Subject: Geometry of EMC Barrel Crystal
Posted by Christian Hammann on Fri, 18 Sep 2009 10:43:01 GMT
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Hi everybody

I'm new to Pandaroot and the EMC and started using the Simulation a few weeks ago. I noticed that the shape of the Crystals in the EMC Barrel in the simulation is not what I would have expected from the description in the TDR. The angles between frontface and the sides of the crystal do not match. Also the size of the frontface and the backface is different.
Is the shape in the simulation or the one in the TDR the correct one?

I use the geometry files emc_module1245.dat and emc_module3new.root. The crystal shape in the fwEndCap is the same in the simulation and the TDR.

Best Regards
Christian

Subject: Re: Geometry of EMC Barrel Crystal
Posted by StefanoSpataro on Fri, 18 Sep 2009 11:42:29 GMT
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The barrel geometry in pandaroot comes from a conversion of the Philippe Rosier drawings of almost three years ago.
As far as I know there were no changes with respect to that geometry.

Could you please show the difference between the geometry in the code and the one in the EMC TDR?

Subject: Re: Geometry of EMC Barrel Crystal
Posted by Christian Hammann on Fri, 18 Sep 2009 12:13:08 GMT
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I was looking at crystal 5 in row 1 copy 1 of module 2 which should be a type 1 crystal.
These are the coordinates obtained by doing an inspect node on the root geometry created by the simulation:

Front face:
point #0 : x= -1.64783 y= -1.25634 z= -9.99926
point #1 : x= -1.64783 y= 0.88266 z= -9.99926
point #2 : x= 0.49055 y= 0.88266 z= -9.99926
point #3 : x= 0.49055 y= -1.25634 z= -9.99926

Rear face:
point #4 : x= -0.88418 y= -1.25633 z= 9.99926
point #5 : x= -0.88418 y= 1.63001 z= 9.99926
point #6 : x= 2.04146 y= 1.63001 z= 9.99926
point #7 : x= 2.04146 y= -1.25633 z= 9.99926

This gives a frontface of 21.4 by 21.4 mm which is about 1mm smaller than it is in the TDR. Also it should not be quadratic, (not even rectangular) according to the TDR.

The backface has a size 29.2mm by 28.9mm which more or less agrees with the TDR but it should also not be rectangular.

From the TDR I expected that 2 of the sides have a right angle with the front- and backface, also the TDR is not very clear about this. This is not true with the coordinates given above, there only 1 side has right angles with the frontface.

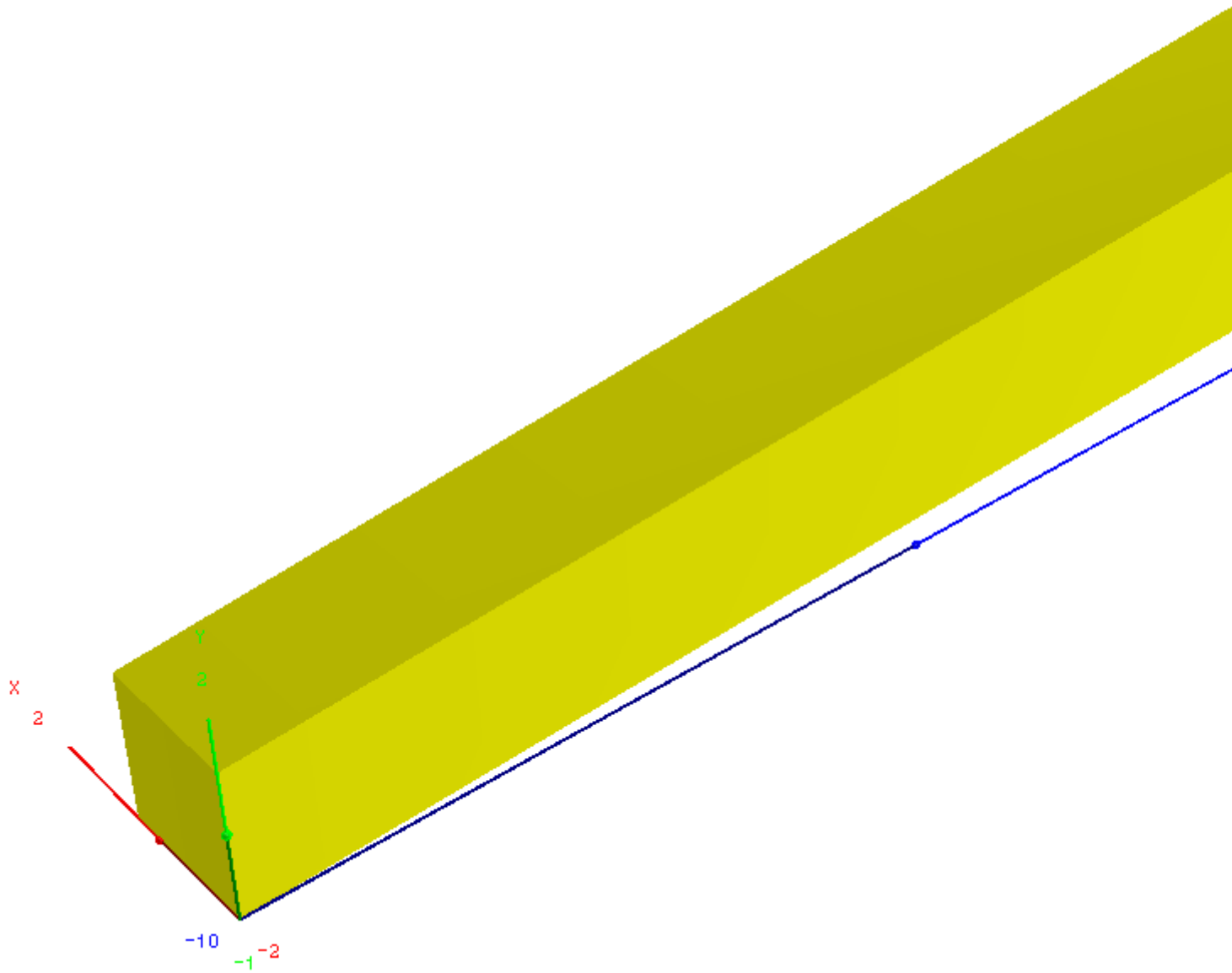
I have attached a view of the crystal from the simulation.

Regards

Christian

File Attachments

1) m1r1c5.gif, downloaded 1388 times



Subject: Re: Geometry of EMC Barrel Crystal
Posted by StefanoSpataro on Fri, 18 Sep 2009 12:58:56 GMT
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Christian Hammann wrote on Fri, 18 September 2009 14:13I was looking at crystal 5 in row 1 copy 1 of module 2 which should be a type 1 crystal.
These are the coordinates obtained by doing an inspect node on the root geometry created by the simulation:

Front face:
point #0 : x= -1.64783 y= -1.25634 z= -9.99926
point #1 : x= -1.64783 y= 0.88266 z= -9.99926
point #2 : x= 0.49055 y= 0.88266 z= -9.99926
point #3 : x= 0.49055 y= -1.25634 z= -9.99926

Rear face:
point #4 : x= -0.88418 y= -1.25633 z= 9.99926
point #5 : x= -0.88418 y= 1.63001 z= 9.99926
point #6 : x= 2.04146 y= 1.63001 z= 9.99926
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This gives a frontface of 21.4 by 21.4 mm which is about 1mm smaller than it is in the TDR. Also it should not be quadratic, (not even rectangular) according to the TDR.

The backface has a size 29.2mm by 28.9mm which more or less agrees with the TDR but it should also not be rectangular.

I have taken a look into the emc tdr, and I have found the numbers for crystal type 1. I compare the values (in mm) to what is present inside the pandaroot geometry definition:

Crystal	TDR	PandaRoot
AF:	21.21	21.38
BF:	21.28	21.39
CF:	21.27	21.38
AR:	29.04	29.26
BR:	28.75	28.86
CR:	29.12	29.26

There are some differencies, but everything is below 200um. Why do yo write "1mm smaller"? I do not think 0.2 mm can change something, maybe it could be good to check also the position. I repeat, the numbers are coming from an old drawing and as far as I know it was not modified. Maybe comments from emc geometry experts are required.

Subject: Re: Geometry of EMC Barrel Crystal
Posted by Christian Hammann on Fri, 18 Sep 2009 13:12:32 GMT
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Hi

sorry I think copied some wrong numbers from the TDR.
0.2mm probably won't make a difference.

But I am still a little puzzled by the less than 90 deg. angle between the frontface and one of the sides of the crystal.

You can see that angle in the picture above. (The bottom of the crystal is in the plane of the x and z axis) Is that correct? that seems not to be indicated in the TDR.

Thanks for your help

Christian

Subject: Re: Geometry of EMC Barrel Crystal
Posted by Philippe Rosier on Tue, 06 Oct 2009 06:48:50 GMT
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Dear Christian
To my knowledge the geometry between pandaroot and tdr are not the same. The geometry may have been created with George Serbanut from points of my CAD and translated to an IGES file that I gave to him.
In february 2008, I have reshaped all the crystals before the mass production and before the TDR writing.
This for 2 reasons 1-to get more space around crystals (about 50µm) as the first prototypes showed stress when inserting crystals (we never imagine additional thickness due to tapes for example) 2-the crystals now are packed alone in their alveoles (instead of by 4 as in the technical proposal in 2005), then the angles have been changed.
To conclude: The size in the TDR or in the database of the CAD created few days ago (see mail below with the link) are the same but as to be reinjected in the pandaroot.
Regards
Philippe

Mail sent to Jan Schulze and others...
Please note that you can find the CAD of the barrel EMC on the following directory (in official database):

http://ipnweb.in2p3.fr/~rdd/prv
login : rdd
password: !rdd1005

Later it could be on PANDA-EDMS software (developed by GSI) but for now this will be used for reference between all barrel-EMC-users.

There are the crystals CAD, with or without aveoles. Use the axes_PANDA (horizontal beam and vertical up lines) to position the crystals in PANDA reference frame (the absolute coordinate are in EMC crystals frame shifted of 37mm forward).
And the target spectrometer CAD as far as it has been defined by neighbor detectors teams around the EMC, but this file can also be similar to the one in integration directory in PANDA website.

For any question, you can contact me or Christine (clegalli@ipno.in2p3.fr)

Best regards
Philippe

****
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