

TOP and ARICH status and problems

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Status of TOP geometry

- Geometry defined
 - TOPGeoPar class used to access geometry parameters
 - Geometry defined as specified by TOP hardware group
- Quartz bar
 - Was/Is defined with TGeoXtru
 - TGeoXtru generates photon accordingly
 - Photons do not exhibit total internal reflection → dropped TGeoXtru
- New Quartz bar
 - Made out of BBox and TGeoArb8
 - BBox produces correct pattern on detection plane



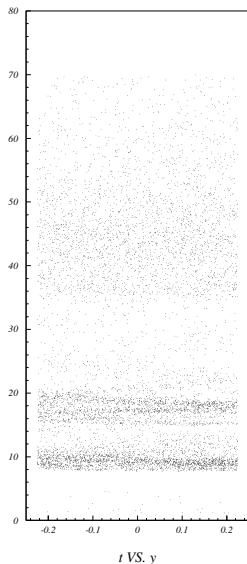
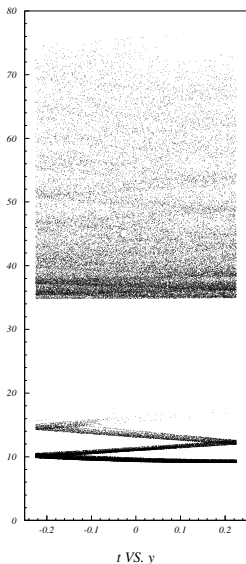
- Composition of $2 \times$ BBox and Prism closer to actual design
- Possible issues on contact of objects → have to investigate

Status of ARICH geometry

- Geometry defined
 - Correcting aerogel from hexagon tiles to new design
 - Test new tiles
- Peculiar error in saving hits
 - If a member of the datastore has a comment with `/*!` SimpleOutput modules does not save this to root file
 - However the during the simulation the variable is in datastore.

Test of BBox of TOP

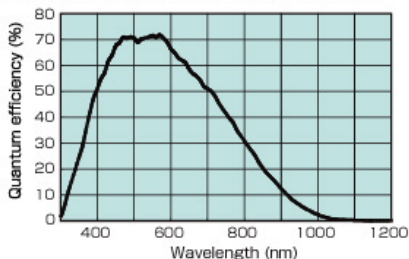
- Quartz Bar defined only as BBox
- No PMTs only detection plane
- Fire 100 π^+ at bar
 $\phi = 180^\circ$ $\theta = 90^\circ$
- Pattern seems OK
- Smearing in second part of signal because of missing mirror



Photon generation

- At present simulation generates real number of photons
- Actually this is too much

SPECTRAL RESPONSE CHARACTERISTIC



- This increases time → ray tracing
- According example picture above, we would like to discard approx. 30% of photons

What we have to do

- At present the range in which the optical photons are generated is defined by the material (XML range in which n is defined)

Suggestion

- Define the material generally
- Generate photons in range defined in Q.E.
- Scale number of generated photons to max Q.E.

Issue: How to kill photons (example 1000 π^+)

- No optics 4s
- All photons 58s
- StackingAction (kill 60% of photons) 24s
- Geant4 source hack (kill 60% of photons) 20s

What do you think?

StackingAction

- We kill only Čerenkov photons
- We leave the scintillating photons
- Luka Šantelj can prepare StackingAction and Andreas can add to kernel

TOP reconstruction

- Marko Starič working on reconstruction
- Reconstruction still in fortran → few months for porting (Marko has other work at the moment)
- At first we would like to test existing code in fortran
- any issue with linking fortran to basf2?
- If no issues Marko can make reconstruction work in few days after TOP simulation is complete

Summary

- Check which TGeoShapes are working
- Reduce the number of generated photons to speed up simulation
- Optical surfaces
- Are we going to employ different physics lists for each detector component?
- Is yes, can the detector as a whole be embedded in air with refractive index
- How to handle Q.E. and other electronics properties?