Beam Backgrounds and Shielding

Seonho Choi
Seoul National University

SANE Readiness Review
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Simulation Model

- Pavel's program to simulate backgrounds from the beamline

- Glen added BETA detector configuration

- BETA detector geometry updated for the new design (at least for Cerenkov)

- Updated to be compiled and run with GEANT4 package
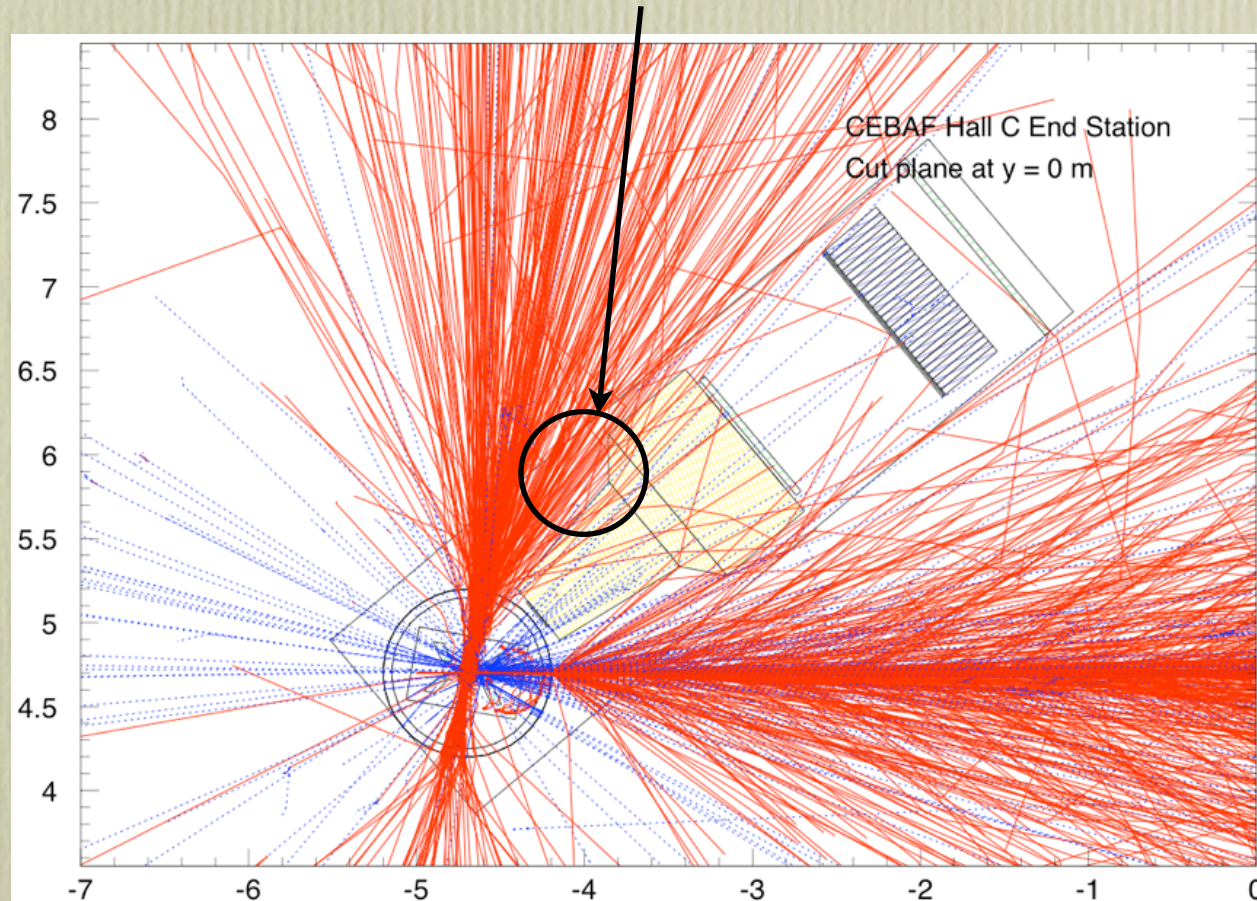
- Test of various configuration of shielding

Beam backgrounds

- At parallel configuration

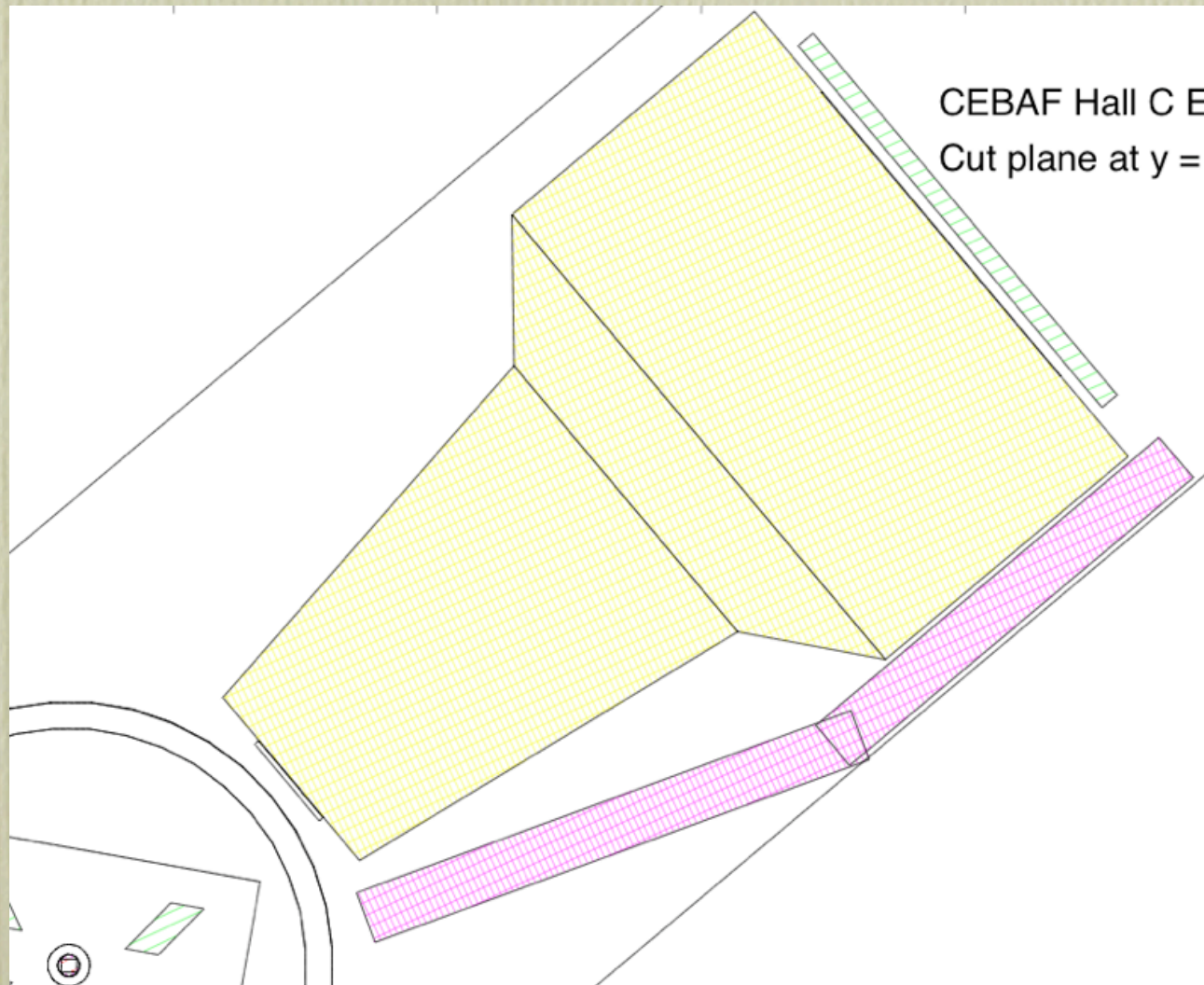 - Most backgrounds are from the target exit window - PMT's are relatively safe
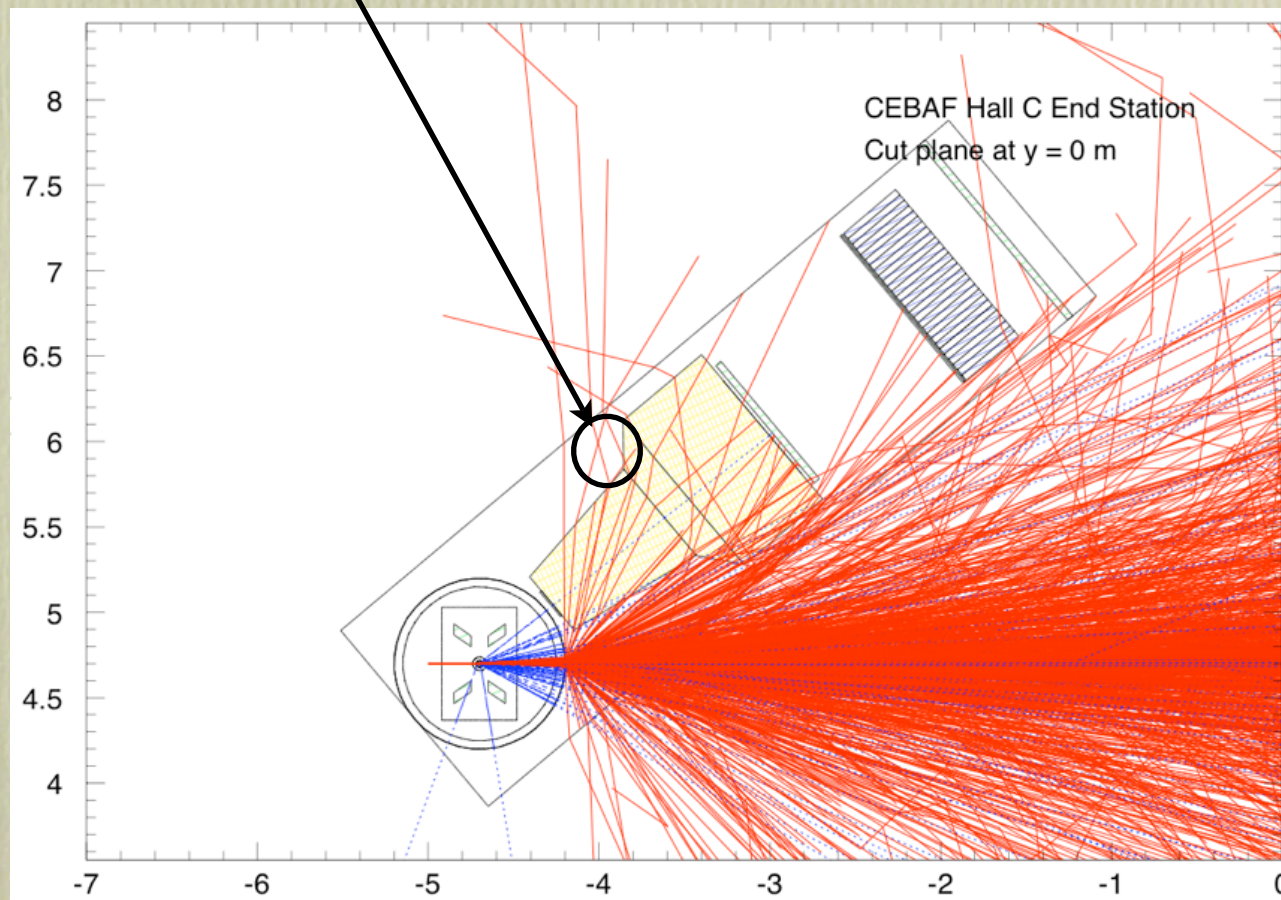
Backgrounds (cont.)

- At perpendicular configuration

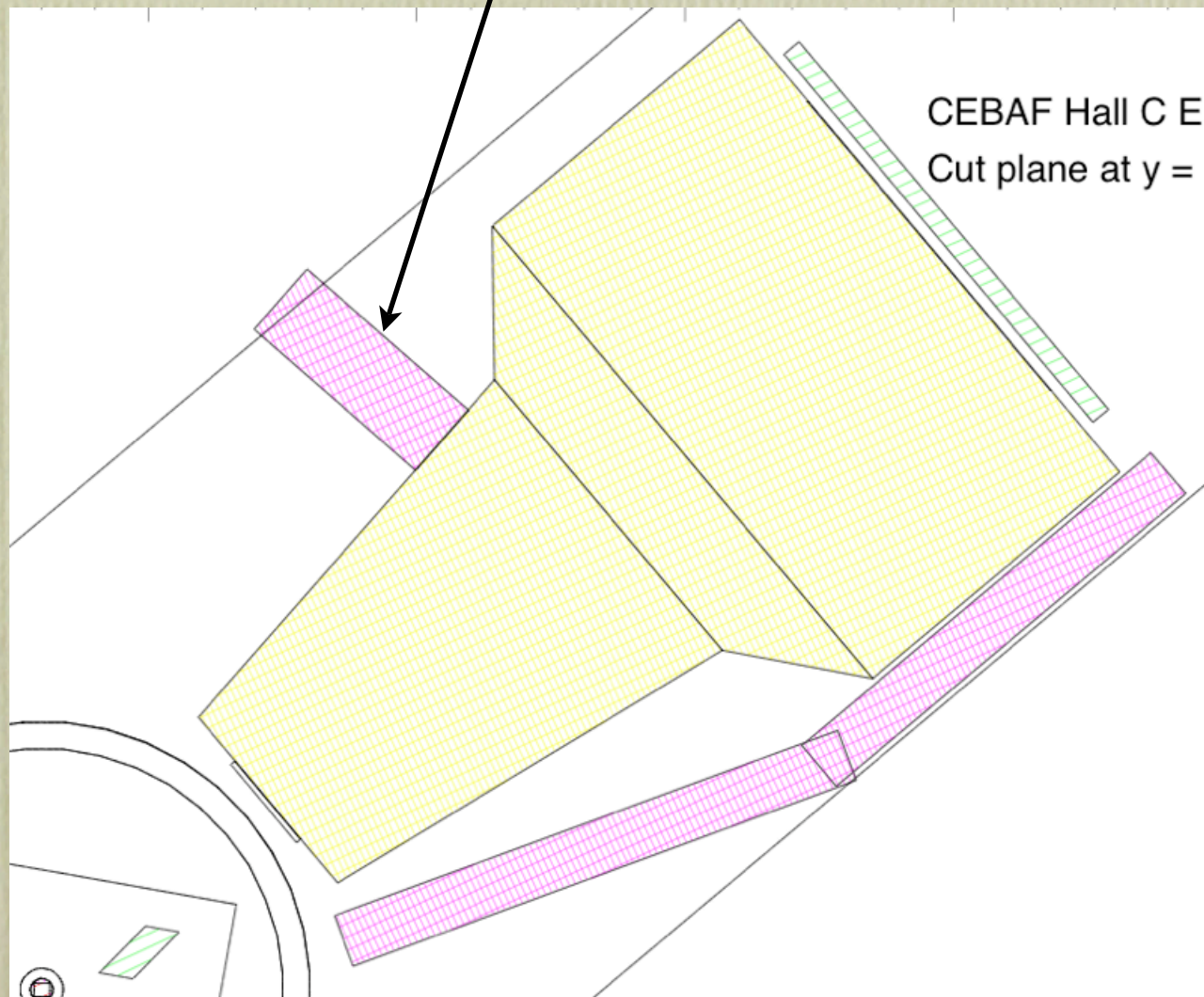 - Backgrounds from the target cell - major contribution to PMT stacks

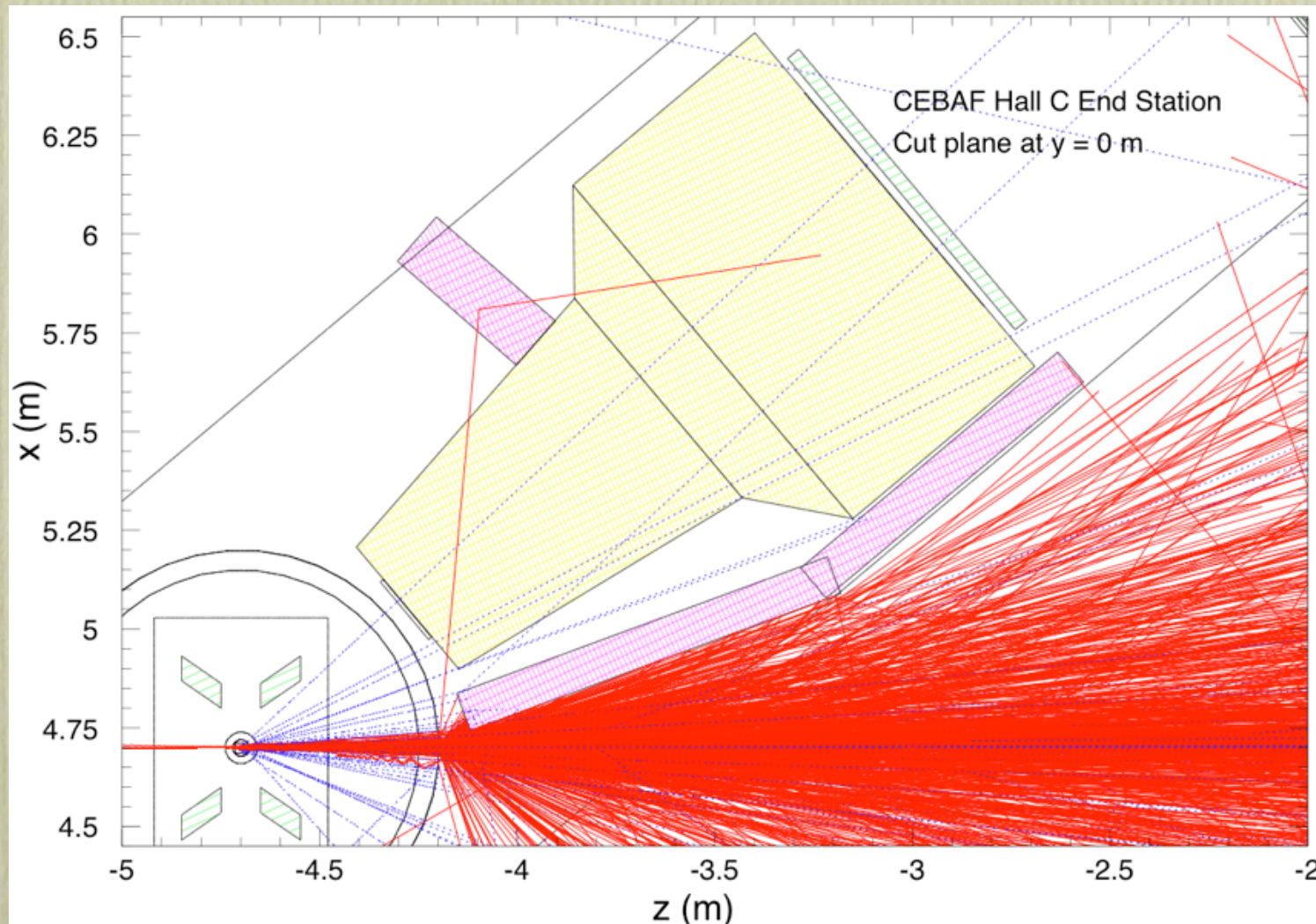# Shielding for beamline side

- Continuous Pb wall of thickness 10cm

CEBAF Hall C En
Cut plane at y = (

Shielding for PMT side

- 15cm thick Pb wall in front of PMT stack
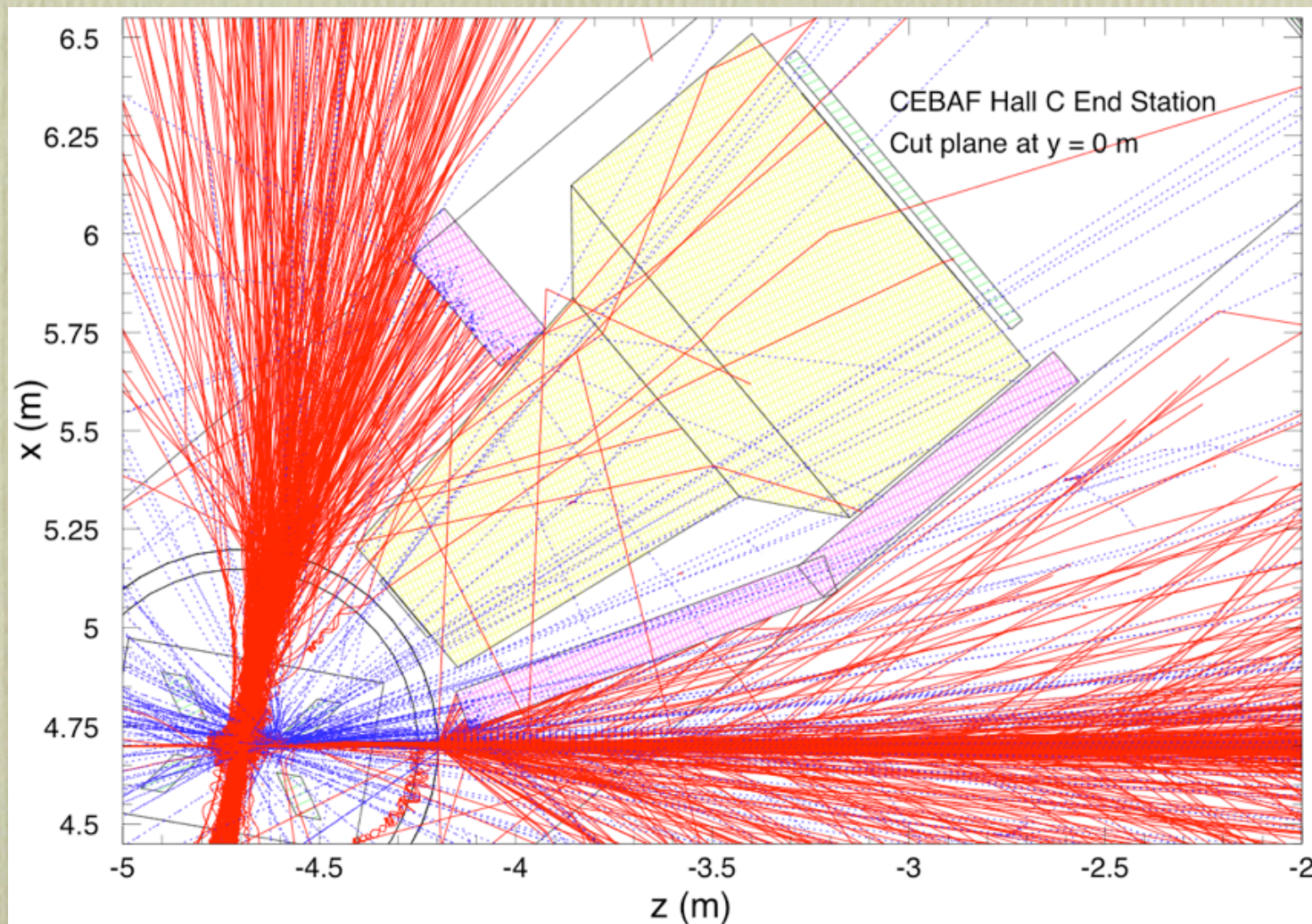

CEBAF Hall C En
Cut plane at y = (

Results for parallel configuration

- The beam background is not an issue.

Perpendicular Configuration

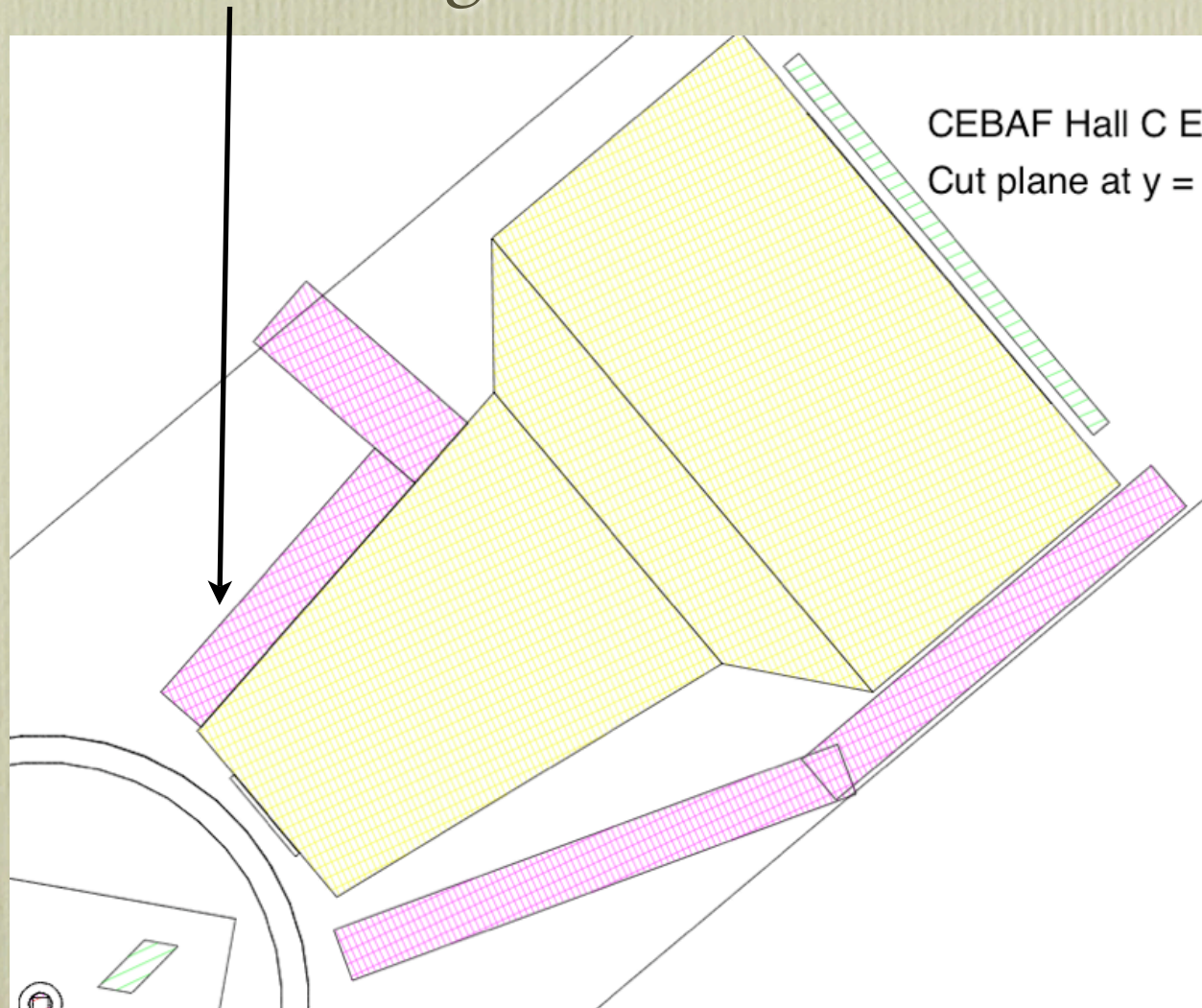- Some charged particles hitting Cerenkov
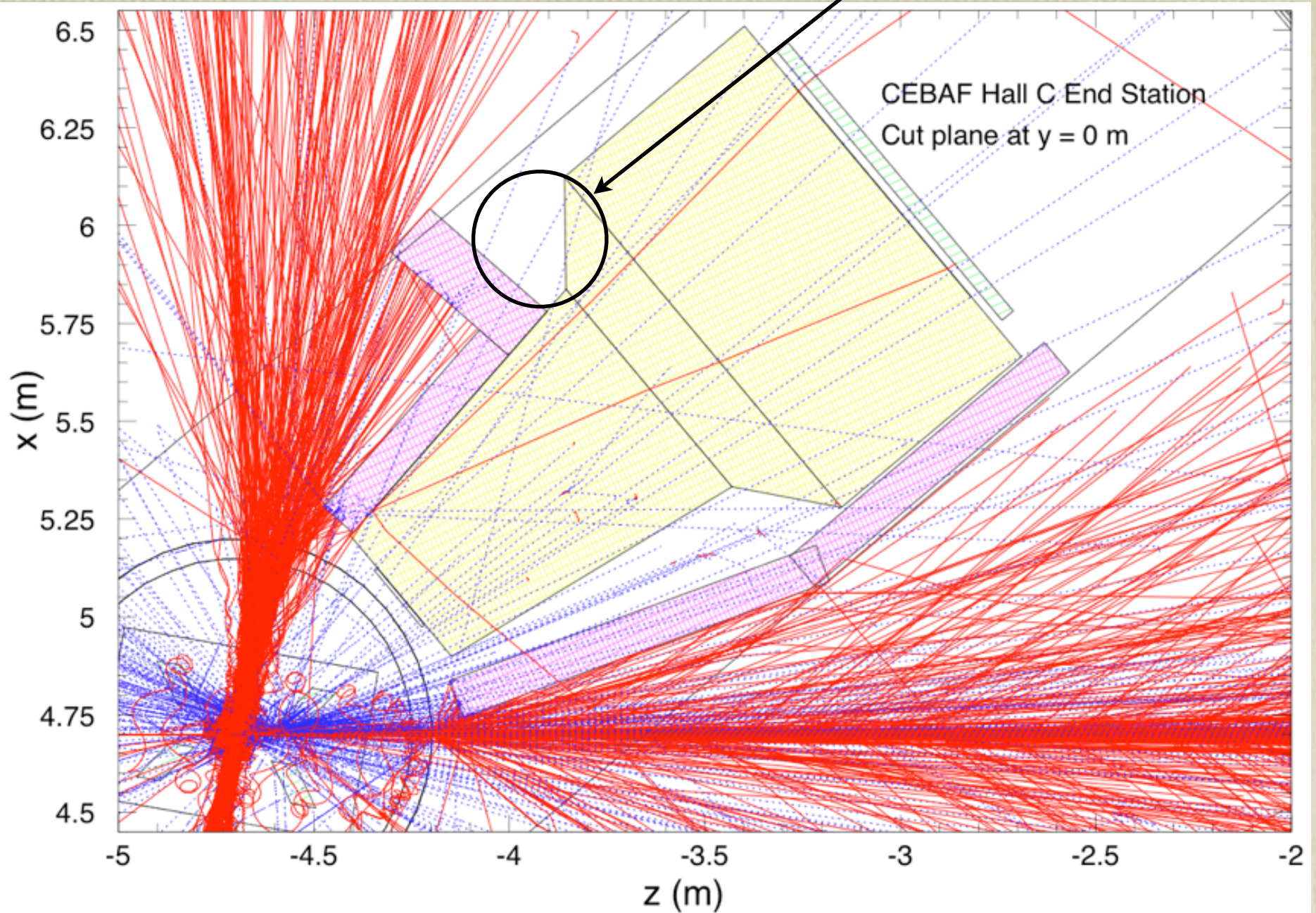
Perpendicular configuration

- The background from the target cell is a major issue.

- Single 15cm wall in front of PMT's is quite an effective shielding.

- Second shielding necessary to reduce charged particles inside the Cerenkov tank.
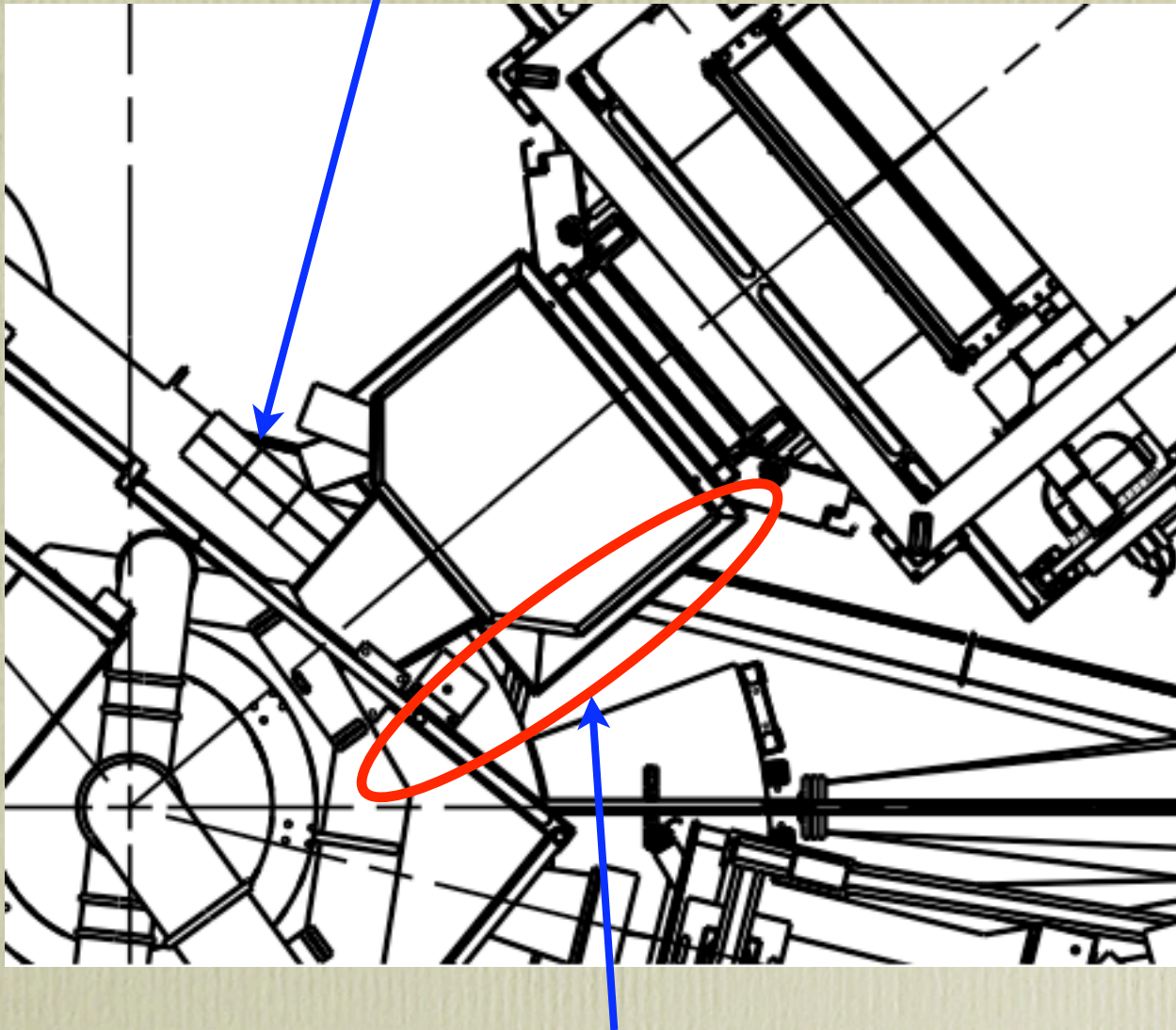
Additional Shielding
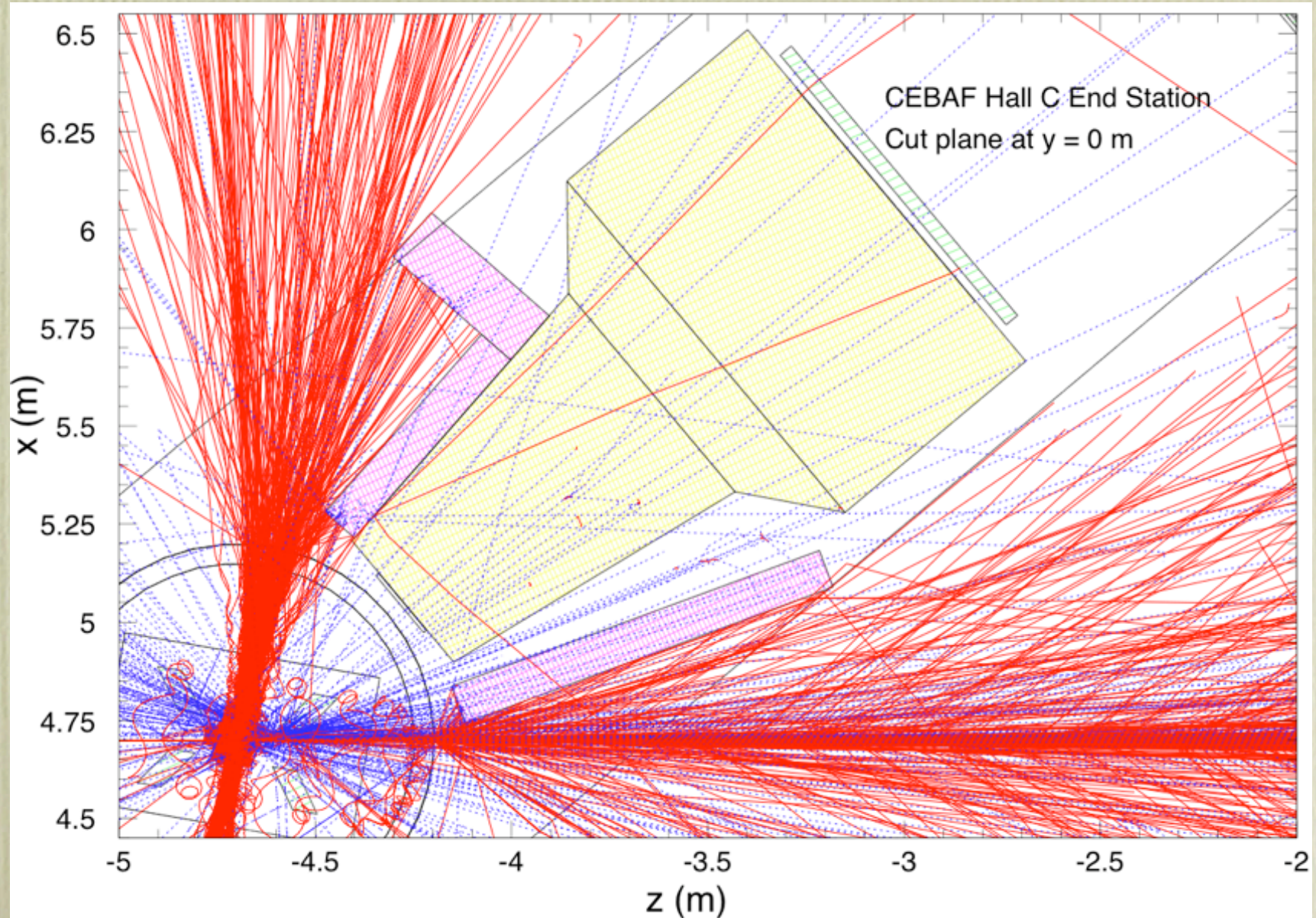
- 10cm Pb wall along the side of the Cerenkov

CEBAF Hall C Er
Cut plane at y = (

PMT Stack

CEBAF Hall C End Station
Cut plane at y = 0 m

x (m)

z (m)

15cm thick Pb wall on SOS pivot

Not enough space for shielding

Pb wall on SOS pivot only

CEBAF Hall C End Station
Cut plane at y = 0 m

Conclusions

- Usual Pb walls at various locations are quite effective for the protection of PMT's at both target magnet configurations

- Desirable to use thicker Pb wall in front the PMT's

- Possible to place all the essential shields on SOS pivot

- With proper shielding, **beam backgrounds are not an issue for SANE**.