Weekly RBRC meeting 3/June/2021

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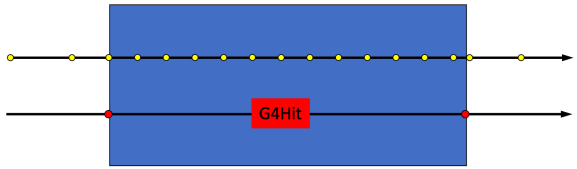
ZDC status

- First design of ZDC is ready to be implemented in Fun4All.
  - Crystal + ALICE FoCal style EM and Hadron Calorimeter. *(slide 3)*

- Output variables are ready and can be filled in TTree or TNtuple.
  - Information of ZDC G4Hits.
  - Variables:
    Detector type (Silicon/Crystal/Scintillator),
    Layer ID, x and y ID, position (x,y,z), timing
    and energy deposits of ZDC G4Hits.

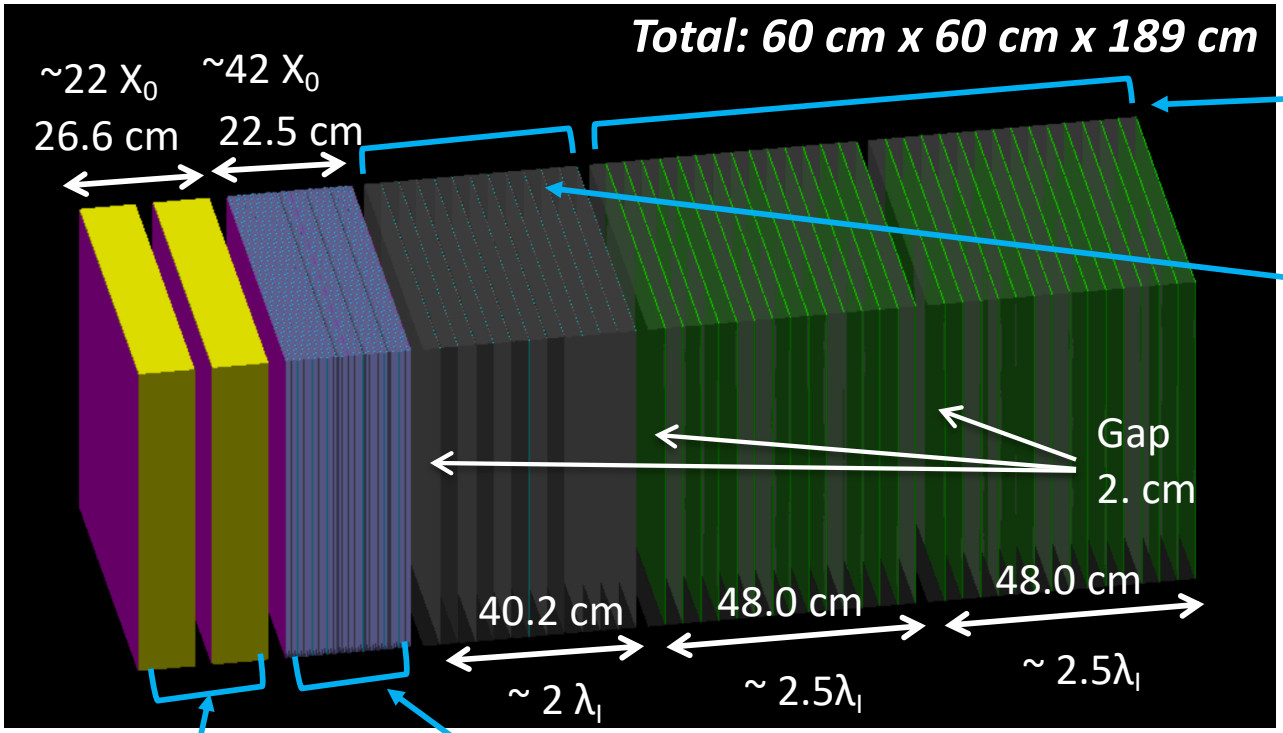


- First check of the energy deposits in the implemented ZDC. *(slide 4, 5)*
  - Using particle gun of photon and neutron.

  → Looks reasonable for the current structure.

- Submitting codes to eic/fun4all_eicdetectors. *(slide 6)*

First ZDC design



30 layers (15 layers x 2)

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

12 layers

Pb 3cm Thickness
PET (Glue) 0.11 mm
Silicon
1 cm x 1 cm x 320 µm
PET (Glue, FPC) 0.41 mm
Gap 1. mm

2 layers

Silicon
3 mm x 3mm x 300 µm
PET (Glue, FPC) 0.39 mm
Gap 1.2mm
Crystal (PbWO4)
3cm x 3cm x 10 cm
Gap 3 cm

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

= Si + 2 x

20 layers

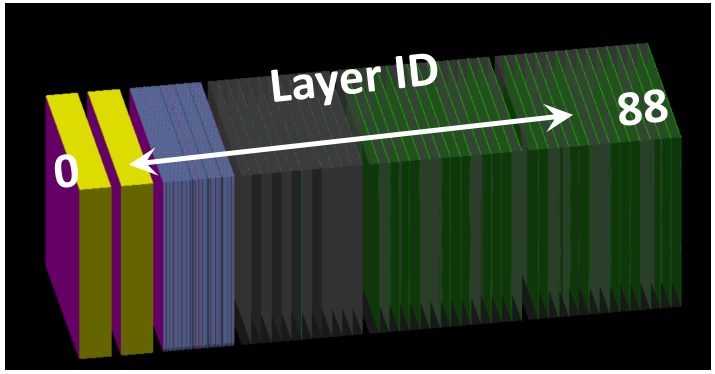
Tungsten 3.5 mm Thickness
PET (Glue) 0.11 mm
Silicon 1 cm x 1 cm x 320 µm
PET (Glue, FPC) 0.41 mm, Gap 1.mm

+

1 layer

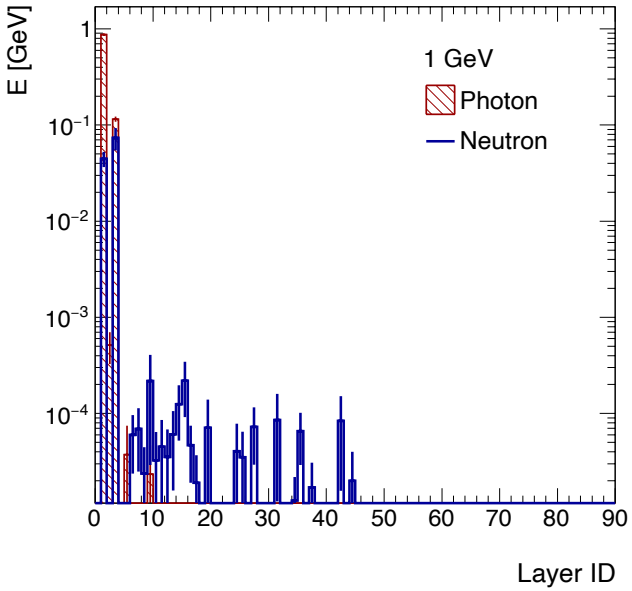
Tungsten 3.5 mm Thickness
PET (Glue) 0.11 mm
Silicon 3 mm x 3mm x 300 µm
PET (Glue, FPC) 0.39 mm, Gap 1.2mm

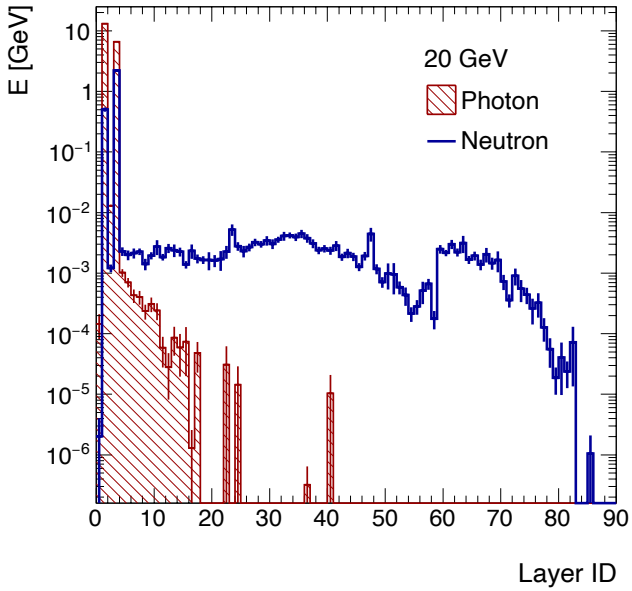
Energy deposition per layer

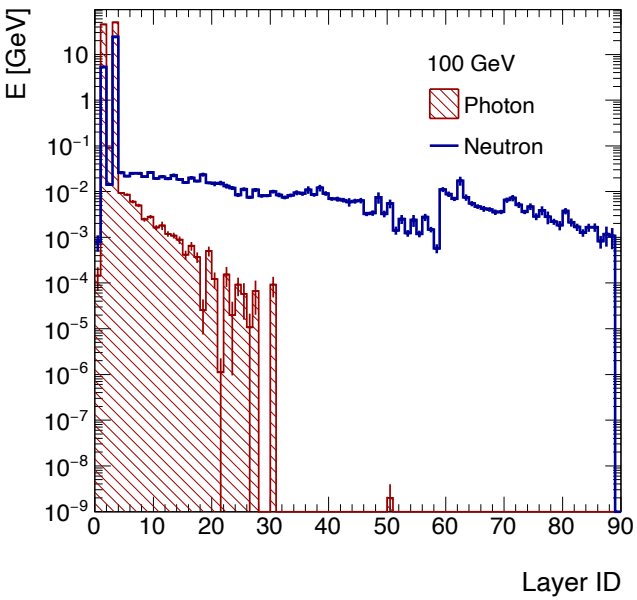


- Using particle gun of photon and neutron.
  - 1, 20, 100 GeV

• Layer 1, 3:	Crystal 3cm x 3cm	10cm thick
• Layer 0, 2, 4, 25, 46:	Silicon 3mm x 3mm	300μm thick
• Layer 5-24, 25-45:	Silicon 1cm x 1cm (w/ Tungsten)	320μm thick
• Layer 47-58:	Silicon 1cm x 1cm (w/ Pb)	320μm thick
• Layer 59-88:	Scintillator 10cm x 10cm (w/ Pb)	2mm thick







Energy map w/ 100 GeV photon or neutron

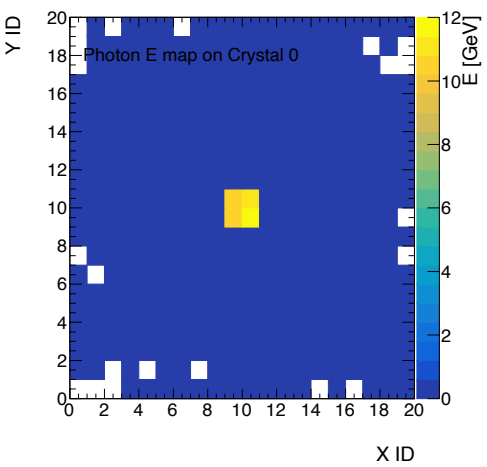
Layer 1
(Crystal 0)

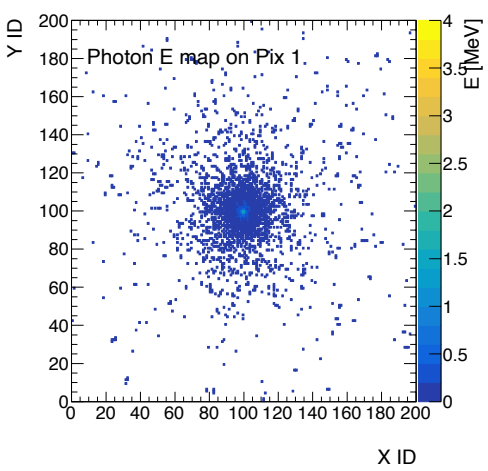
Layer 2
(3mm x 3mm Silicon)

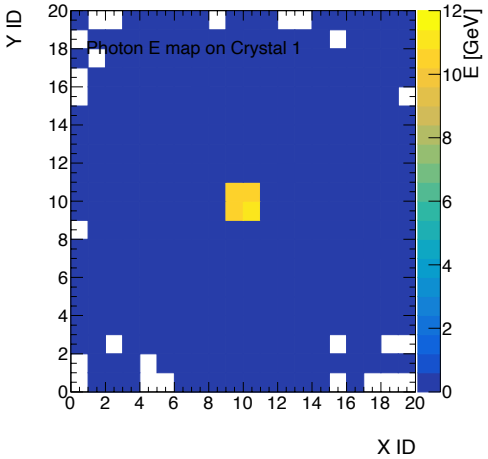
Layer 3
(Crystal 1)

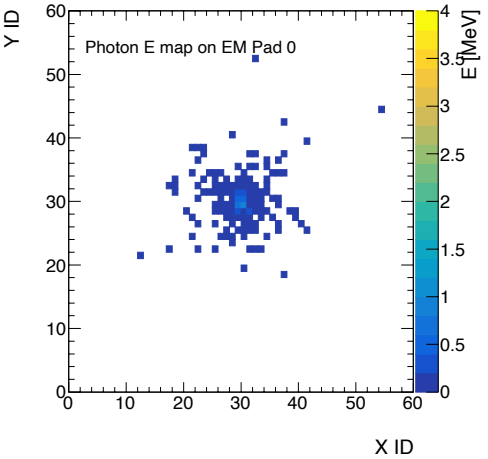
Layer 5
(1cm x 1cm Silicon)

Photon

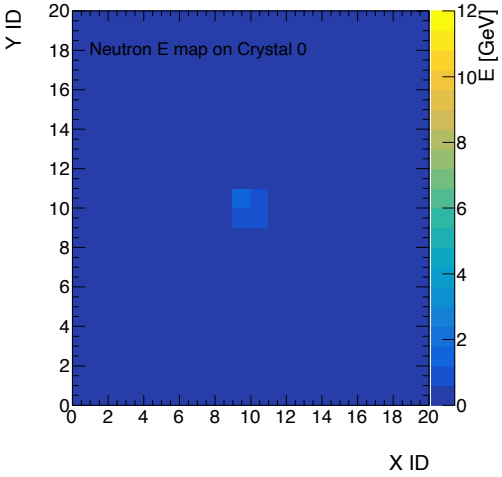


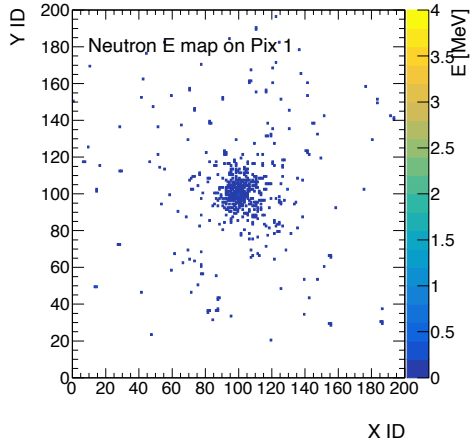


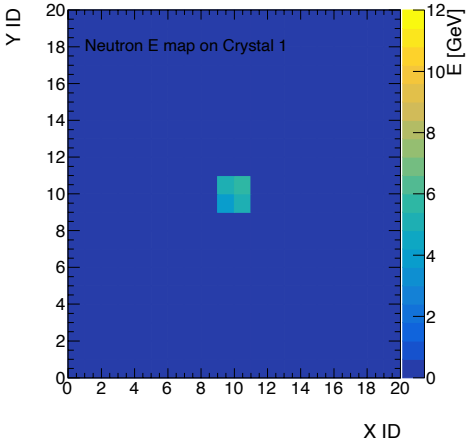


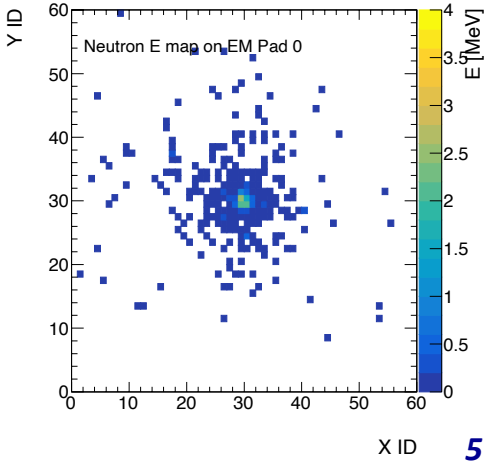


Neutron



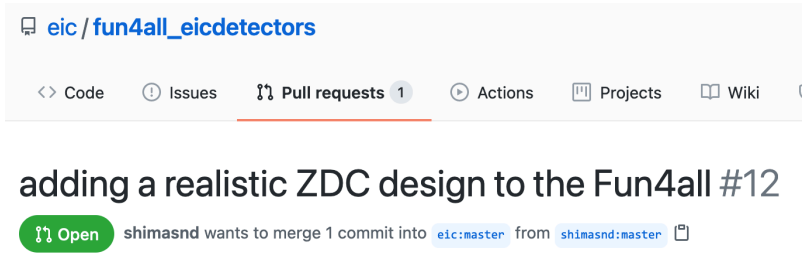


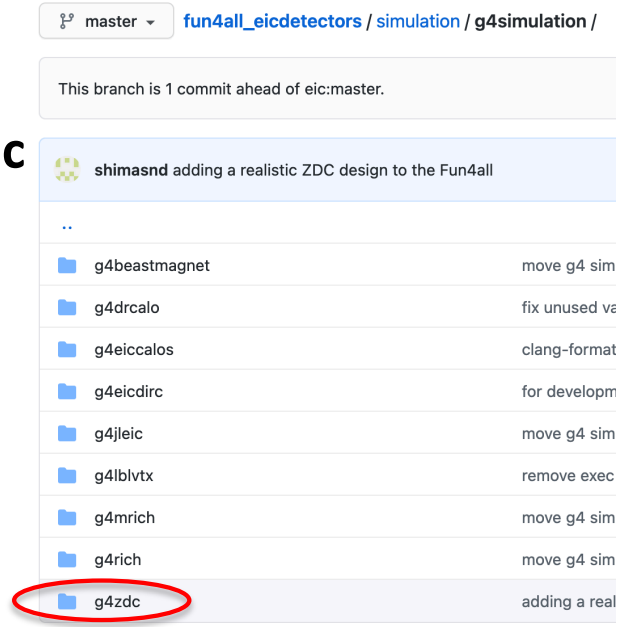




Submission to eic/fun4all_eicdetectors github

- Codes will be placed under: eic/fun4all_eicdetectors/simulation/g4simulation/**g4zdc**
- Current status: Created a pull request





- Will be **EICG4ZDC** library.
  - In Fun4All_XX.C macro:

```
#include <eicg4zdc/EICG4ZDCSubsystem.h>
#include <eicg4zdc/EICG4ZDCHitTree.h>

EICG4ZDCSubsystem *mydet = new EICG4ZDCSubsystem("EICG4ZDC");
mydet->SetActive();
g4Reco->registerSubsystem(mydet);

EICG4ZDCHitTree *zdctree = new EICG4ZDCHitTree("Hits");
zdctree->AddNode("EICG4ZDC_0", 0);
se->registerSubsystem(zdctree);
```

  - Placement of ZDC can be modified in the macro

```
//for test
mydet->set_double_param("place_z",375.);
mydet->set_double_param("place_x",0.);
mydet->set_double_param("rot_y",0.);
```

- Next: modification of G4_hFarFwdBeamLine_EIC.C
  - It takes care of forward configuration (incl. magnet, pipe, RP, B0, OM) for both IP6 and IP8.

Other items

- Reading Yellow Report for ZDC-related topics.
  - Also considering what should be the next step for ZDC simulation.

- ECCE inclusive reaction meeting yesterday
  - Perhaps a starting point can be to check personal DJANGOH samples on JLab?
    - To see items needed for simulation sample.
      (Check of kinematics, physics objects, etc?)

    → Requesting a JLab remote access.

- BNL guest account
  - Signed an online document last week. Then, no news…