMD||MMDMMD||MDMDMD||DMMMD|`



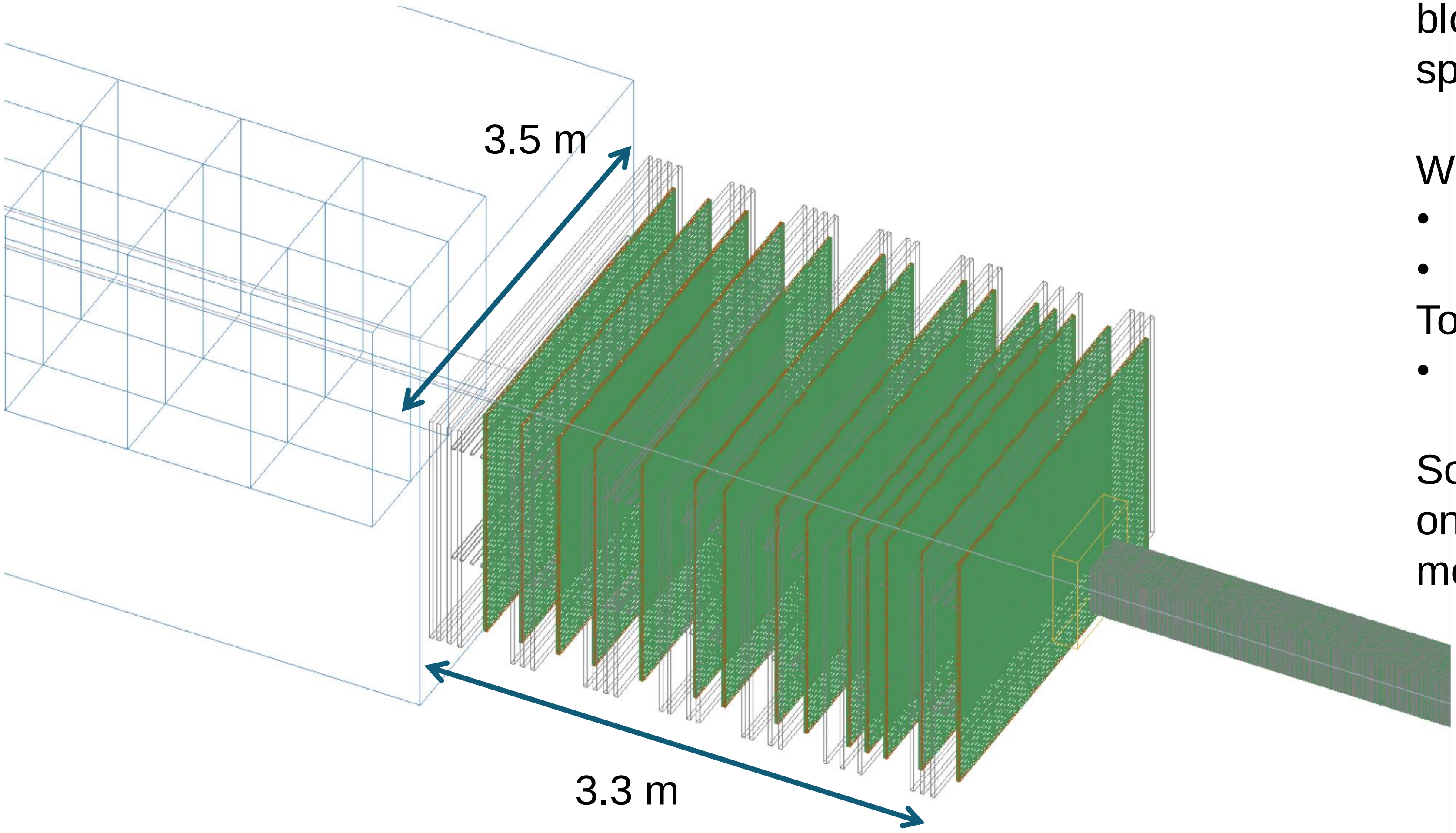
SIDE VIEW

from IP

Two building blocks:

- M → **M**agnet plate, ARMCO steel w/ 1.5 T field
- D → **D**etector module, 2+2 scintillator layers.

FLAre + BabyMIND



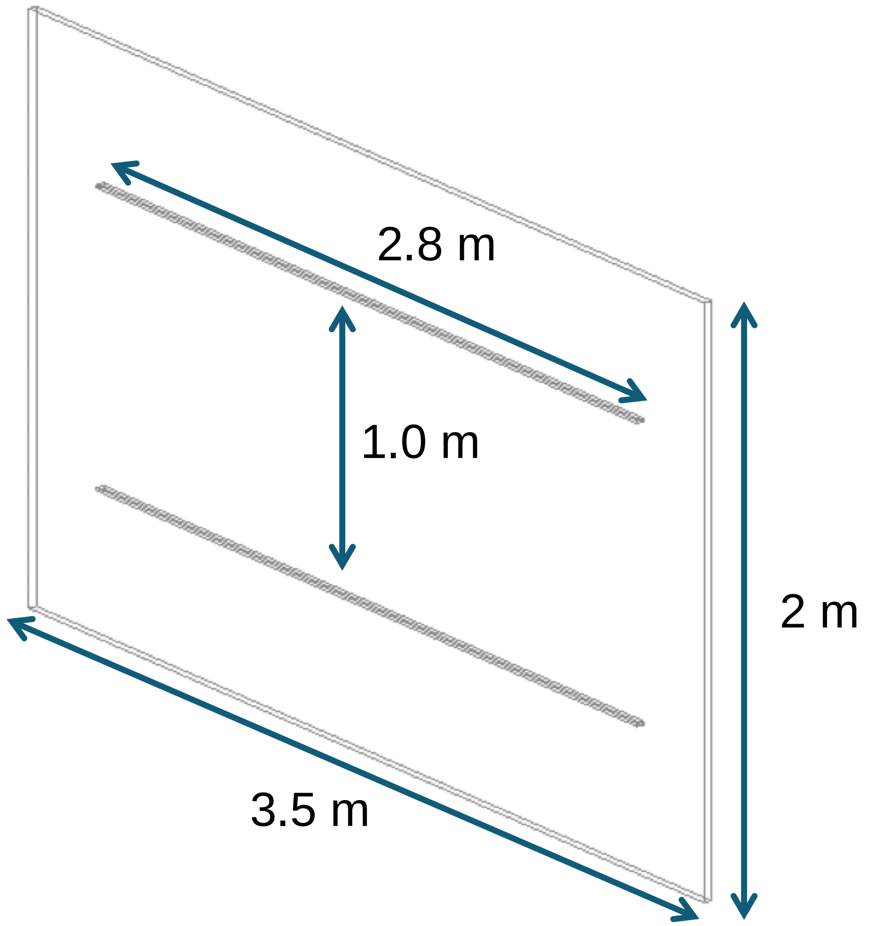
Mechanical supports for each block (|) are not simulated, but spacing is added.

Width:
- 3.5m (magnet plates)
- 3m (scintillator planes)

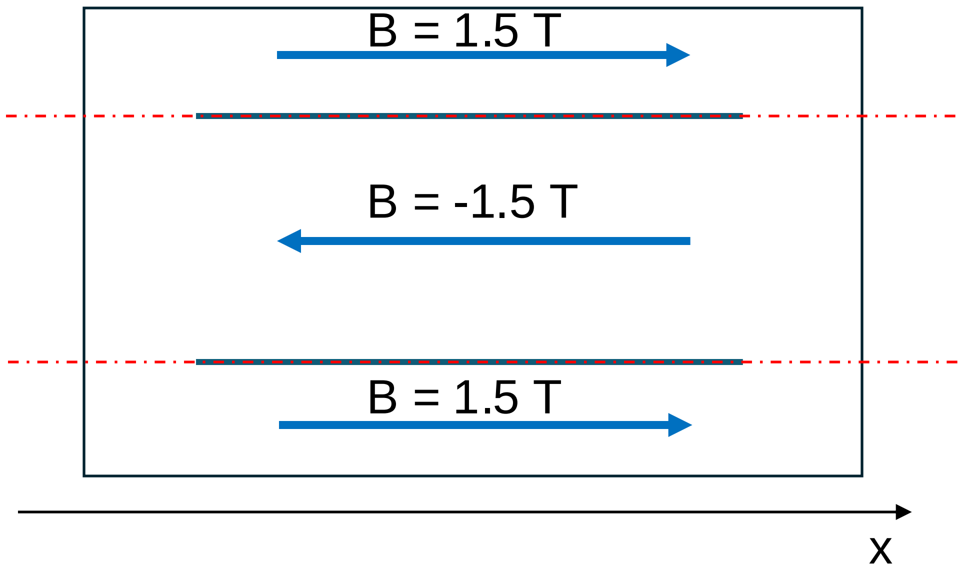
Total Length
- 3.3 m

Some spacings are guesses, only partially supported by the model.

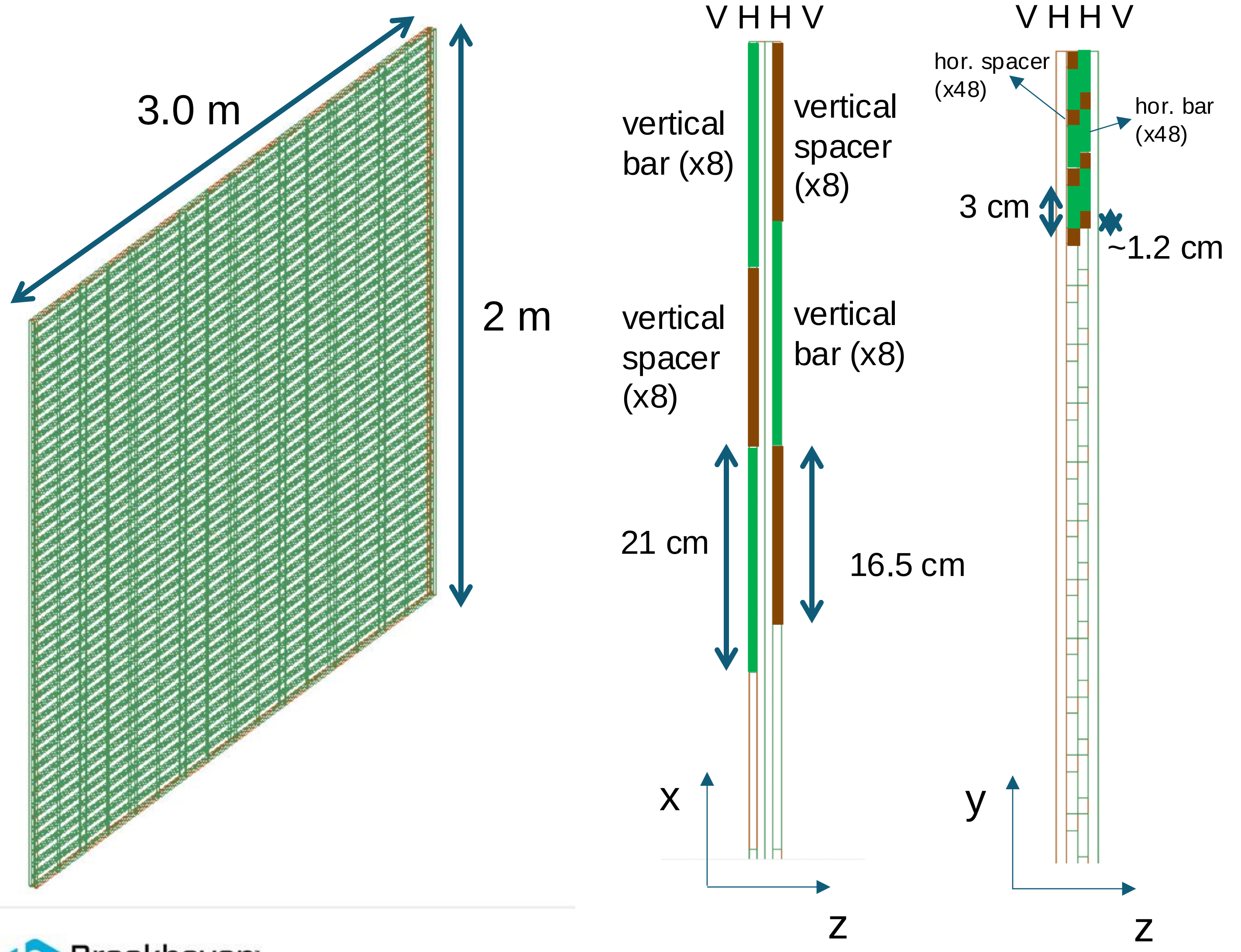
Magnet plate



- ARMCO steel (>98% iron).
- Total size: 3.5 m x 2 m
- Two 2.8 m x 10 mm slits.
- NO electrodes simulated.
- Simple B-field w/ 3 uniform field regions.



Detector module



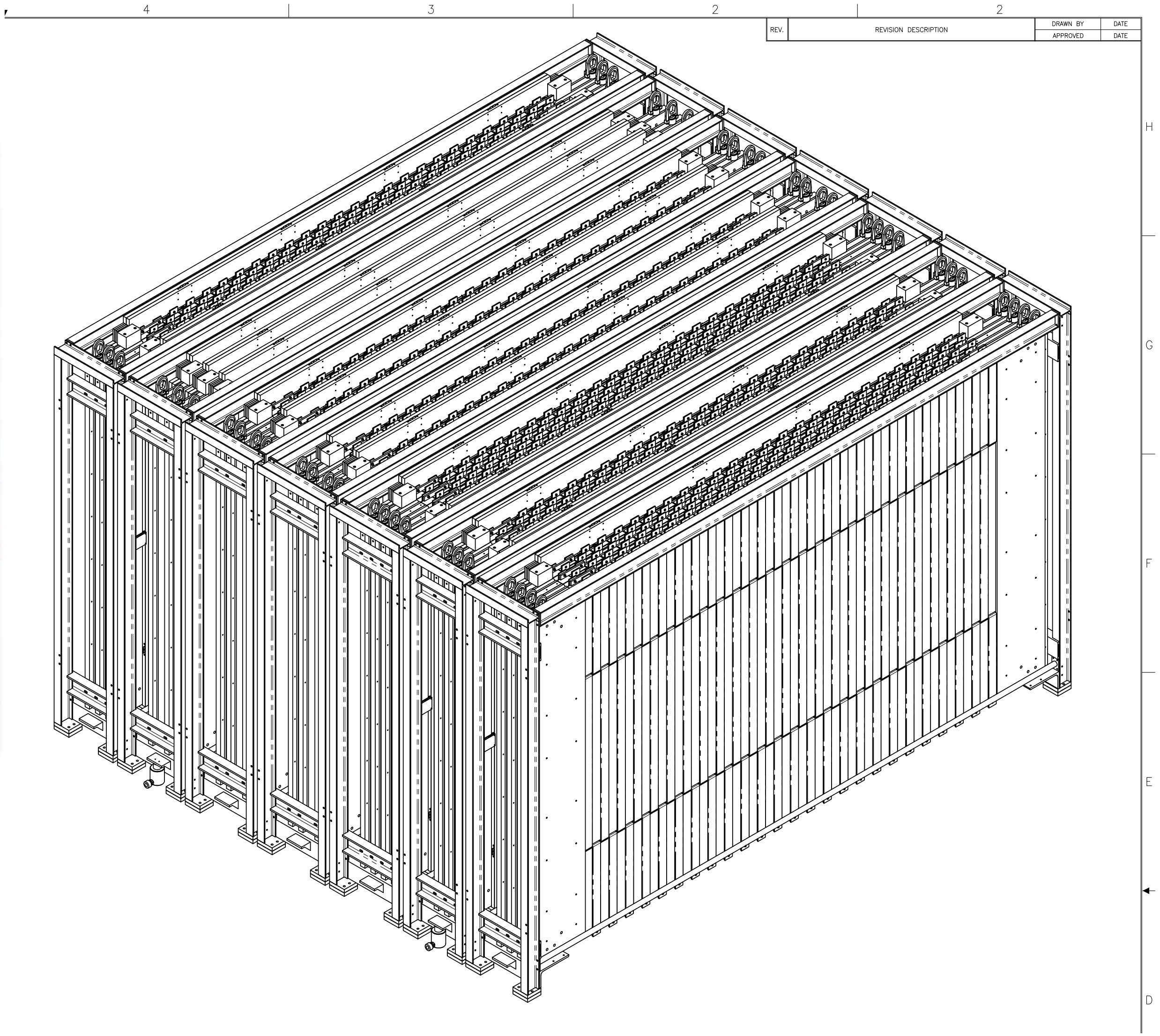
- Two materials: spacers (Polyethylene) and plastic scintillator (Polystyrene).
- Total size: 3 m x 2 m
- 4 scintillator layers:
  V + H + H + V

- Spacers and bars match between the two halves to avoid gaps.
- Ver: 16 bars (ok!)
- Hor: 96 bars (should be 95!)

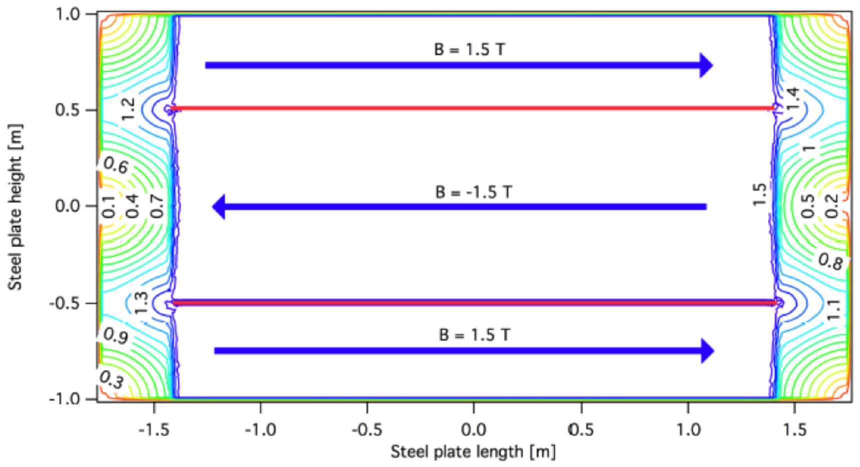
Backup

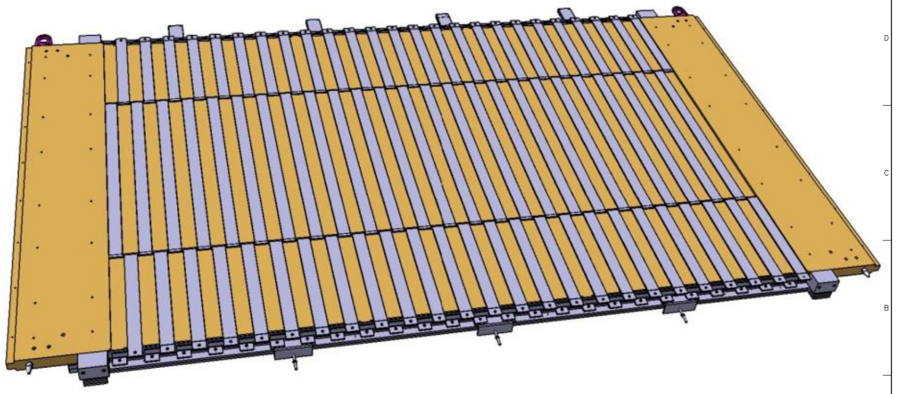
BabyMIND

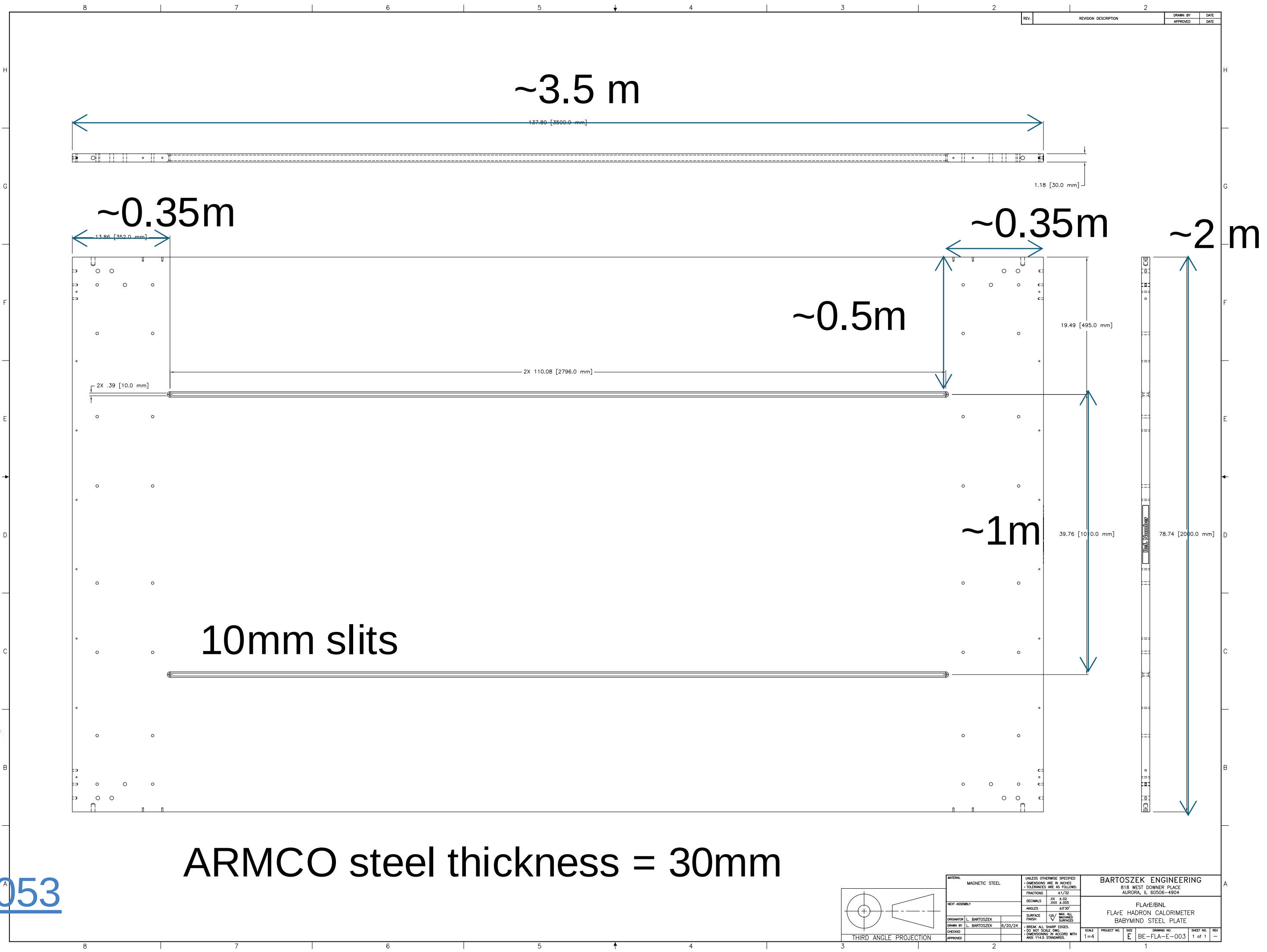
BabyMIND in T9 area



Magnet module: ARMCO plate

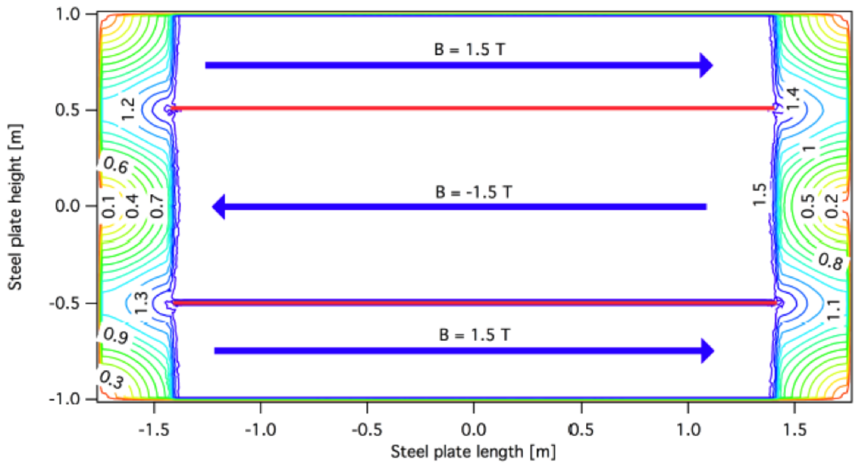


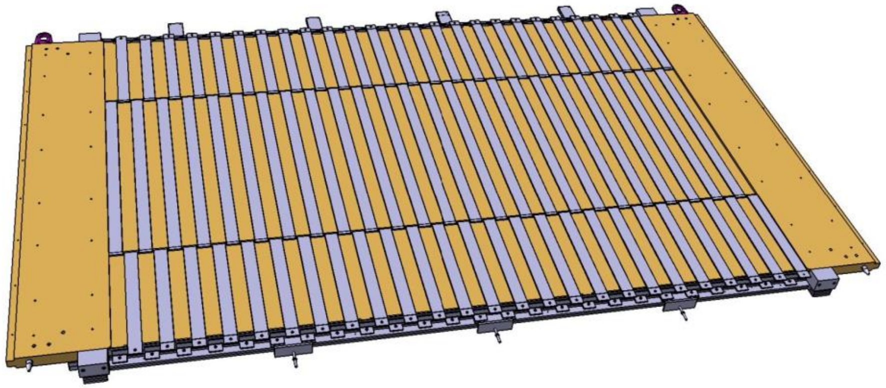




https://doi.org/10.1109/TMAG.2017.2664053

Magnet module: electrodes





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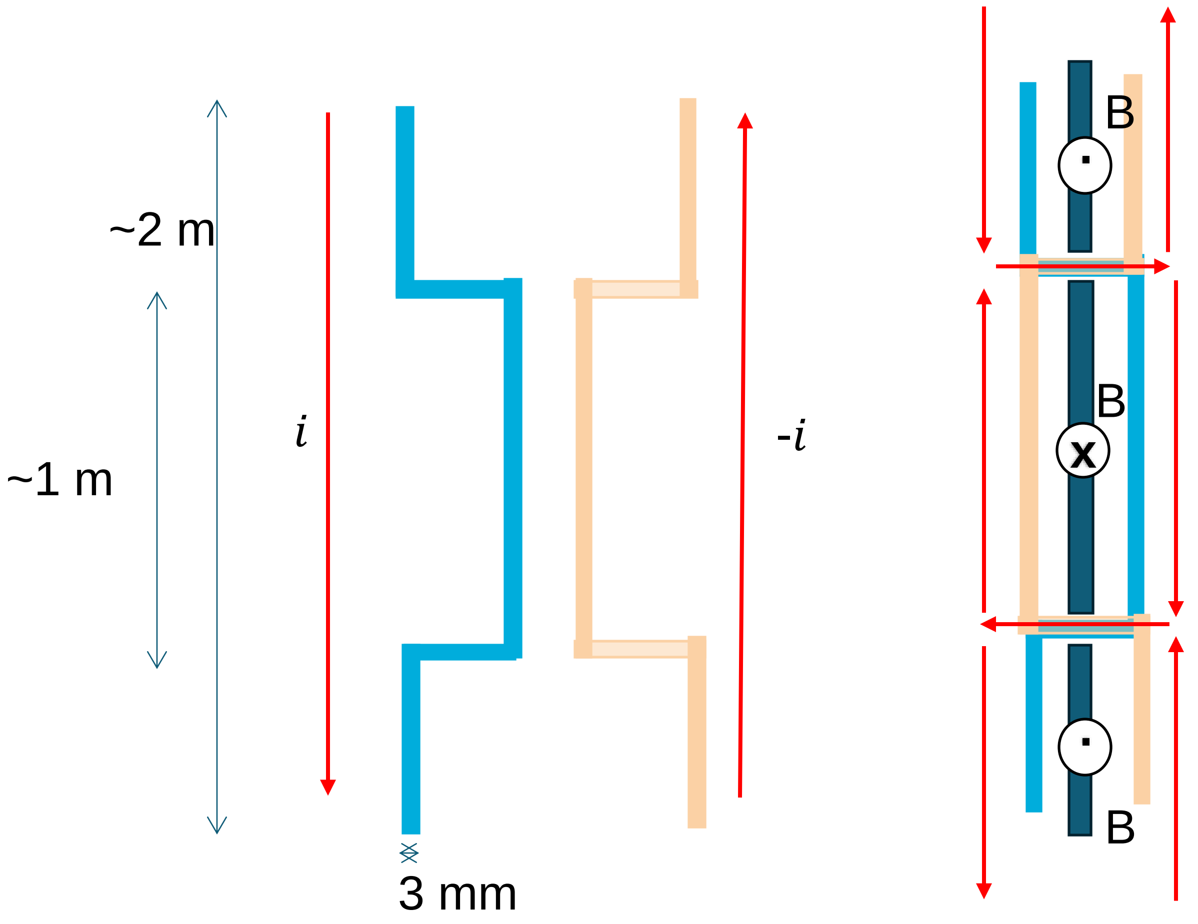
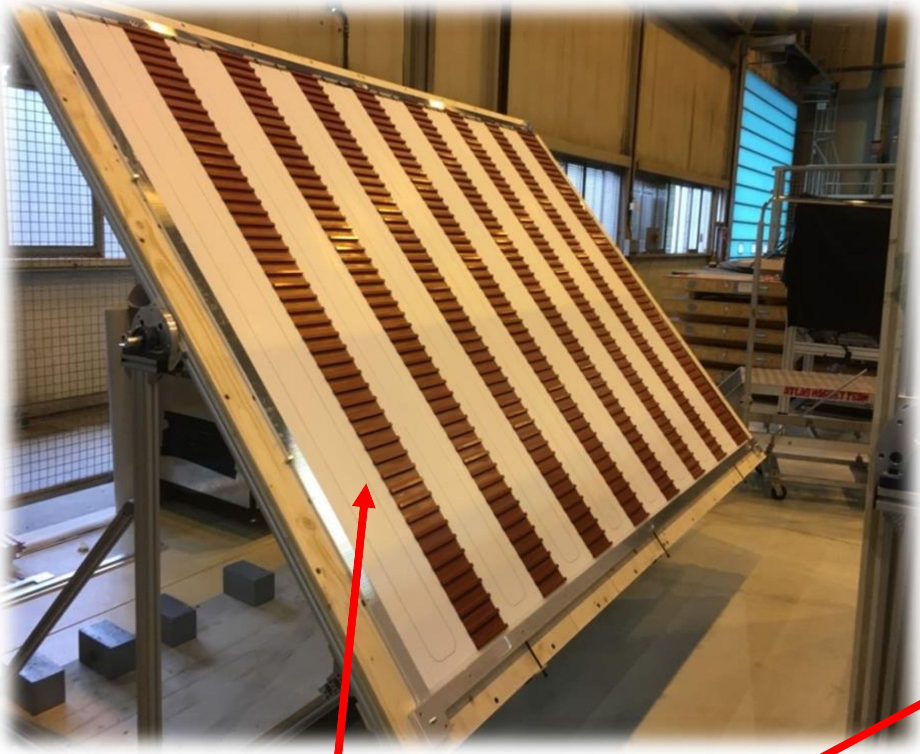
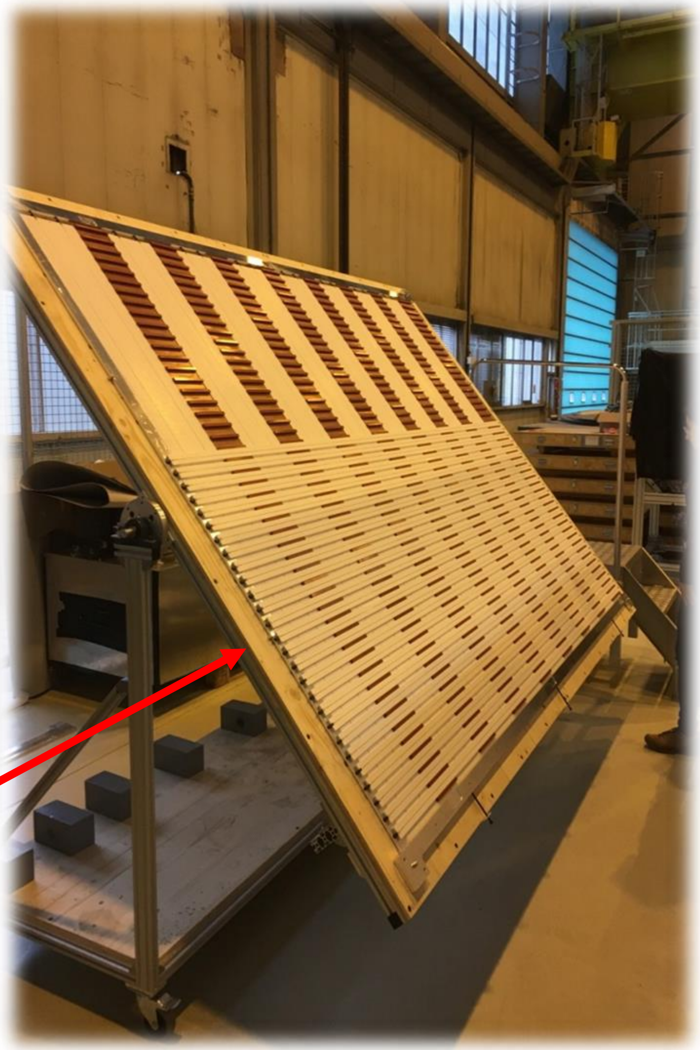


Aluminum ”ribbon” strip:
Thickness = 3 mm
Width = 50 mm (25 turns x coil)

Detector module

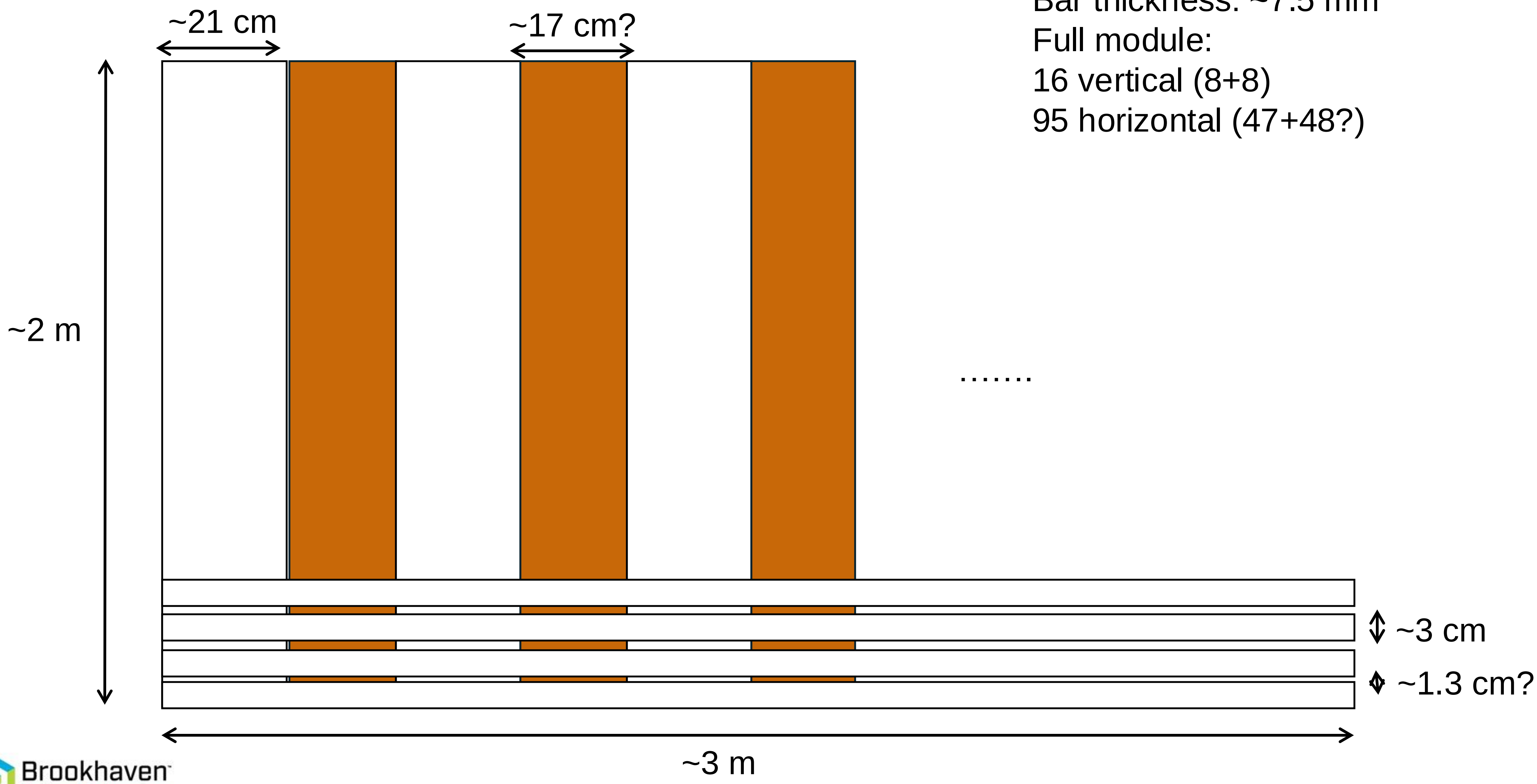




Spacers for the vertical bars also support the horizontal bars

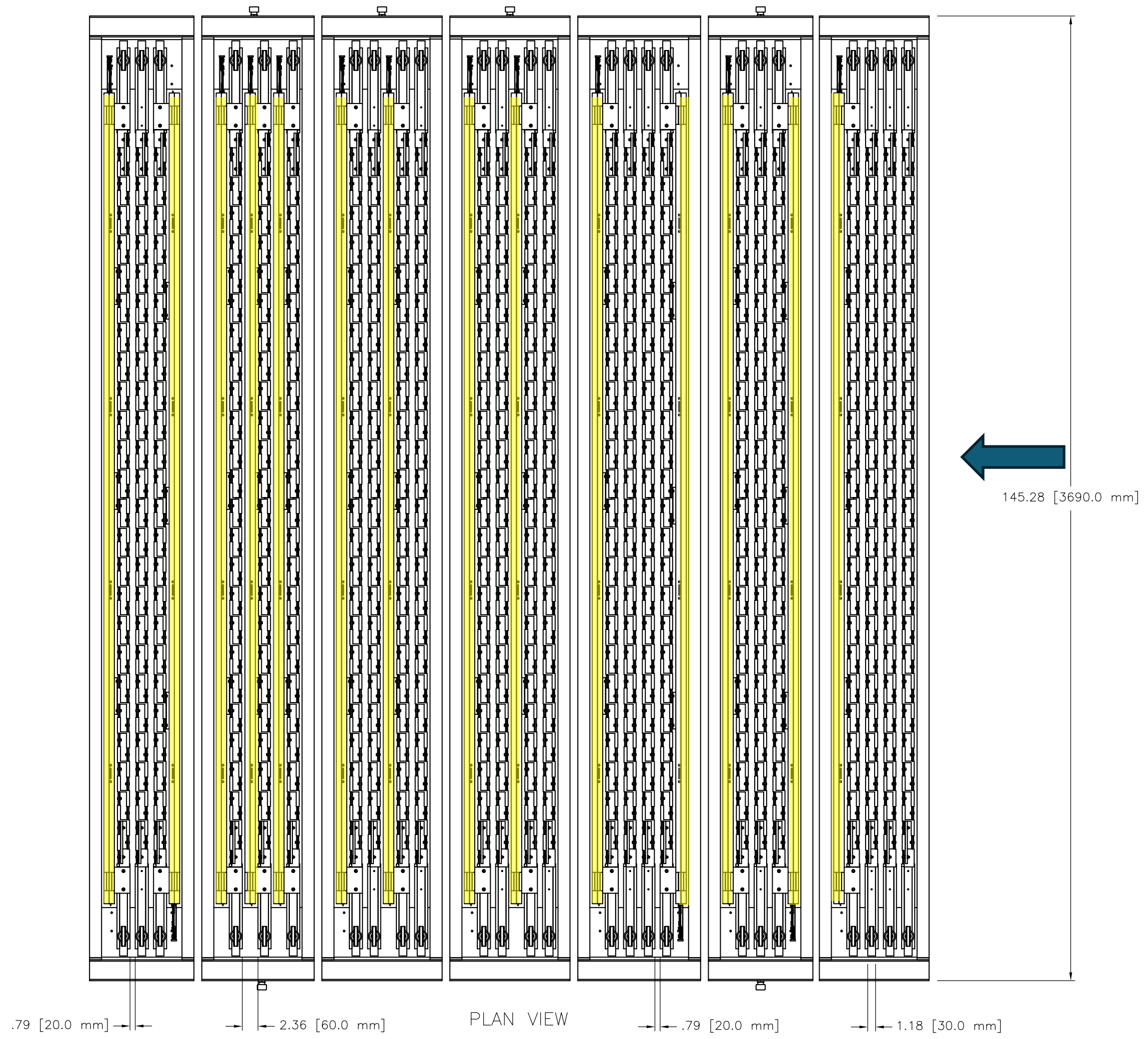
Bars are staggered in the second half to cover the gaps in the first half.

Detector module

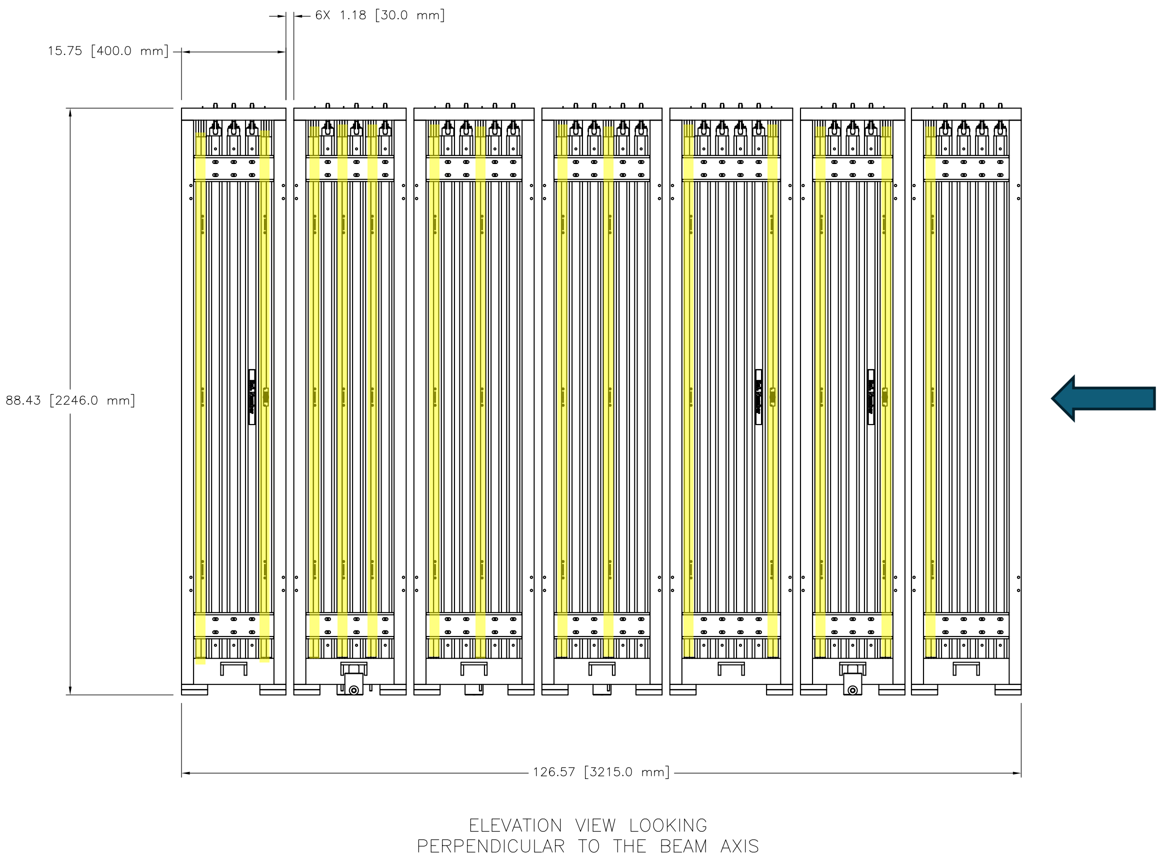


Bar thickness: ~7.5 mm
Full module:
16 vertical (8+8)
95 horizontal (47+48?)

Full assembly



TOP VIEW



SIDE VIEW

Readout

Channels per module:

- 16 vertical bars x 2 = 32
- 95 horizontal bars x 2 = 190
- TOTAL = 222 channels

Current assembly:

- 14 detector modules
- 3108 channels