Subject: Cherenkov photons. Accuracy problem with Geant3
Posted by Maria Patsyuk on Wed, 27 Jun 2012 08:39:34 GMT
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Dear all,

while simulating the PANDA Barrel DIRC detector I faced different behavior of Cherenkov photons in the same geometry with Geant3 and Geant4.

More detailed I'm doing the following:

1. The geometry was created using a macro like the one attached (putting Root volumes into right positions, usually side by side), no overlaps in there.

2. Inspect with eventDisplay photons propagating inside the detector: with Geant4 photons don't see borders between the volumes (they are all made of the same material), with Geant3 some photons are stopped at the borders between the volumes (see snapshots from the eventDisplay - the first one is with Geant3, the second - with Geant4) - "accuracy problem" resulting into very different photon yield for Geant3 and Geant4. Photons in Geant3 see tiny "gaps" between the volumes due to the lack of precision and are stopped.

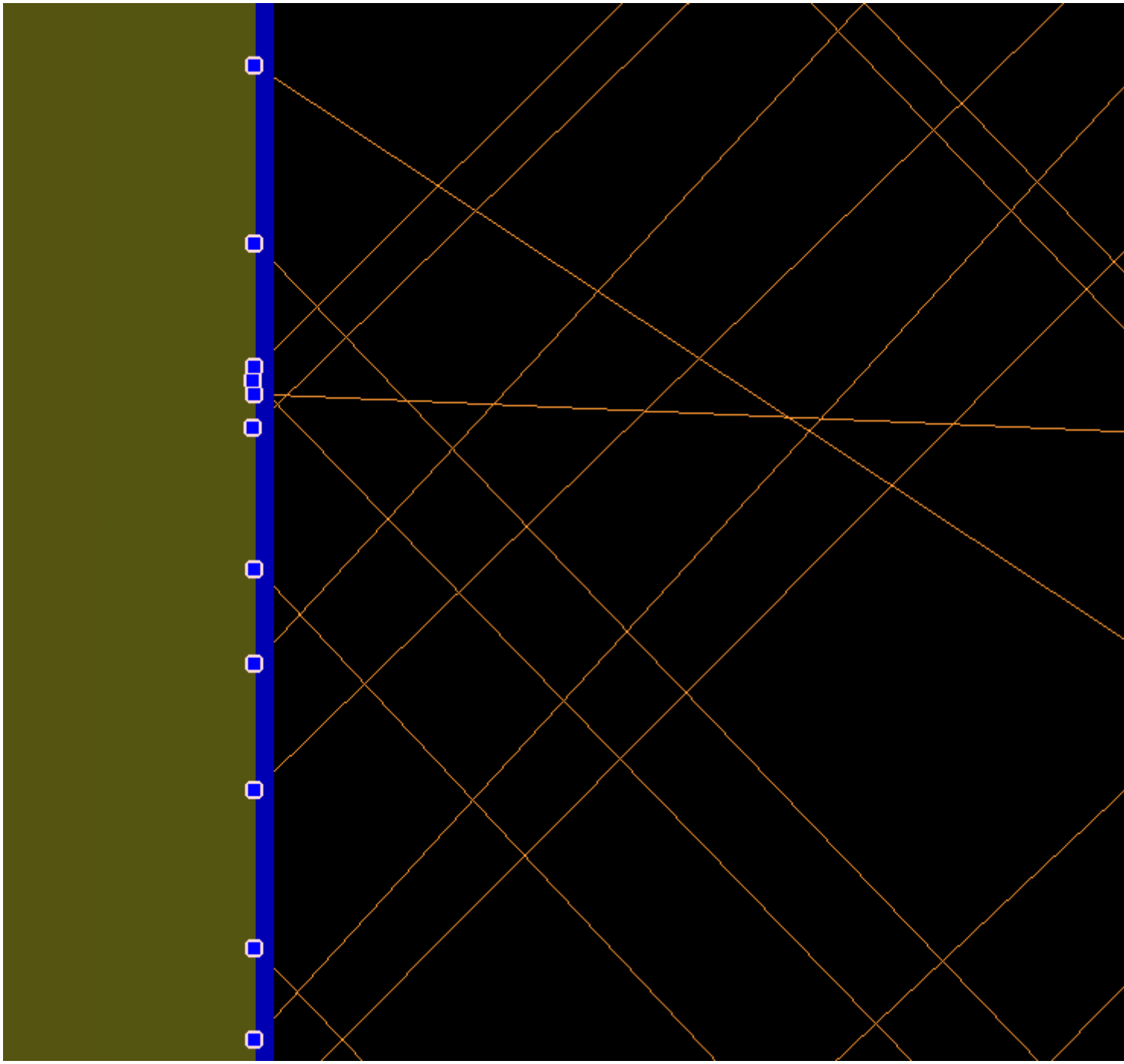
So my question would be - are there any settings for Geant3 to avoid such a problem (to make stepping smaller...?)? Do you probably know any other way to make Cherenkov photons in Geant3 not to be stopped between the volumes??

One solution Mohammad has proposed - not to place volumes side by side, but put them one into another, so that there is no "gaps" between them. This solution seems to be not very suitable for us, as we're testing different geometries and should be able to make quick changes, and putting volumes as daughters is not very convinient in this case. Moreover, that way is not very physical - we'd prefer to put the photo detector next to the radiators, as it would be in the reality, and not inside.

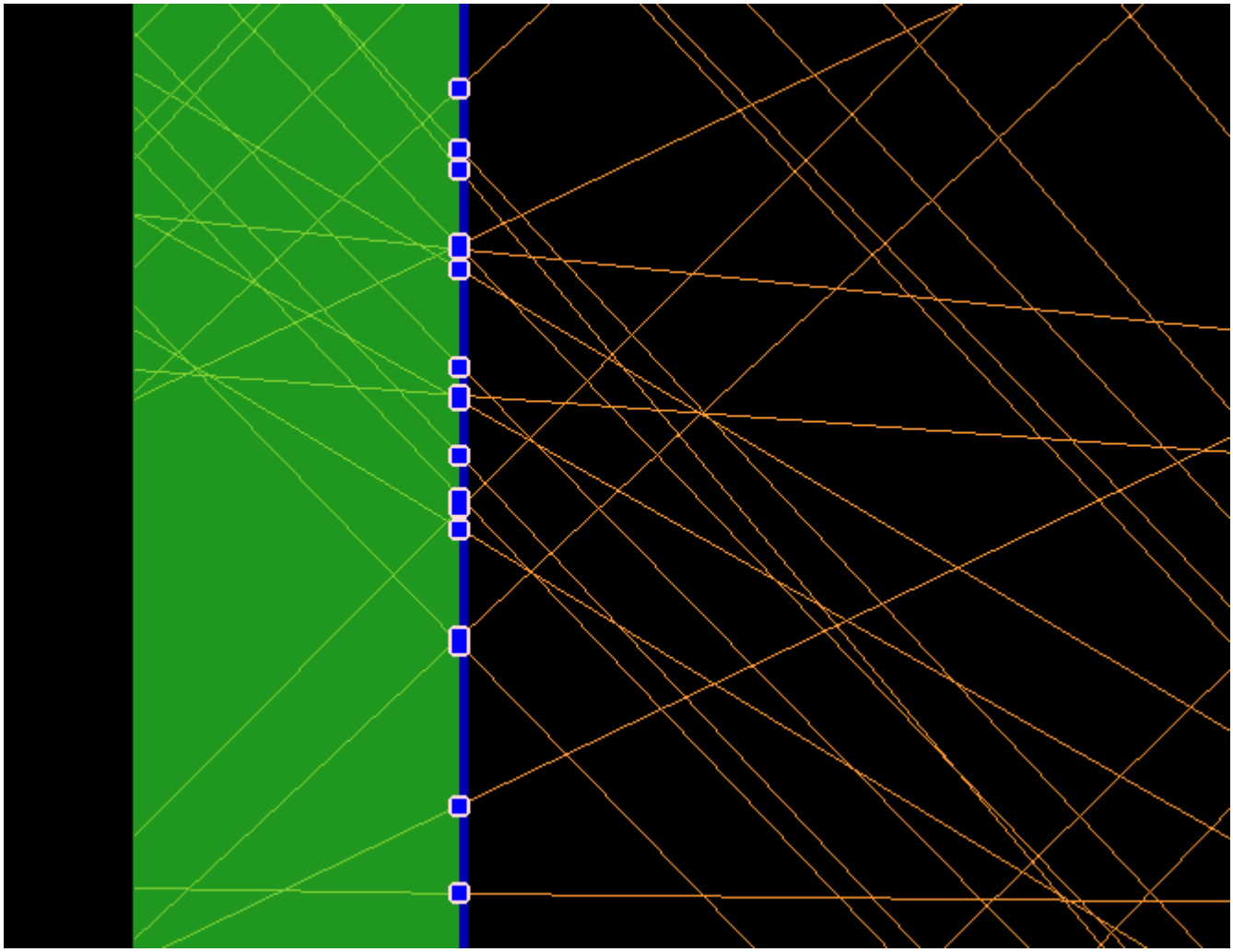
So any comments are welcome.

File Attachments

1) createRootGeometry_DIRC_sepEV_noGrease_bigPD.C, downloaded 505 times
2) Photons_onPD_g3_glueInsideEV.png, downloaded 1182 times



3) Photons_onPD_g4_glueInsideEV.png, downloaded 1322 times



Subject: Re: Cherenkov photons. Accuracy problem with Geant3
Posted by StefanoSpataro on Thu, 28 Jun 2012 15:41:20 GMT
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Dear Maria,
I remember there was a similar problem ages ago, when Annalisa was taking a look into Dirc code. The problem was not the material between the two volumes, but simply the edge of the volume itself. In optical properties I remember you could define if a surface was absorbing or reflecting or transparent dwpendently on some flag inthe materials,and the flag was different from g3 and g4.
This is not a answer, maybe you could try ask Ivana if Mohammad does not remember which was the solution at that time. Maybe there is something inthe forum, you could try to search for old Annalisa messages, but I don't remember if the solution was written there.
Hope it could help somehow.