

TMS Geom Validation

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Introduction

- Asa made updated geometry
 - Using updated engineering information
- Includes option to output hybrid geometry
 - X + UV planes
- See [PR here](#)
- I wanted to validate the geometry
 - We've had geometry issues before

Read a ROOT file

JSROOT version 7.7.5 31/10/2024

hybrid.root

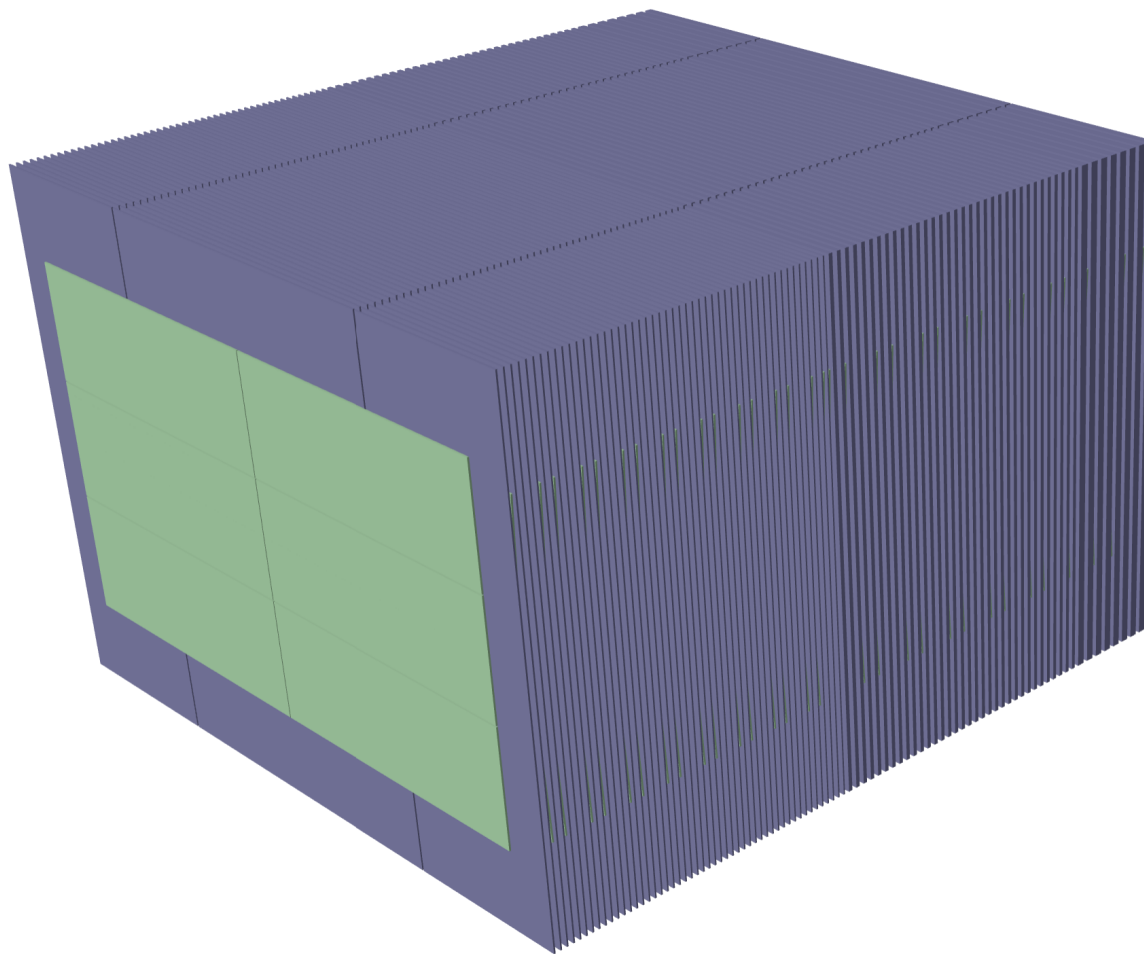
[Read docu](#) how to open files from other servers.

Load Reset simple ▾

[expand all](#) | [collapse all](#) | [clear](#)

- hybrid.root
 - Default;1
 - Materials
 - Media
 - volWorld
 - rockBox_lv_0
 - volDetEnclosure_0
 - volSAND_0
 - volTMS_0
 - volArgonCubeDetector_0
 - elevatorBlock_lv_0
 - craneRail1_lv_0
 - craneRail2_lv_0
 - egressHallway_lv_0
 - volfullCryoTubeBox_0

StreamerInfo



Loaded in [geometry viewer](#). (have to convert gdml into root file first)

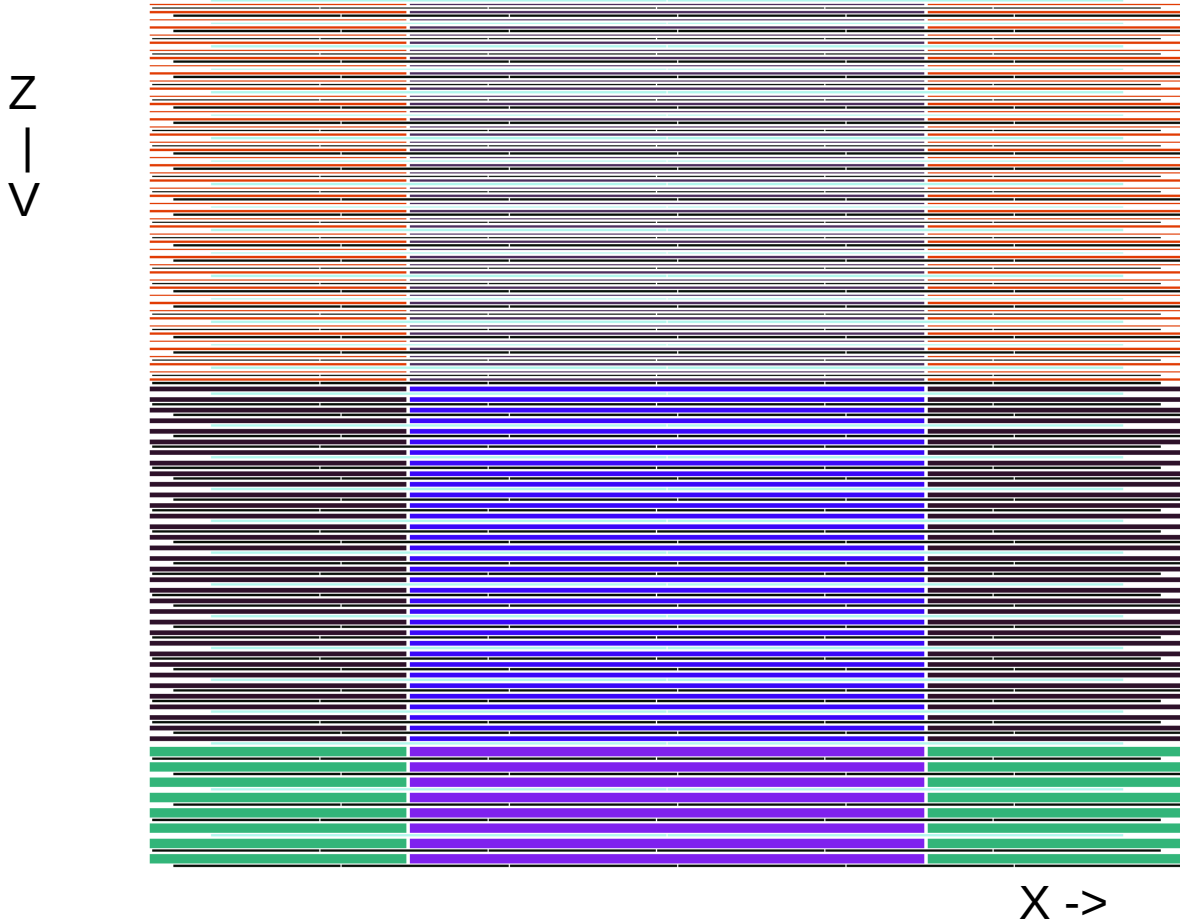
Issues with using viewer

- Can't see everything consistently
- No measurements
- Can't perfectly compare before and after changes
 - Difficult to align camera to the same positions

Solution: `brute_force_geometry_viewer.py`

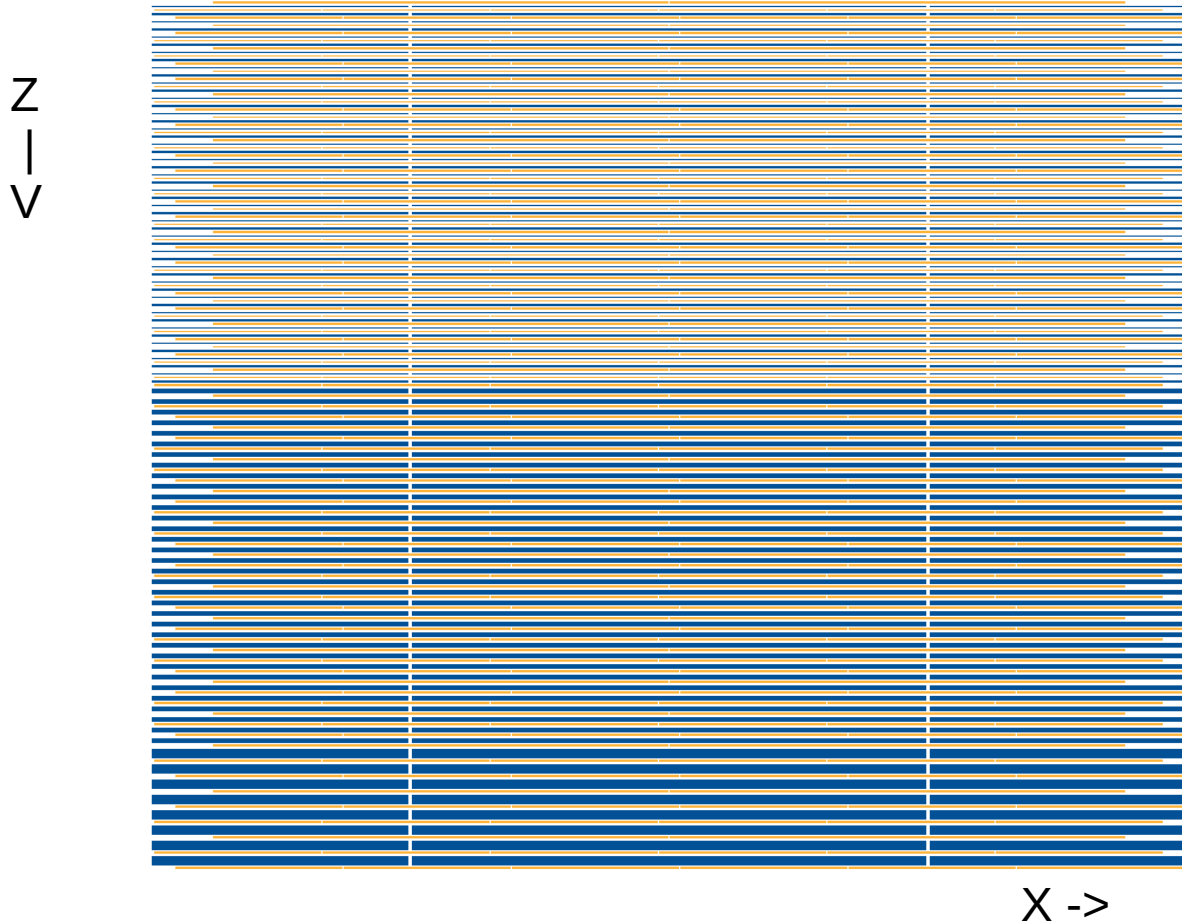
- Acts like a video game shader
- Each image pixel corresponds to a position in space
 - using the camera matrix
- Use `geometry.FindNode(x,y,z)` and give that node to a color function
 - This gives a consistent slice based on the matrix
- Currently have 4 color functions built in
 - random color, scintillator, material, density
- A bit slow – 13s per 1000x800 image – could speed up in `c++`

TMS XZ View



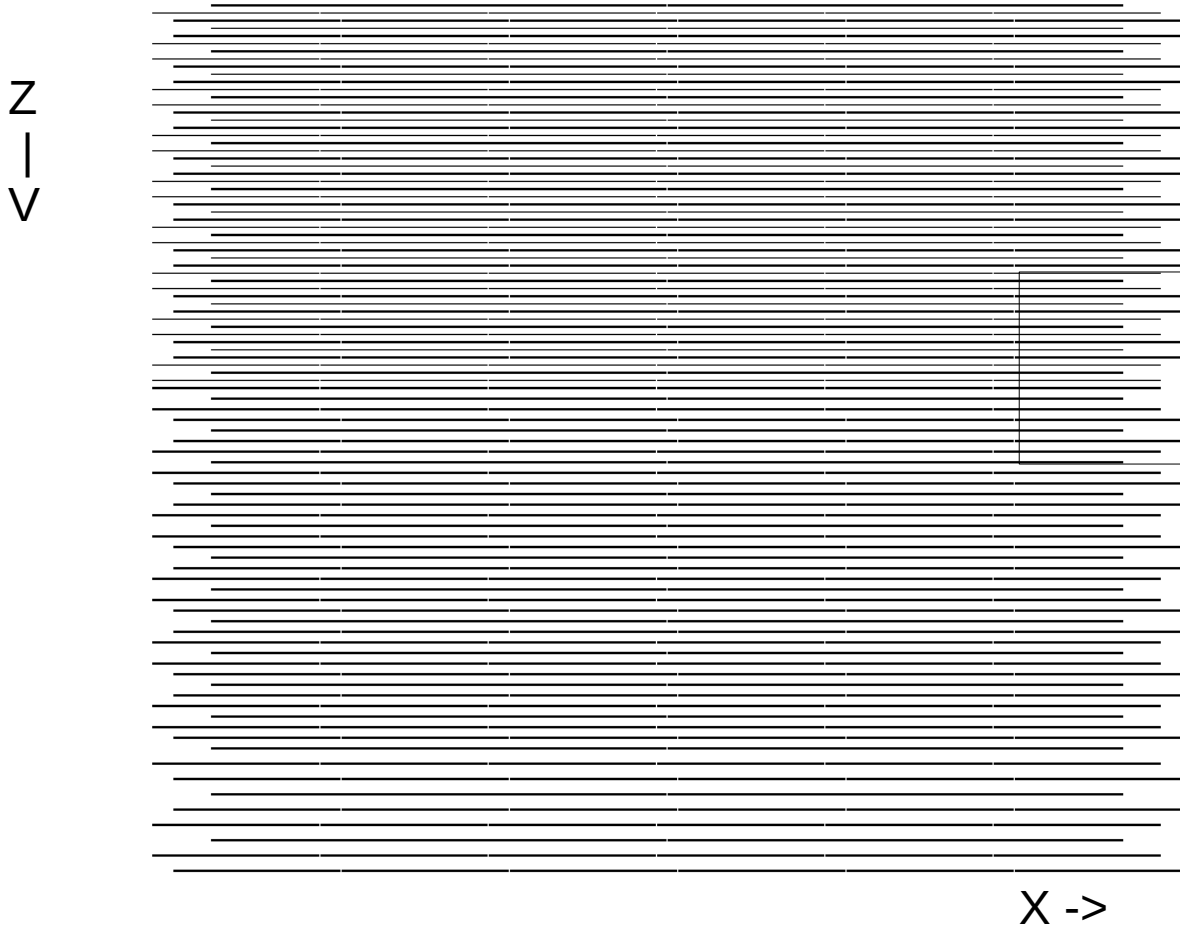
Air is white. Otherwise, colors are random based on material name. This gives you an idea of whether the materials are set correctly. In theory, I could add a legend. Later slides have an actual axis

TMS XZ View



Material view – Scintillator is orange and SteelTMS is blue

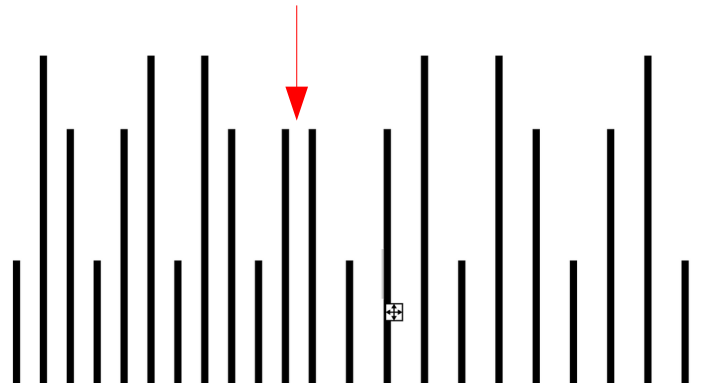
TMS XZ View



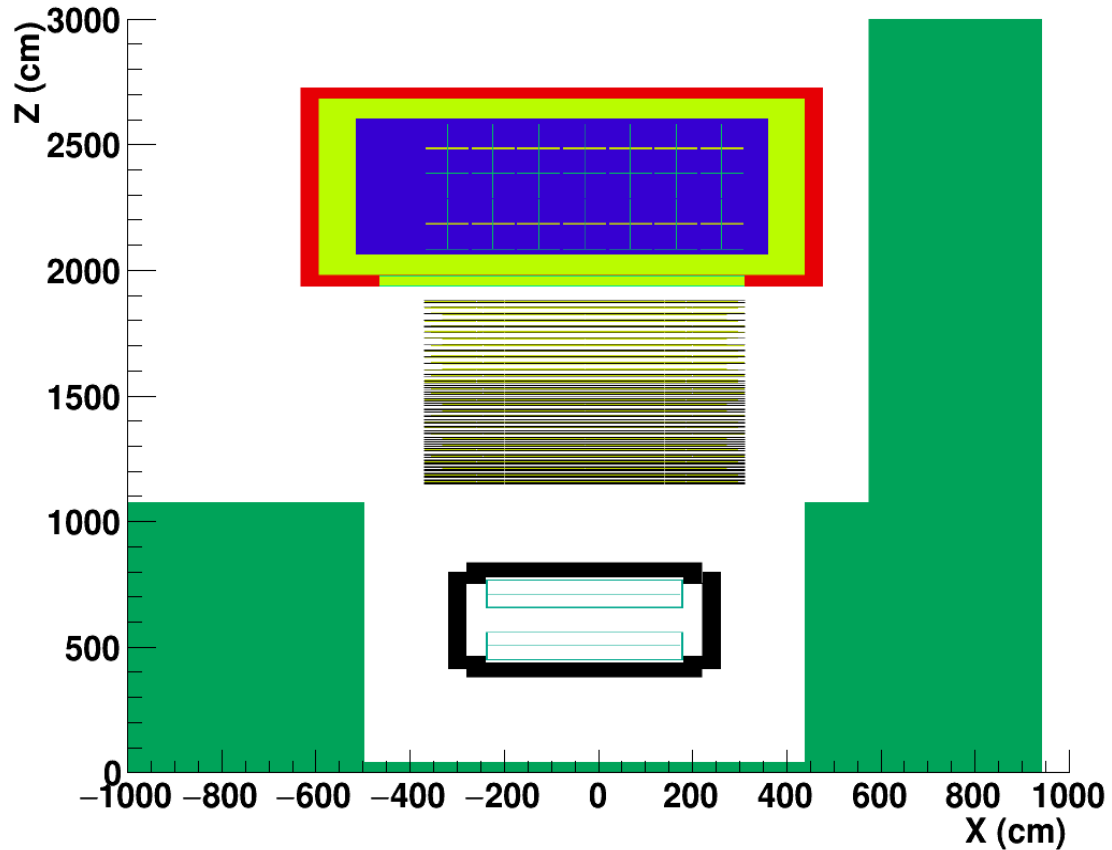
Scintillator only

This found the first bug. The pattern was assumed to be XuvXuv, but it's actually XuvXvu. This caused a jump when going from thin to thick. Which pattern do we want?

XUV XVU XUU XUV XVU XUV



TMS XZ View



Density view – Intensity is density and hue is atomic number

Just figured out how to include axis properly. We can add it to all of them in the future.

Conclusion

- Each image needs a transformation matrix and a color function
- Can make a comprehensive geometry validation package with a list of matrices (ie views)
- Need somewhere to put the code
 - scripts/validation directory in dunendggd somewhere?
- Currently the geometry validation validates the default, but the new geometry has two options
 - We need to allow for and validate both

Bonus slides about files

ND TDR files

- Official files should be stored in
/pnfs/dune/persistent/physicsgroups/dunendsim/
- Current quota is 50TB, but 37TB in use. A lot of “small-ish” folders and:
 - 16T cwret (<- confirming with Clarence whether these need to be kept)
 - 13T ndmuonspect (<- files used for TMS CDR studies, can be removed from persistent but should be backed up on tape)
 - 7.9T production (<- this is the 2022 MiniProd, may want to back up to tape once new production is ready)
- Where to store input files not produced “officially” but that we still want to keep (eg ND-LAr+TMS generated with different detector sizes)
 - Analysis files should be stored above
 - Mid-stages files (eg geant) on tape with appropriate metadata
 - Metadata declaration done through json:
 - Should declare all of our files to MetaCat and/or Sam irrespective if they are stored on persistent or tape
 - Will reach out to 2x2 to understand how they are currently handling this

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 - 16T cwret (<- confirming with Clarence whether these need to be kept)
 - 13T ndmuonspect (<- files used for TMS CDR studies, can be removed from persistent but should be backed up on tape)
 - Anyone using `ndmuonspect` (<- this is the 2022 MiniProd, may want to back up to tape once it is ready)
- `/pnfs/dune/persistent/physicsgroups/dunendsim/ndmuonspect`
- Where to store input files not produced “officially” but that we still want to keep (eg ND-LAr+TMS generated with different detector sizes)
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Storage Wars – Season 2

- Currently we track datasets on [the wiki](#)
- Looks like there are about 9.2 TB in my directory alone
- And Alex B stores the microprods
- And I know there are untracked files
 - Please add them – They may be useful to others
- Shouldn't there be an official location – and tape backup?

2.2G /exp/dune/data/users/mhandley/energy_angle_variations
1.4M /exp/dune/data/users/mhandley/full_hall_nosand_geometries
314G /exp/dune/data/users/kleykamp/tmsreco_combined_files
9.2T /pnfs/dune/persistent/users/kleykamp/nd_production
1.3T /pnfs/dune/persistent/users/abooth/nd-production/MicroProdN1p2
4.3T /pnfs/dune/persistent/users/abooth/nd-production/MicroProdN3p1
6.6T /pnfs/dune/persistent/users/abooth/nd-production/