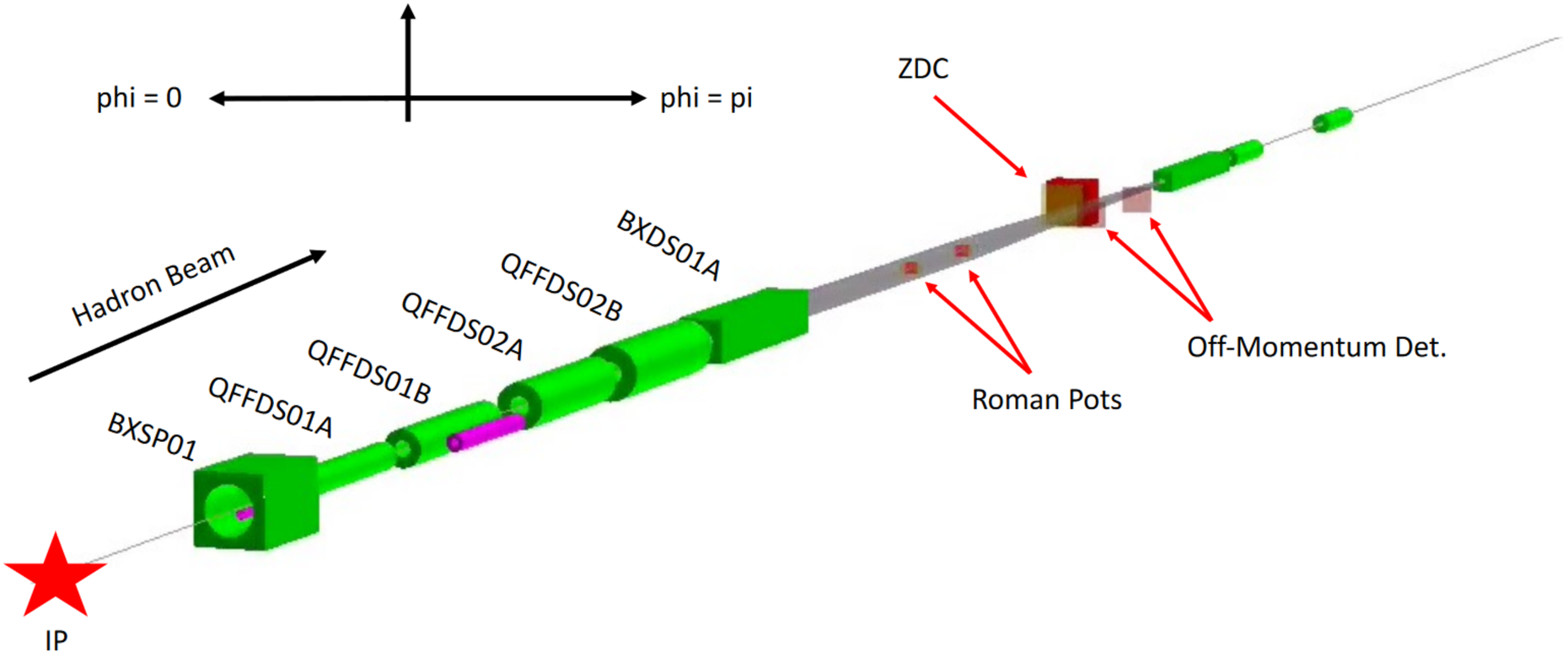
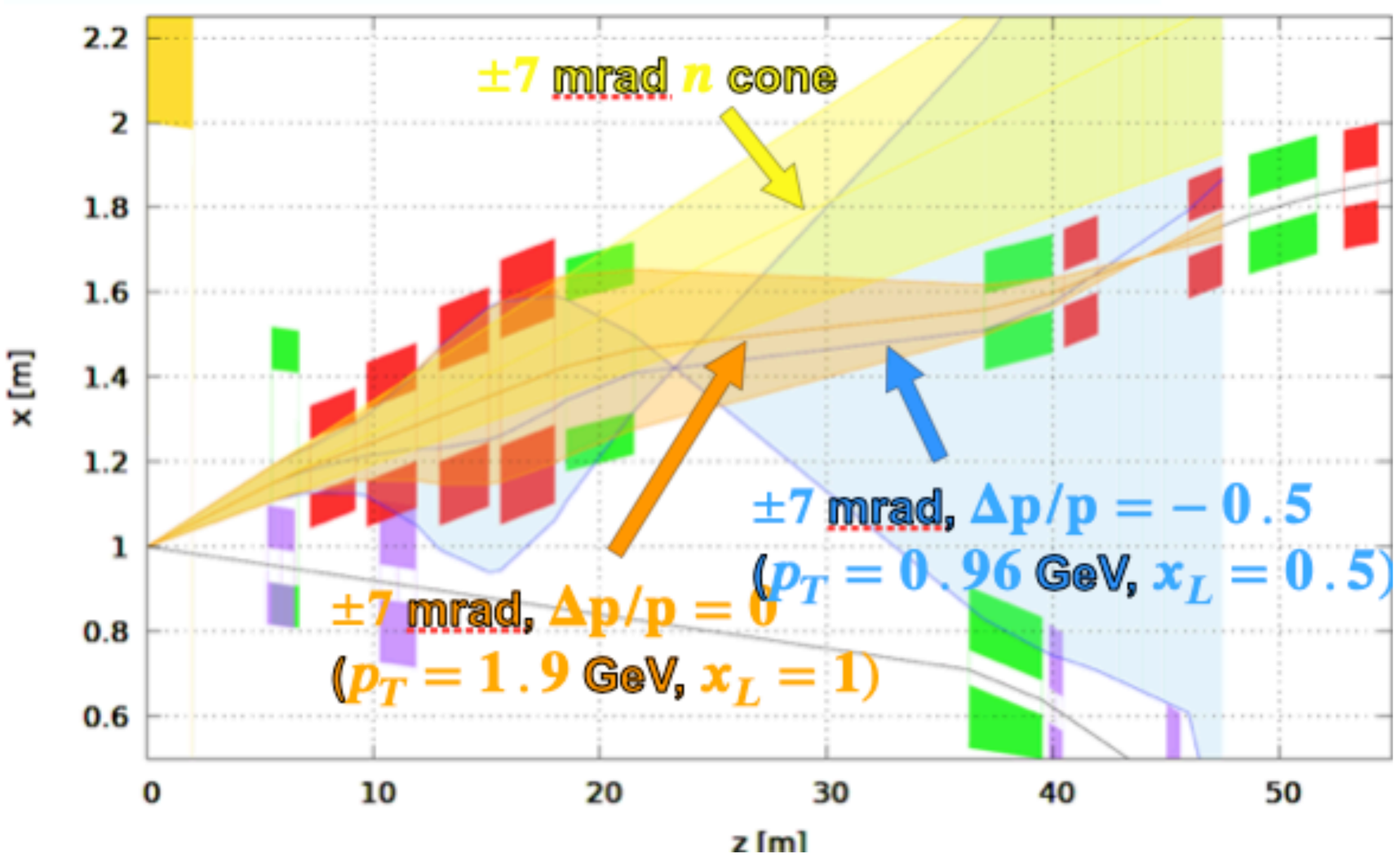
Update on Forward Detectors



Michael Murray, Yuji Goto for the Forward Group, 31 May 2021

IR8 is still in flux

After first iteration is released we need to check for any showstoppers that could ruin acceptance.



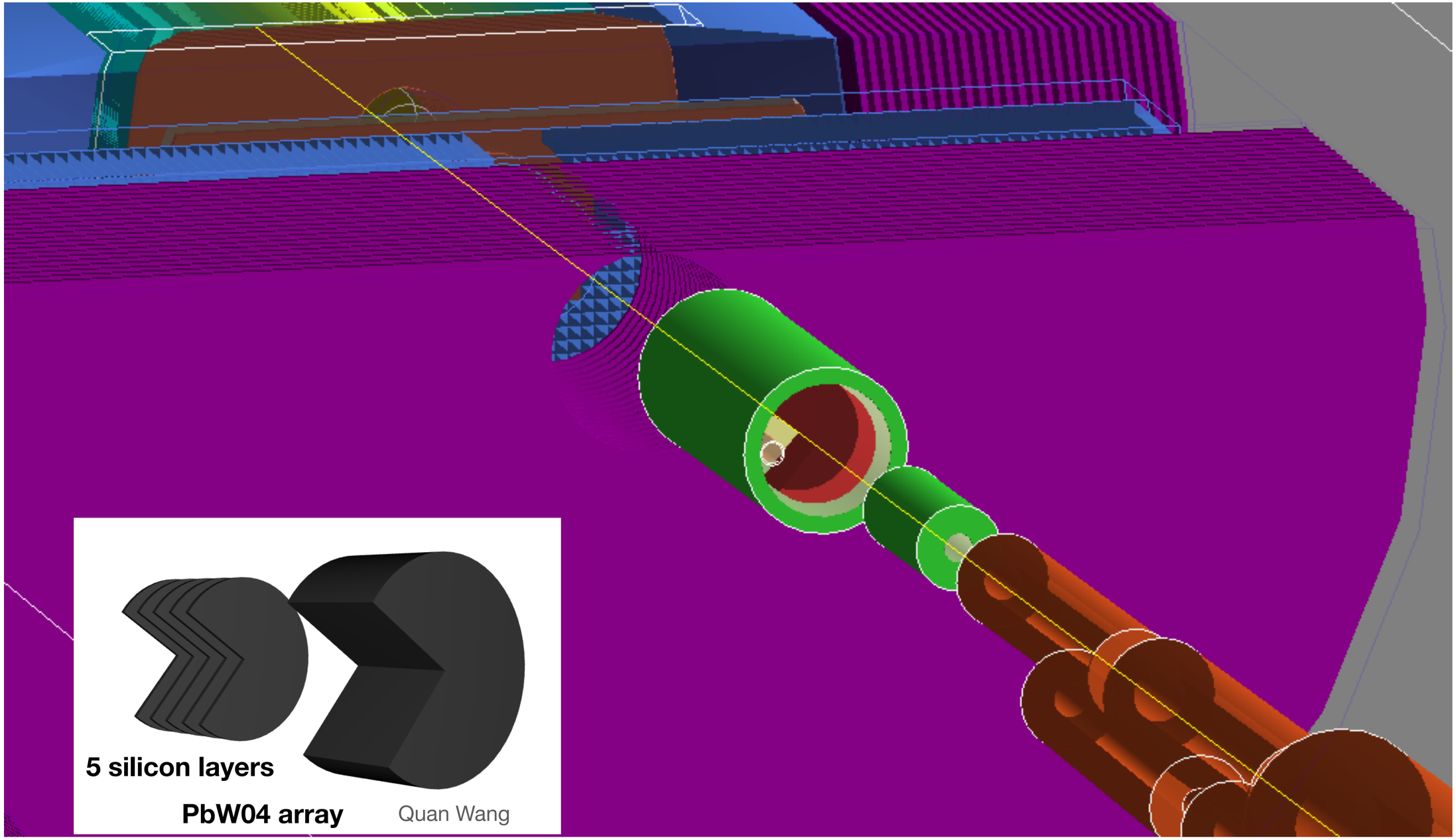
Logistics

- Yuji Goto and Michael Murray serving as conveyors
  - Looking for 3rd convener to help
- First kickoff meeting Thursday 3rd of June, 7.30am Eastern Time, watch for email announcement today.
- So far most effort focussed on B0 and ZDC but will expand soon.

Initial Goals for Forward Region

- Implement in Fun4All a full description of the forward detectors for both IR6 and IR8.
- Map both the performance and acceptance of the individual subsystems and for both IP6 and IP8.
  - This is particularly critical for IP8
- Workout a feasible technologies that could can be costed for proposal
  - Develop risk estimates, channel counts etc.

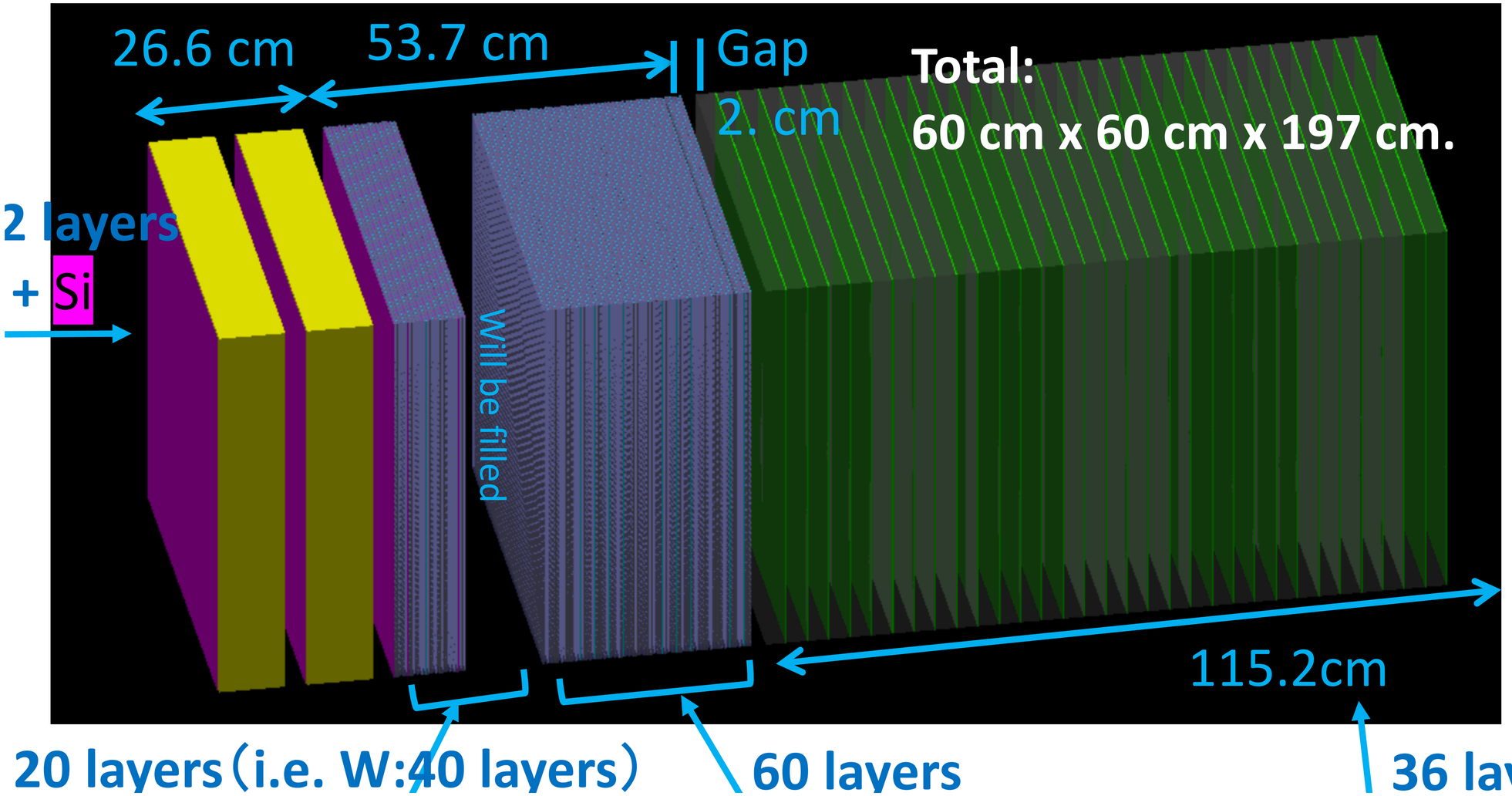
Looking for soft photons in B0 using lead tungstenate array



ZDC uses Silicon/PbW04 for EM followed Silcon/W for Hadronic Section

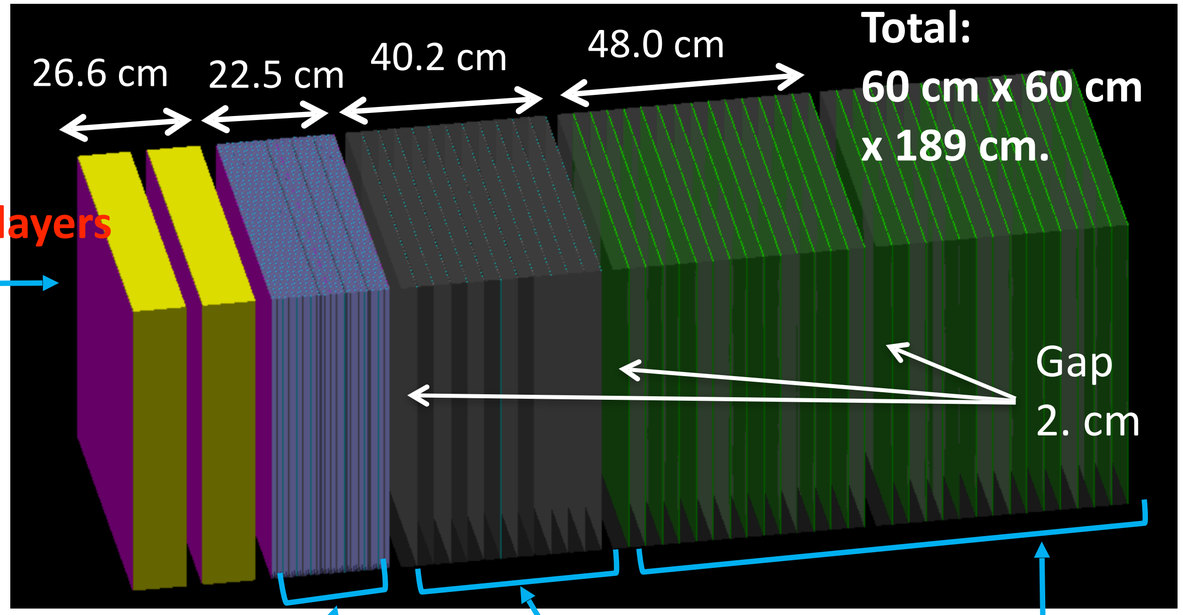
Shima Shimizu

Silicon layer in front of $PbW0_4$



What I put in Fun4All
-- ongoing

Shima
Shimizu



Silicon
3 mm x 3mm x 300 µm
PET (Glue) 0.11 mm
PET (FPC) 0.28 mm
Gap 1.2mm
Crystal (PbWO4)
3cm x 3cm x 10 cm
Gap 3 cm

2 layers

Si +

12 layers

30 layers
(15 layers x 2)

Tungsten 3.5 mm Thickness
PET (Glue) 0.11 mm
Silicon 1 cm x 1 cm x 320 µm
PET (Glue) 0.13 mm
PET (FPC) 0.28 mm
Gap 1. mm

5.34 mm

Pb 3cm Thickness
PET (Glue) 0.11 mm
Silicon 1 cm x 1 cm x 320 µm
PET (Glue) 0.13 mm
PET(FPC) 0.28 mm
Gap 1. mm

x 2

20 layers

+

1 layer

Tungsten 3.5 mm Thickness
PET (Glue) 0.11 mm
Silicon 3 mm x 3mm x 300 µm
PET (Glue) 0.11 mm
PET(FPC) 0.28 mm
Gap 1.2mm

5.5 mm

Total:
W: 42 layers,
Si: 3 layers,
Si: 40 layers

Pb 3cm Thickness
Scintilator 10 cm x 10 cm x 2 mm
Gap 0.0013 mm

Roman Pots

- Will copy CMS-PPS silicon pixels
- Cooling, vacuum & mechanics developed by Totem group
- One layer of LGAD for ps timing

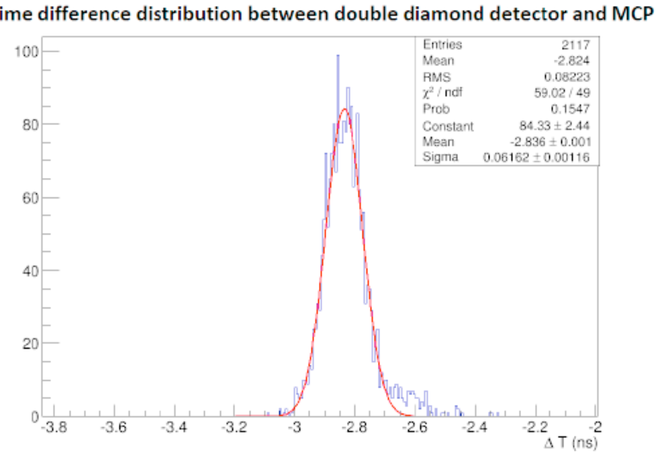
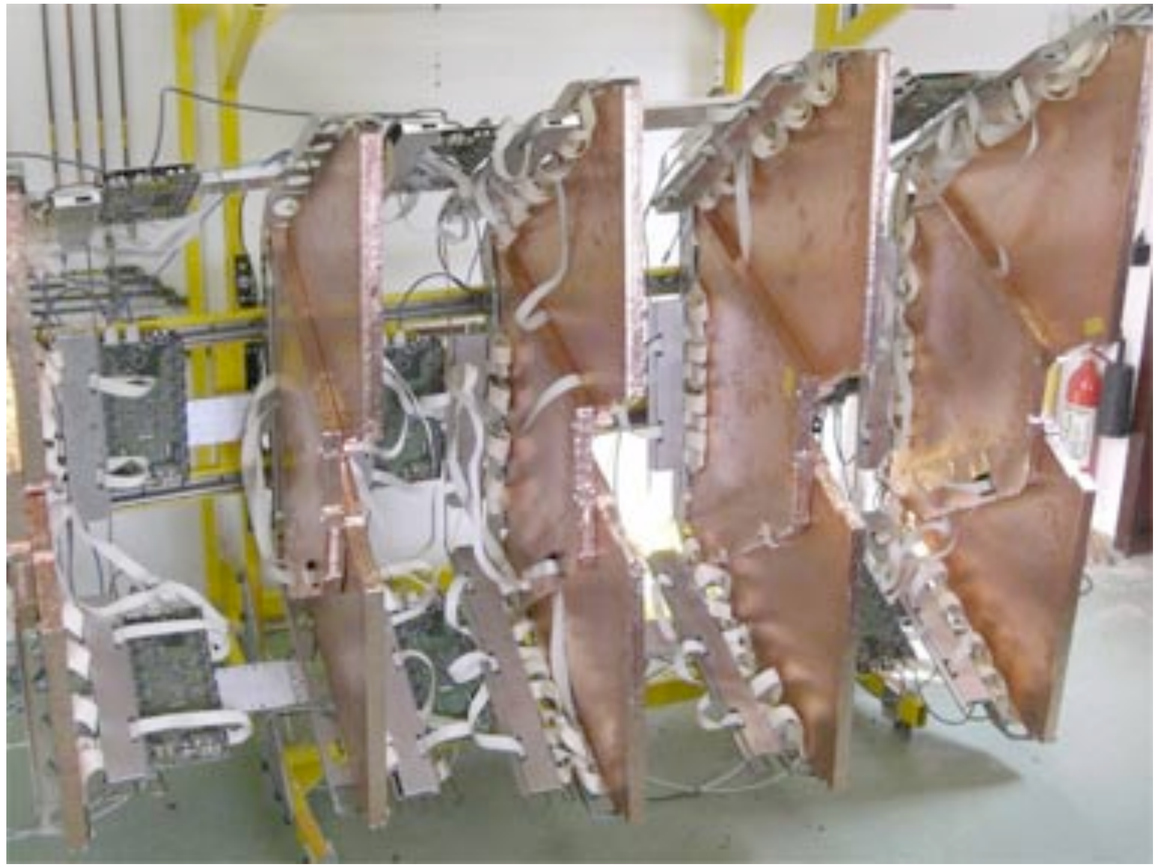


Figure 6. Time precision of a double diamond detector: the time difference between the time measured by the MCP and the time measured by the double diamond detector is shown.



Off Momentum Detectors

- Since they are in air detector package is much simpler than for Roman Pots.
- Plan to use GEMs as in yellow report or perhaps silicon tracker from central region.

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- Plan to copy silicon tracker from central region.

Summary

- Lots of work to do, but it is very exciting
- Plan to leverage LHC efforts and other EIC work to design detectors
- We would love to have you join us, see you on Thursday at 7.30am!