Subject: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Mon, 16 Mar 2015 10:46:37 GMT
View Forum Message <> Reply to Message

Hi everybody,

I have some problems with the correction for the Doppler effect in my experiment. The target position was selected forward, and this makes the system very sensible for very small changes in the determination of the particle positions or the gamma positions.

I am comparing whether the crystal positions is calculated properly, because we know that there is a small rotation in the phi axis between the Legnaro and the GSI configurations of the AGATA detectors. The rotation from the original positions is 7.8 degrees in the Legnaro case, and 10 degrees in the GSI cases. I have two look-up tables in my hand, one is from the GammaWare software and the other is from the prespec analysis package. I see that the coordinates in the look-up table of the Gammware software are in agreement with the coordinates inside the femul software. But, the coordinates that the prespec software package uses are different.

I don't know if femul uses the original coordinates, or the coordinates that are already rotated 7.8 degrees for the Legnaro case. But, a rough calculation shows that the rotation is approximately 10 degrees between the two different look-up tables I possess.

Therefore, I was wondering if the rotation introduced in the coordinates of the prespec package is considered from the original positions of the detectors, or the Legnaro configuration. If, the person who performed the rotation considering that the coordinates are already for the original positions, but in fact they are for the Legnaro case, then the coordinates inside the prespec package should be corrected.

Maybe this issue addresses Michael. So, I would be grateful if you could inform me, Michael, regarding to the transformation you have done.

Thank you very much!
Tayfun

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by miree on Mon, 16 Mar 2015 17:28:06 GMT
View Forum Message <> Reply to Message

Hi Tayfun,

the position lookup table is used to transfrom the PSA hits from the crystal frame to the AGATA frame.
In the code I use the positions and rotations directly as they are defined in that in that file: 1 translation and 1 rotation. No further modifications or transformations.

Actually, there is one additional transformation that takes the coordinates from the AGATA frame of reference to the FRS frame of reference, but this is only swapping coordinates (x and y I believe).

As far as I know, the lookup table was provided by the AGATA community. I was assuming this is the correct one.

Best regards,
Michael

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by Damian Ralet on Wed, 18 Mar 2015 13:22:14 GMT
View Forum Message <> Reply to Message

Dear All,

The CrystalLookupTable allow to pass from the local referential (detector level) to the global referential (laboratory frame). The transformation need the crystal Id to associate the crystal position in the frame.

The table was generated in the Geant4 simulation code for the LNL campaign. I was not aware that they were two tables, but I hope we got the proper one.

The issue with the table between the LNL and the GSI campaign comes from the crystal labeling in the frame. The convention is I think different. The reason might be the position of the AGATA frame with respect to the beam axis, meaning forward at GSI, and on the side at LNL.

I think there is a rotation of 180Degree to performed between the LNL lookup table, and the GSI one. In addition, the axis need to be swap and opposite:
//x,y,z->-y,-x,z

I hope this help,
Cheers,
Damian

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Thu, 19 Mar 2015 10:16:08 GMT
View Forum Message <> Reply to Message

Dear All,
i dont understand.
It is not clear to me if the coordinates and in which approach are correct or not ?
Is it possible to check and state clearly if the methods and the geometry we are using are correct or not ?

Oliver

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by miree on Thu, 19 Mar 2015 12:08:30 GMT
View Forum Message <> Reply to Message

I'm also confused: I was not aware of any rotation.
However, the structure was able to rotate... and if it was a small amount it would not be obvious unless you have the target in the forward position as mentioned by Tayfun.

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Thu, 19 Mar 2015 13:46:20 GMT
View Forum Message <> Reply to Message

Dear all,

If we compare the coordinates of the first several crystals in both cases:

Lookup table inside the GW:

0	0	48.08390	31.04885	-227.95092
	1	0.45352	0.86888	0.19842
	2	0.86889	-0.48060	0.11858
	3	0.19839	0.11862	-0.97292
1	0	40.86042	88.71803	-213.76361
	1	0.64447	-0.74500	0.17214
	2	-0.73906	-0.54919	0.39011
	3	-0.19610	-0.37863	-0.90454
2	0	96.65970	58.36943	-206.11951
	1	-0.90585	-0.01692	0.42326
	2	0.09899	0.96308	0.25036
	3	-0.41187	0.26869	-0.87073
3	0	-14.67047	55.32513	-227.95092
	1	-0.68622	0.72558	-0.05146
	2	0.69982	0.67784	0.22535
	3	0.19839	0.11862	-0.97292
4	0	-71.74929	66.27595	-213.76361
	1	0.90204	0.29209	-0.31782
	2	0.38454	-0.87825	0.28426
	3	-0.19610	-0.37863	-0.90454
5	0	-25.64313	109.96598	-206.11951
	1	-0.37407	-0.92117	-0.10731
	2	-0.83092	0.28151	0.47991
	3	-0.41187	0.26869	-0.87073
6	0	-57.15075	3.14396	-227.95092
	1	-0.87762	-0.42045	-0.23022
	2	-0.43637	0.89953	0.02069
	3	0.19839	0.11862	-0.97292

Lookup table insdie the prespec an. pack.:

0	0	41.34692	39.57936	227.95091
	1	0.95033	-0.26615	0.16133
	2	0.23981	0.95660	0.16553

	3	-0.19839	-0.11862	0.97292
1	0	95.77207	19.18782	213.76361
	1	-0.56958	-0.70689	0.41938
	2	0.79820	-0.59745	0.07704
	3	0.19610	0.37863	0.90454
2	0	79.18105	80.50124	206.11951
	1	-0.11363	0.93294	0.34164
	2	-0.90413	-0.23965	0.35372
	3	0.41187	-0.26869	0.87073
3	0	-24.86530	51.55395	227.95091
	1	0.06560	-0.99203	-0.10758
	2	0.97793	0.04248	0.20459
	3	-0.19839	-0.11862	0.97292
4	0	11.34650	97.01402	213.76361
	1	-0.93514	0.34976	0.05632
	2	-0.29505	-0.85692	0.42266
	3	0.19610	0.37863	0.90454
5	0	-52.09293	100.18191	206.11951
	1	0.82476	0.51622	-0.23084
	2	-0.38746	0.81322	0.43422
	3	0.41187	-0.26869	0.87073
6	0	-56.71452	-7.71727	227.95091
	1	-0.90979	-0.34695	-0.22782
	2	0.36458	-0.93035	-0.03909
	3	-0.19839	-0.11862	0.97292

First of all, it is not clear for me what would the "small" coordinates mean, in other words, the coordinates with the id "0" make sense, but the ids "1, 2 and 3" are not obvious for me.

Well, if we compare the coordinates with id 0, then we immediately see that the z coordinates are swapped from -z to +z, from the GW to the prespec code, respectively. But, the transformation on x and y seem totally confusing. Damian, did you find out by yourself the transformation, or you were told by somebody else?

Does anybody know if the crystal numbering was changed from Legnaro to GSI? This information is required to focus on comparing crystal by crystal without worrying if also the crystals were scrambled.

edit:
sorry for the bad view of the coordinates, the tabs are not shown properly in the html, I guess.
I uploaded two file, so you can compare them with your favorite viewer.
So, the one with suffix __gw is from the GW, and the __orig is the one inside the prespec code.

File Attachments

1) Adapter.CrystalPositionLookUpTable__gw, downloaded 488 times
2) Adapter.CrystalPositionLookUpTable__orig, downloaded 472 times

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by miree on Thu, 19 Mar 2015 14:05:08 GMT
View Forum Message <> Reply to Message

In the prespec package, the transformation looks like this
(prespec/plugins/AGATA/process/AgataAdapter.cpp)

```
void AgataAdapter::Orientation::transform(int crystal_id, double x, double y, double z, double
&x_lab, double &y_lab, double &z_lab)
{
  // perform the full transformation:
  // crystal coordinate sytem -> agata array coordinate system -> frs cooridinate system
  y_lab = -(crystal_ori[crystal_id][0][0] * x  + crystal_ori[crystal_id][1][0] * y +
crystal_ori[crystal_id][2][0] * z + crystal_pos[crystal_id][0]);
  x_lab = -(crystal_ori[crystal_id][0][1] * x  + crystal_ori[crystal_id][1][1] * y +
crystal_ori[crystal_id][2][1] * z + crystal_pos[crystal_id][1]);
  z_lab =   crystal_ori[crystal_id][0][2] * x  + crystal_ori[crystal_id][1][2] * y +
crystal_ori[crystal_id][2][2] * z + crystal_pos[crystal_id][2] ;
}
```

You can see that swapping and minus signs are explicitly put here and are not part of the transformation matrices in CrystalPositionLookupTable.

As far as I know, the CrystalPositionLookupTable did change from Legnaro to GSI.

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Thu, 19 Mar 2015 14:33:32 GMT
View Forum Message <> Reply to Message

Dear All,
so if i understood correctly,
the coordinates of the crystals are taken from the LNL table and then
rotated to match with the prespec setup.
Why we do not take the precise measurements done from the mechanics group in 2012 determining the
crystal front face positions.
In my point of view, these measurements should be better than adapt old tables,
or is this already done ?
We need at least a precision of mm to do good measurements at high v/c.

oliver

In case it is needed
Please see the latest word file from the 2012 campain i have with the coordinates in the beamline coordinate system.
Who knows how to convert them into the AGATA coordinate system

File Attachments

1) 2012-09-20-186 AGATA-ph2-meng-rep-0003v2 survey of beamline components.doc, downloaded 491 times

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by Damian Ralet on Fri, 20 Mar 2015 07:58:07 GMT
View Forum Message <> Reply to Message

Hi Oliver,

The coordinate measured by the mechanic group might be more precise, but I am not sure if we can use these only.
The CrystalLookupTable allow to orientate the crystal and to position it in the global referential. The position of the crystal center, as given in the table might miss the rotation of the crystal along its z axis.
I think, the table from the mechanic is really useful to make sure that the positions determined by the CrystalLookupTable are good. We just need orientate properly the two coordinate system, and check the position center of each crystal. If this agreed in the 2012 campaign, they should be good as well for 2014.

Cheers,
Damian

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Fri, 20 Mar 2015 10:22:01 GMT
View Forum Message <> Reply to Message

Dear All,
the measurement of John Strachan is the exact position of cristal fron and back face.
This measurements must be used to analyze.
We cannot use an old LNL measurement rotate it and believe that it works at GSI.
At LNL we had no doubles and only triple cristals, and the mecanics is good but not perfect.

I dont know how the Lookuptable is created.
But it is extremly important to start from the measured points (they give front and back face of the cristals)
and transform it to compare it with the used table.

Somebody knows how the agata lookup table is created starting from the laboratory coordinate system used by Strachen?
In this system the AGASTA target, as i understood, is not in th 0.0.0 position but shifted,
Also this changes the analysis.

If there are differences bigger than some mm, then the doppler correction will not work good and the gamma peaks disapear and the lineshape will change.
I think this is an important issue.

Oliver

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Fri, 20 Mar 2015 10:22:15 GMT
View Forum Message <> Reply to Message

Hi all,

Michael, thank you very much for posting the related part of the code where the coordinate transformation is defined. But, these transformations are applied to the coordinates inside the Lookup table, if I'm not wrong. Then, one has to be sure here if the transformation is applied twice. Because, if the Lookup table coordinates are the ones that already transformed, and we make another transformation as we process them, then there will be a problem. Do we know who did provide these coordinates?

Oliver, thanks a lot for posting the document where the measurement results could be found. This might be a very good reference to understand if the crystal positions in the global frame are as same as with the ones after the proper transformation and/or/of the positions inside the Lookup table.

I think there is a good question asked by Oliver: How could we be sure whether we are using the right coordinates?

If we draw the hit points in x,y,z, from which perspective we should see them?

Since there is a 2.2 degrees of rotation difference in the phi axis due to the traslation of the array from Legnaro to GSI, how could we "see" this small angle difference? Let me remind you that the experiments in which the target position is selected forward and with high beta, small changes in positions and angles affect the analysis very much.

Cheers,
Tayfun

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Fri, 20 Mar 2015 10:43:36 GMT
View Forum Message <> Reply to Message

Dear all,
i did a simple test
(tell me if i am wrong)
i took the look up prespec table x,y,z and calculated the r distance
and as you see they look very much "theoretical" as they are all the same !
Then i took the table from Strachen Laser measuremnts at GSI,
and the cristal front face have different r, as ecpected from "real life".
(see list at end).
Frontface means if i understood correctly, front of cristal housing.
Written in the word document.

A second test i did now is to take serious the measured target position offset that wrote Strachen,...
and the 2plus state shows up better.

If this is true, that the measured positions are different from the tabled one, i think we have to reevaluate all lookuptable and we have a problem.
maybee a serious problem, if we continue using the old tables.
Who is able to take care of this problem ?

radius distanze

prespec lookup
235.0270515
235.0270487
235.0270439
235.0270429
235.0270428
235.0270419
235.0270416
235.0220086
235.0220077
235.0220057
235.0220053
235.0220049
235.0220048
235.0220035
235.0220026
235.0220014
235.0220008
235.0220005
235.0220005
235.0219985
235.0219984

Strachen 2012 measures
235.8678514
235.4930124
235.1198427
235.0128345
234.7970693
234.5157763
234.1244172
233.8492784
233.707791
233.5889812
233.366668
233.0576531
232.6759456
232.4498048
232.3274615
232.2338872

231.6427568
231.361688
231.2412362
231.1137296
231.0875362
230.9375023
230.4040869
230.1122638
230.086363
230.0175034
229.7865397
229.4736394
229.3584166
229.3414726
229.2368009
229.2167074
229.0517248
228.7686377
228.7648408
228.7026844
228.4926037
224.1008758
223.224044
222.7145377

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by Damian Ralet on Fri, 20 Mar 2015 12:02:07 GMT
View Forum Message <> Reply to Message

Hi Oliver,

The test is good, but in my opinion highlights that the two coordinate systems do not use the same center, which I noticed already with the Uranium Xrays.

I think I will try to give a look a bit more carefully at the relatives positions between the theory, and measured... but I see how much time I have in the next days, and try to come with some answer.

Cheers,
Damian

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Fri, 20 Mar 2015 13:05:32 GMT
View Forum Message <> Reply to Message

Dear Damian,
the point is not that they have a differnt distance,

(this can be corrected easily, the measured target position of Strachen and the table distance give an offset of approx 1.1 cm in beam direction and 3.6mm in x, which works good for our 2plus)
BUT the point is that they have ALL exactely the same distance !
This looks very much like a CAD or GEANT table, and not like a measurement.
The measured distances are different between each others of up to some cm.
This is only the distance ! So also (surely) the positions may vary, which is worse !
This means, in my opinion, that the table is NOT respecting the real setup !
This can have very big effects.

For this reason i think it is very important to have the correct table.

oliver

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by Damian Ralet on Fri, 20 Mar 2015 13:56:20 GMT
View Forum Message <> Reply to Message

Dear Oliver,

Sorry if i am not clear, but I completely agree with you that we need to find the a way to match reality (and not simulation).
The lookup table is a CAD design, not a measurement. I also agree that the positions are different if radial distances are.

Cheers,
Damian

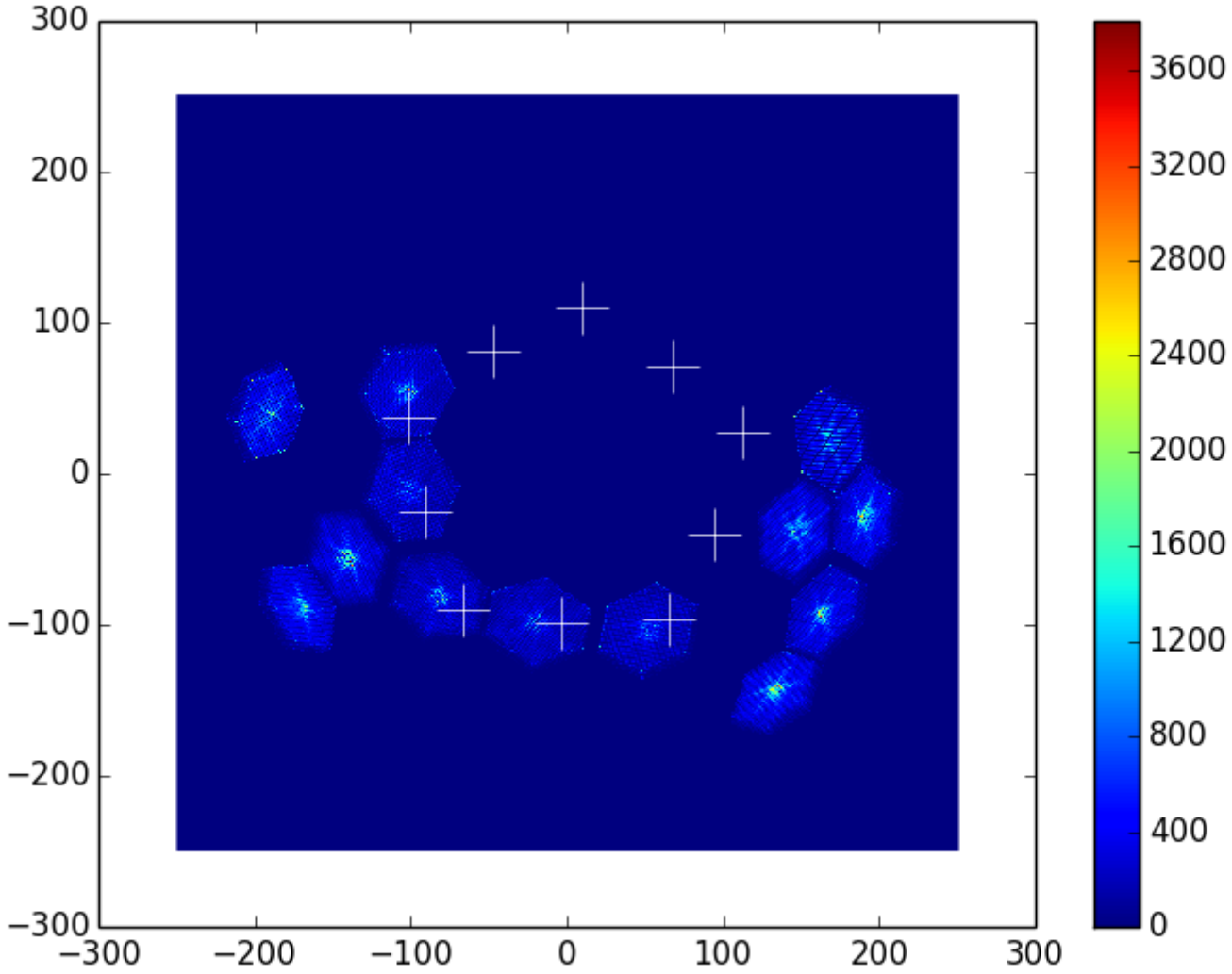
Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by Damian Ralet on Fri, 20 Mar 2015 14:23:18 GMT
View Forum Message <> Reply to Message

Hi All,

Just a plot of the lookuptable position (background hitogram) with respect to the measured position (in white +).
The difference is relatively important (few mm).

File Attachments

1) figure_2.png, downloaded 1047 times



Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by miree on Fri, 20 Mar 2015 15:57:33 GMT
View Forum Message <> Reply to Message

That looks indeed like a rotation ....

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by Damian Ralet on Sat, 21 Mar 2015 10:25:49 GMT
View Forum Message <> Reply to Message

Dear All,

Just a little update concerning the positions of the detectors. If you have any questions, please let me know.

Convention

I use the same convention as given in the mechanical report. THe beam is along the Y axis. The X is horizontal. The referential is direct.

Radial distance

I started to check the same thing as Oliver, i.e. the radial distances of the detector. Previously Oliver mention that the distance were different for the crystal. If we look at the systematic as a function of the crystal position in the X-Z plane (perpendicular to Y axis, the beam). The histogram is in attachement, the color scal highlight the radial disance:

If I now shift the target center with the distance given in the report, we get a uniform radial distance, the difference in the color scale is in the order of 10^-4 mm. THe bin weights are taken here as the ratio of the corrected radial distance over the mean of the radial distance (after target repositioning).

Angles

If we know consider the spherical angle theta and phi. we can see a phi rotation of about 7 degree. The following figure highlights this rotation in the X-Z plane. The background histogram is the detector positions given in the crystalLookupTable, and the '+' dots are the measured positions. The 'x' are the measured positions after a rotation of 7 degree.

Conclusion

There is a rotation, and we need to adjust the frame positione properly in order to adjust our crystallookuptable to the measurement.

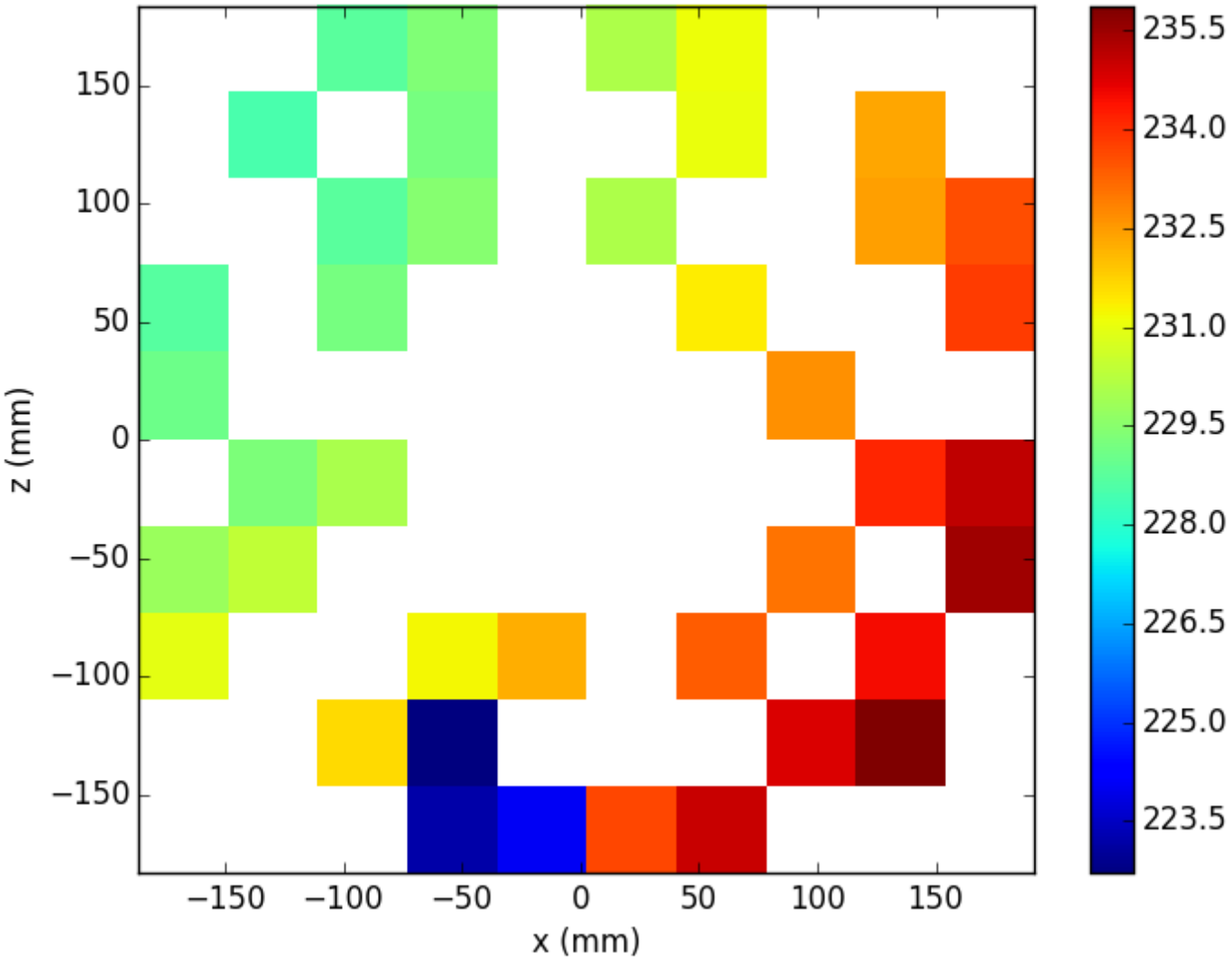
TODO

The angle of 7 degree is a visual estimation, I need to get sth more precise, even if a rotation of phi does not influence the Doppler correction.
The theta angle seem a bit off for the triple, while it look quite good for the double. There might be an other adjustement to perform.

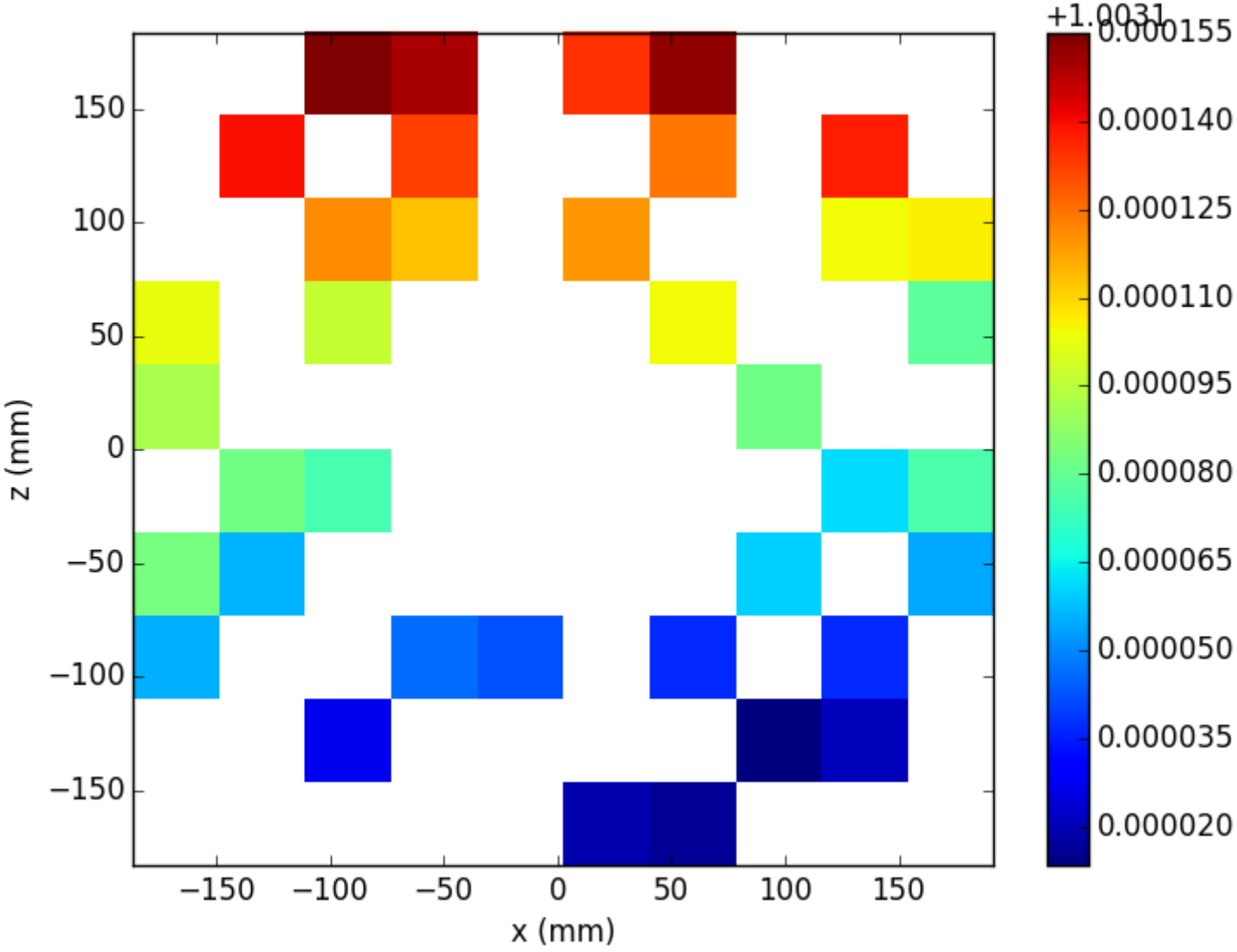
Cheers,
Damian

File Attachments

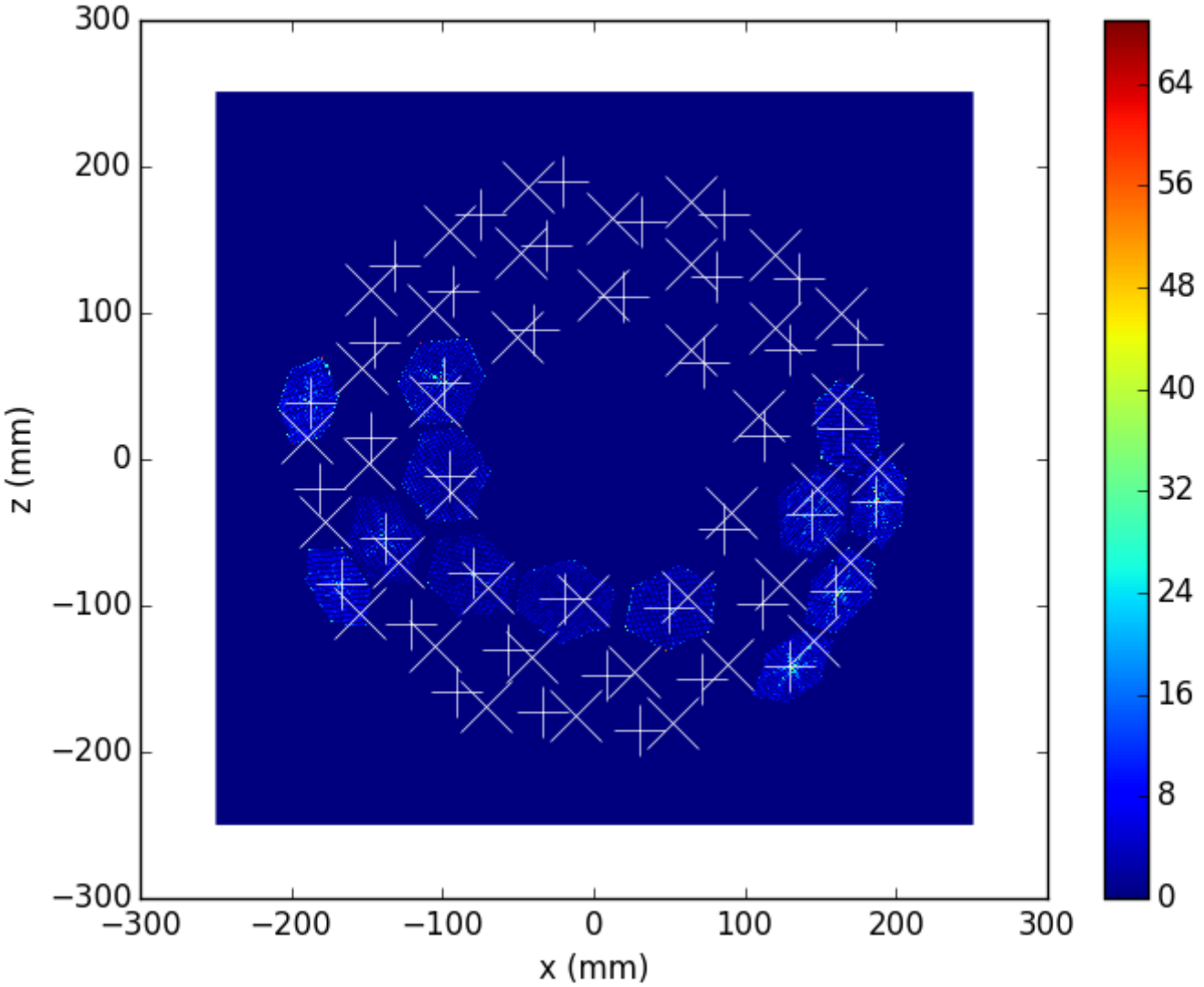
1) Radial distance_noCor.png, downloaded 1591 times



2) Radial distance_Cor.png, downloaded 1605 times



3) rotation_phi7.png, downloaded 1449 times



Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Sat, 21 Mar 2015 16:57:10 GMT
View Forum Message <> Reply to Message

Dear Damian,

we did now the rotation and x,y,z shift of target as proposed from mecanical measures and the 2 Plus state comes out VERY VERY nice now after mgt tracking !!!!
Great improvement and practically a Breakthrough !

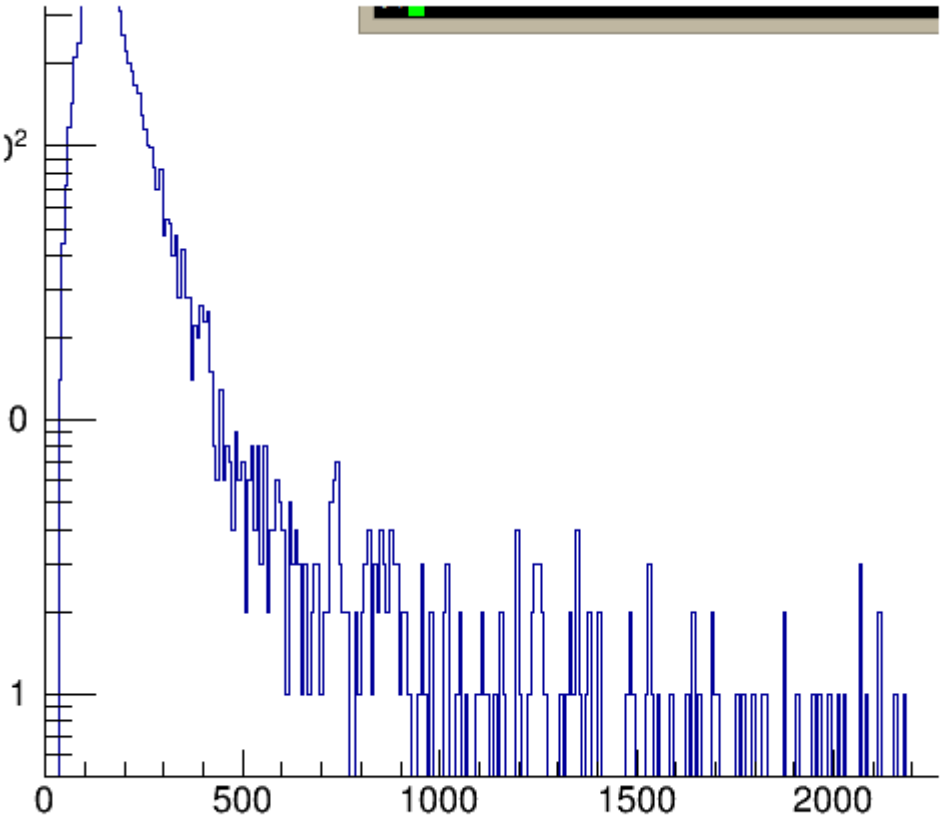
Oliver

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Sat, 21 Mar 2015 17:18:11 GMT
View Forum Message <> Reply to Message

Have a look at our 2plus (at 746kev, and even the 1240kev state) in 64Fe now, from the 2012 measurement.
I think this is an important improvement.

File Attachments

1) 64fe_400aMeV_after_targetshift_and_xy_agataRotation.png, downloaded 1025 times



Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Mon, 23 Mar 2015 07:57:45 GMT
View Forum Message <> Reply to Message

Hi all,

Oliver: Did you just adopt the measured distances into the look-up table? Did you do any modification in the transformation routine inside the code (in case if you are using the prespec data analysis package)?

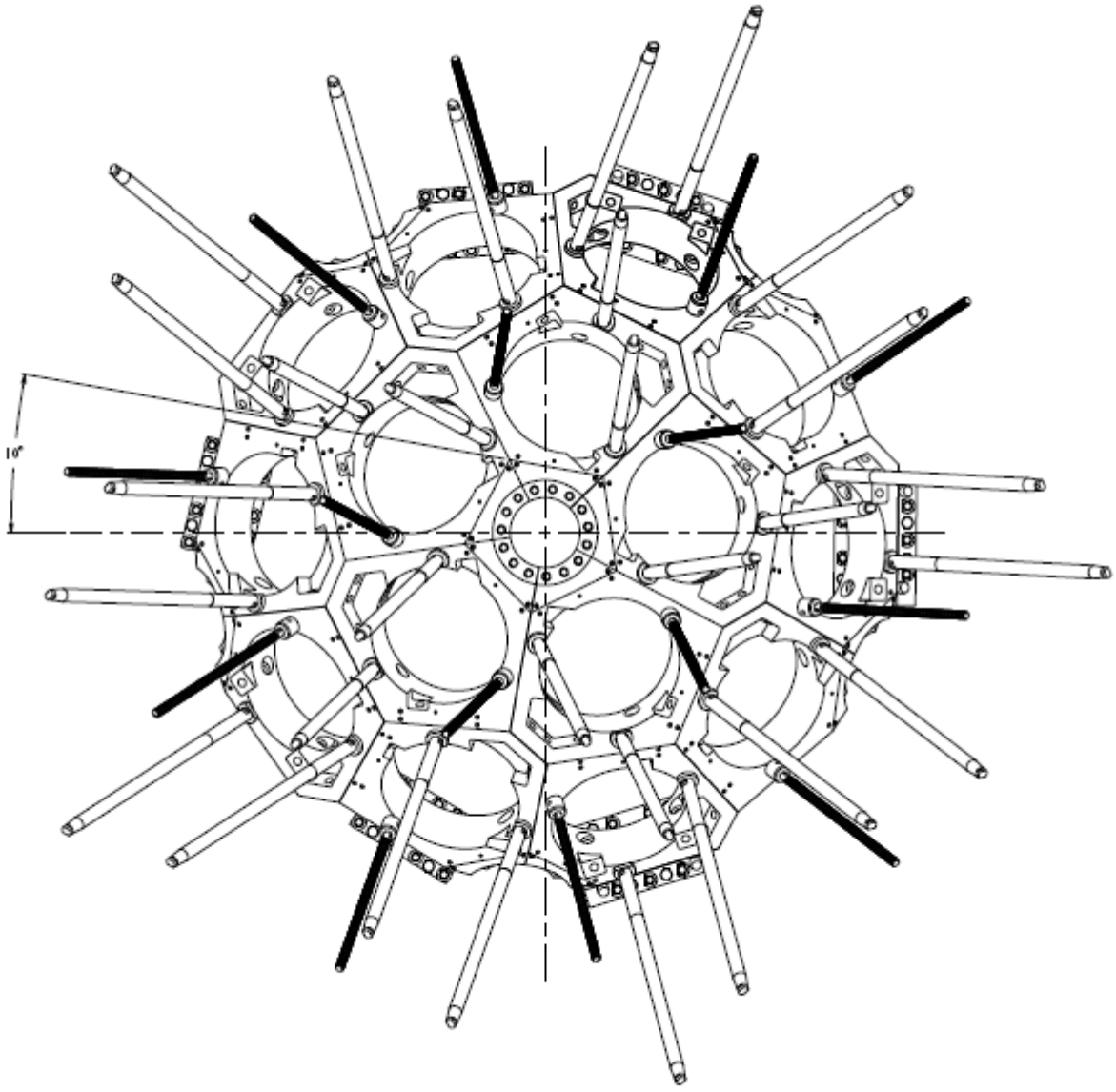
Damian: Thanks a lot for the report and the nice drawings. Please find attached the technical drawings where the rotation is seen in Legnaro and in GSI configurations. In contrast what you stated, I think the rotation in phi axis would spoil the Doppler correction, especially in the outer circle of AGATA. Well, maybe I tend to be a bit more careful since we selected the target at the forward position.

agata_rotation_0.pdf -> Legnaro configuration
agata_rotation_1.png -> GSI configuration

cheers,
tayfun

File Attachments

1) agata_rotation_0.pdf, downloaded 536 times
2) agata_rotation_1.png, downloaded 959 times



Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Mon, 23 Mar 2015 08:50:51 GMT
View Forum Message <> Reply to Message

Dear Tayfun,

we (Riccardo and me) did something really simple.
we did not change the lookup table.
We let it as it was in the package and did all transformations afterward.
Otherwise it will get very confuseing.
Using the prespec package from Michael we printed out the psa data (taking care of the 1.3cm shift measured from Plamen).
then apply a simple rotation (in positive direction - please try out both directions to rotate- using rotation matrixes it is easy to rotate in the wrong direction using different refernce systems, then take the direction that produces better results, try 7 to 8 degrees (visual estimation with basic tools on a paper plotout measured) in the x,y plane (agata coordinates) and target z-shift of the few mm (Riccardo please correct me if it is wrong).
Finaly we gave the coordinates to the mgt code directly (doing additionally the x,y target coordinate shift to correct the source position).
And this worked much better than we did until now.

please try

cheers
Oliver

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by miree on Mon, 23 Mar 2015 13:40:07 GMT
View Forum Message <> Reply to Message

Hello everybody, that is good news!

We added the possibility to rotate the PSA coordinates after the transformation (as described by Oliver) to the AgataAdapter by introducing the parameter "frame_rotation" in the parameter file. It is given in degrees.

About the shift:
I agree that for the z-position during Doppler correction one can take the (measured) location of the target along the z-axis, relative to the AGATA center.
But for (x,y): Is not the position of the target-DSSSD the important one for Doppler correction? The event-by-event (x,y) position comes from the DSSSD. Was the DSSSD position also measured? In the table posted by Oliver I didn't see any DSSSD measurement. How did you get the (x,y) displacement?

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Mon, 23 Mar 2015 14:17:42 GMT
View Forum Message <> Reply to Message

Dear Michael,
thanks for the modification.The x.y targeshift is a test of the few mm is very little and makes very little effect (but it does, so for lineshape measurments it is crucial) to the line shape.
I dont know if the target dssd was aligned to the target. Maybe Plamen knows.

To insert the rotation inside the code is good.

But one has to carefully check if with this rotation the coordinates finaly correspond to the real measurement.

How many degrees ?

We tested 7,7,5,8,5 degree. 7.5 was up to know the best.BUT as written before,
if one is able to check the final coordinates, so we may fix this value.

Oliver

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Tue, 24 Mar 2015 10:17:38 GMT
View Forum Message <> Reply to Message

Dear all,

After looking at the drawings that Damian did, and compare them with what I get with the current CAD-lookup table, I see that the whole array suppose to be swapped in the horizontal axis.

These are the positions in the measurement report that Oliver sent:

These are the positions of the crystals reported by -probably- Plamen before:

Sorry for the poor quality of the second image, I didn't have it in soft copy and had to take a photo of the hard copy. What I get with the CAD-lookup table is pretty much look like this. I intentionally didn't put what I get, but put this image, since the cryostat numbers are given there.

My point is that the cryostat number 1 in the second image does not correspond to the cryostat number 5 in the measurement report, but it seems to me that it corresponds to number 2.

My idea is supported by looking at the number 4 and number 12 in the second image that they have a touching edge, but number 3 and 8 don't have a touching edge in the image that is inside the measurement report. Is it true what I'm saying?

I think we should be careful with this too, since the array has no symmetry according to the vertical axis. The detected angles would be different than the real angles, and this is something that we cannot survive with.

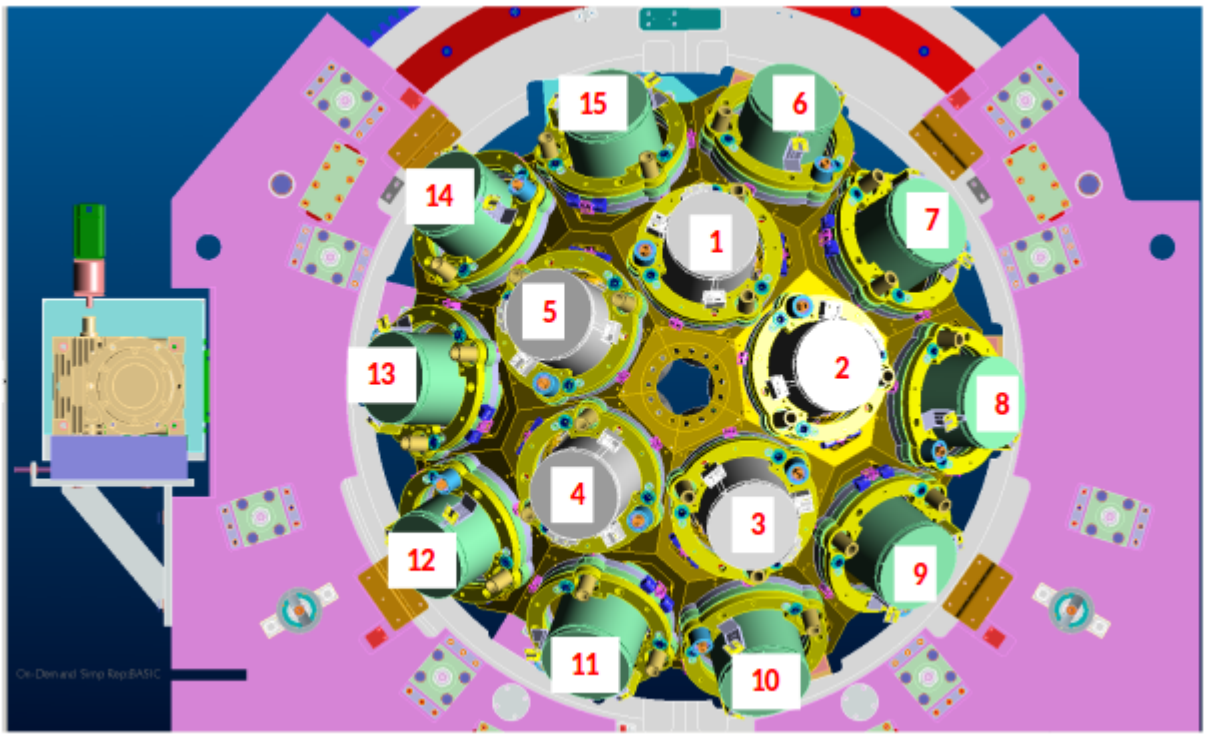
cheers,
tayfun

P.S.

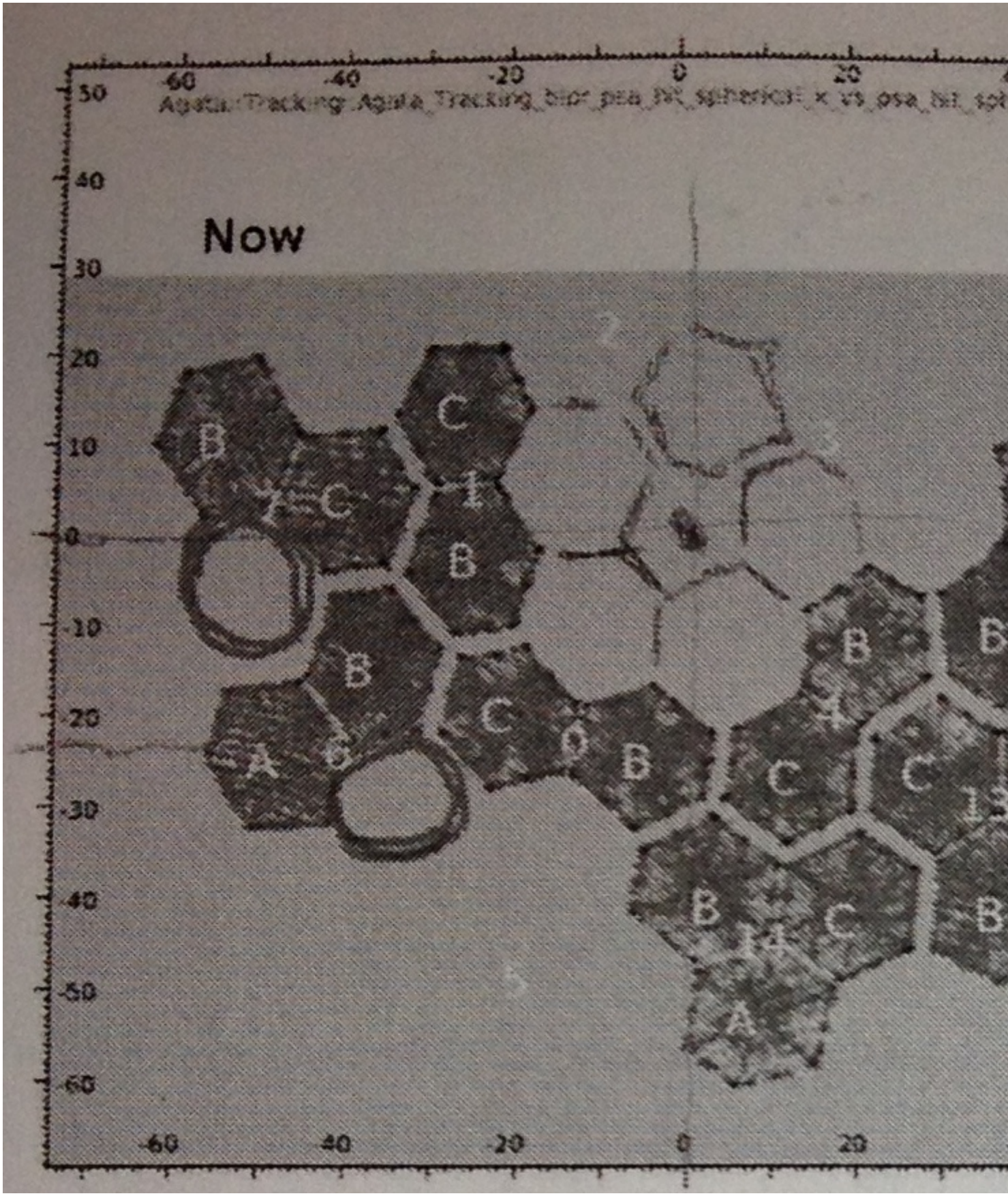
I just found another drawing that Damian sent to me in our private communication. The positioning of the AGATA detectors there also suggest that we should swap the horizontal axis. I didn't get the permission from Damian, but I think he will be OK that I put the image below:

File Attachments

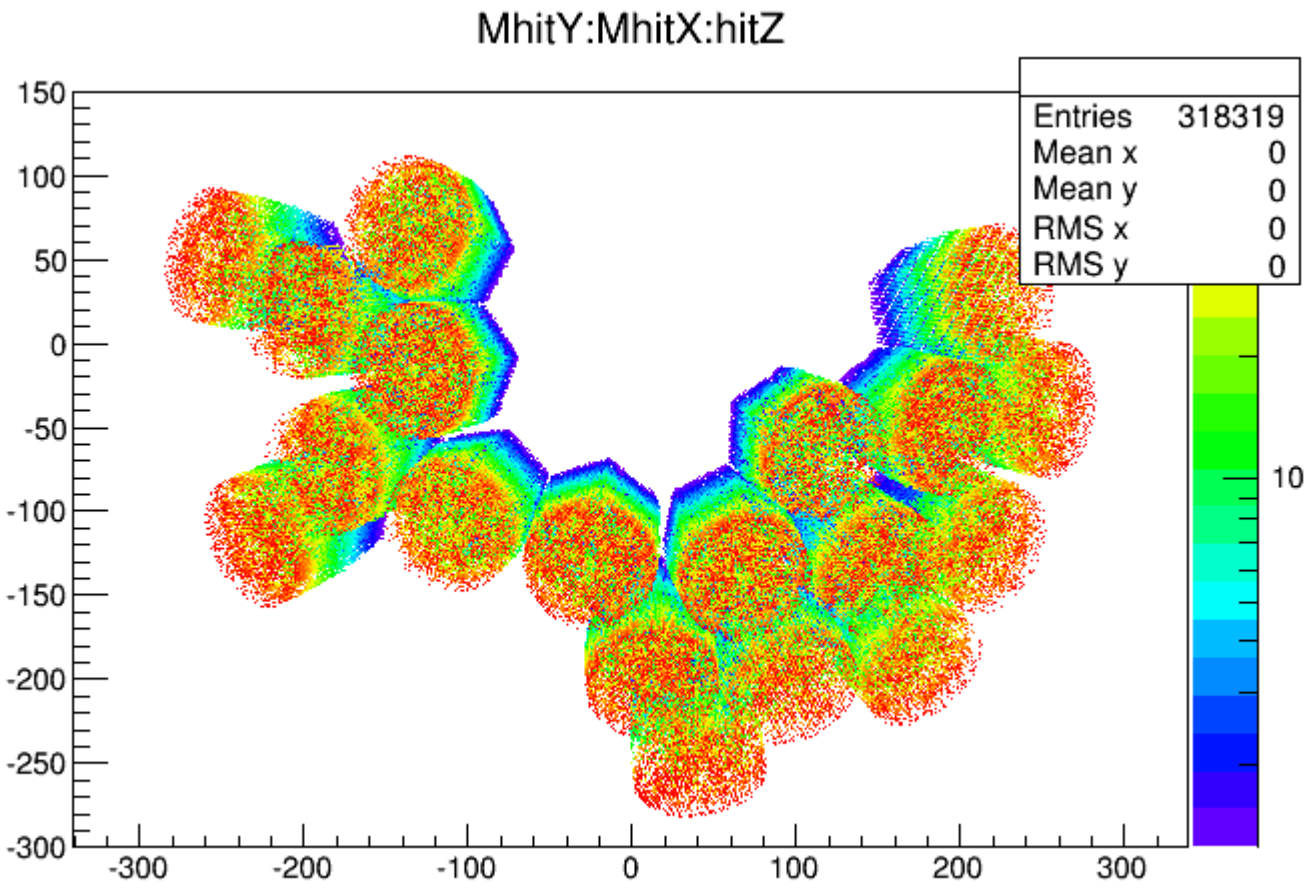
1) agata-report.png, downloaded 1501 times



2) Photo 24-03-15 10 58 45.jpg, downloaded 1882 times



3) hit_position_depthCryst.png, downloaded 1539 times



Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Tue, 24 Mar 2015 11:51:52 GMT
View Forum Message <> Reply to Message

Hi, again,

After what Michael wrote regarding to the unknown position of the Target DSSSD in the measurements report, I remember that the hit points suggest a small shift in the -x axis in my experiment:

The centroid seems to have an offset of ~-3 mm in the x axis. The y axis seems fine.

Maybe the detector positions were not certain and there were "small" offsets in reality with respect to the theoretical positions. Is there any way that we can confirm the exact positions of the detectors?

I concern about another thing: I don't understand what these numbers suppose to mean inside the lookup table:

0 0 41.34692 39.57936 227.95091

1	0.95033	-0.26615	0.16133
2	0.23981	0.95660	0.16553
3	-0.19839	-0.11862	0.97292

I don't understand what would mean the numbers that the absolute values are smaller than 1.

I also want to make another point clear regarding to what Michael wrote:
Thanks a lot for including the rotation part, but, since we have the exact measures in the lab frame, does it really necessary to make transformations inside the code? Would it be better to include only the offsets with respect to the "theoretical positions"?

If I'm following the whole conversation properly, one needs to create a new lookup table with the measured values, and take the x,y,z values given inside the report as -x,z,y; could someone confirm this?

Another point that I think I didn't get: Oliver wrote that the AGATA target position has an offset of 1.1 mm in the beam downstream and 3.6 mm in the horizontal axis. I didn't see this offset inside the report. Only thing that I can see is this:

Agata array target	3.6	-2.9	-2.7

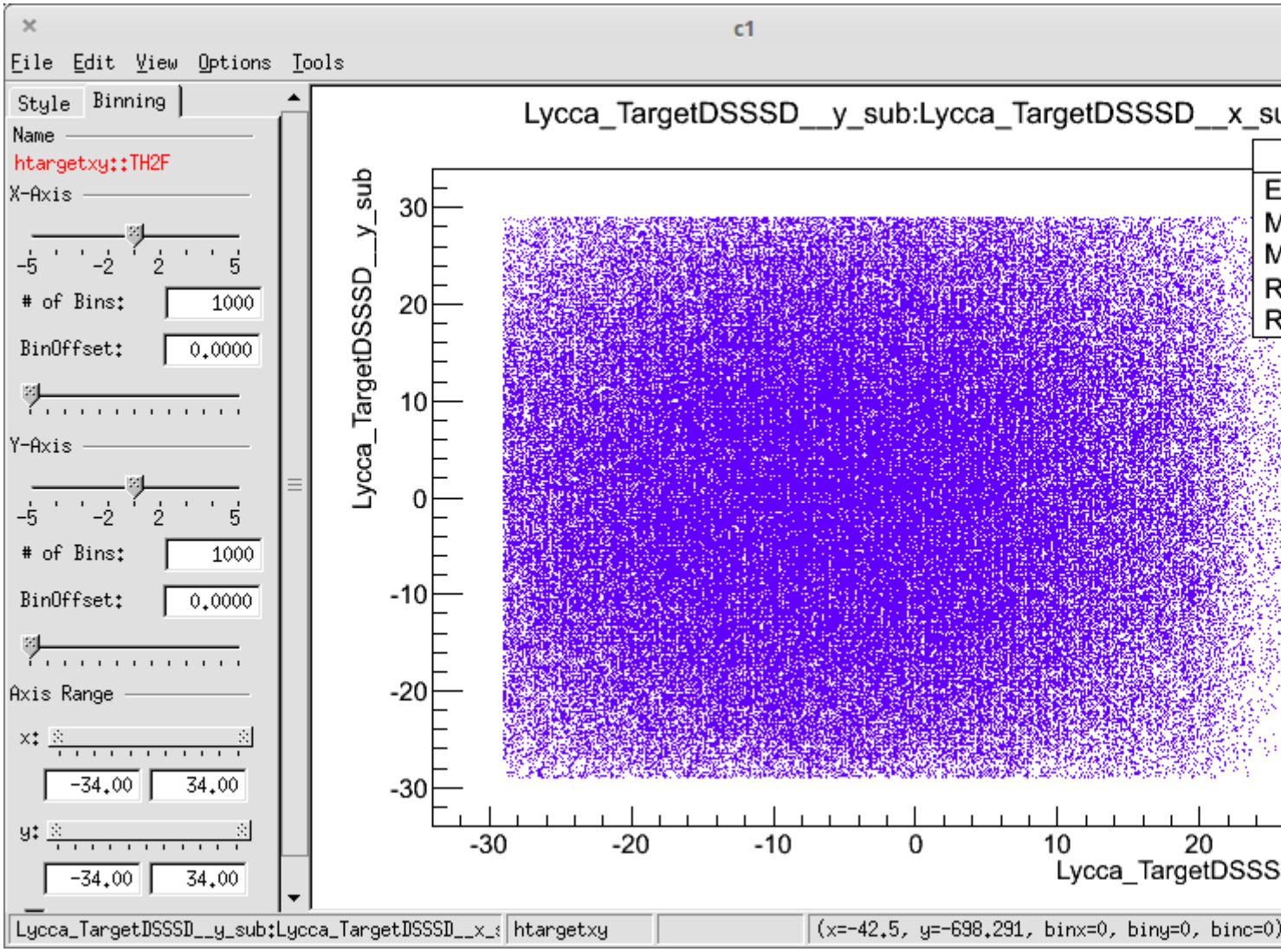
So, the 3.6 mm offset is clear to see, but why 1 mm offset in the beam axis?

In addition, we have been taking the offset for the target forward position as 150 mm, the measurements suggest that this is 142.7 mm, is this correct?

cheers,
tayfun

File Attachments

1) Screenshot from 2015-03-24 12:31:18.png, downloaded 1521 times



Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Tue, 24 Mar 2015 11:52:04 GMT
View Forum Message <> Reply to Message

Dear Tayfun,
this is indeed all very confuseing,
but the cad image i think is seen from lycca whereas the plots are seen from frs side i guess.
The 1.1cm shift was the mean difference in distance between measurement and table.
But as i think now, it is enough to rotate the agata array and apply the measured x,y,z shifts.

Does anybody know the differences between 2012 and 2014 setup ?
Target positions have been already estimated, maybe Michael or Damian did some work about target position ?

oliver

Subject: Re: AGATA Crystal positions (Look-Up Table)

Posted by miree on Tue, 24 Mar 2015 12:27:57 GMT
View Forum Message <> Reply to Message

Hi Tayfun,

the numbers in the lookup table have the following meaning:

line 0: translation (shift in x,y,z)
lines 1,2,3: rows of a 3x3-rotation matrix

Michael

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by miree on Tue, 24 Mar 2015 12:37:49 GMT
View Forum Message <> Reply to Message

Just confirming what Oliver said: the Plots are all "looking" from FRS side, because they all use FRS coordinate system. The FRS coordinate system is:

positive z-axis points along the beam direction
positive y-axis points up
positive x-axis points to the right when looking along the positive z-axis.

(Yes, this is a left-handed coordinate system, which might be confusing)

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Tue, 24 Mar 2015 13:00:26 GMT
View Forum Message <> Reply to Message

Hi,

But these two plots look like when you look at AGATA from the LYCCA side:

...and more important that they don't match in the x axis. Is this because the FRS is using left-handed coordinate system? I wonder the reason to choose left-handed system in the FRS.

Then Michael makes the transformation to rotate the crystals 180 degrees and convert the coordinate system to the FRS coord. sys. (i.e. left-handed).

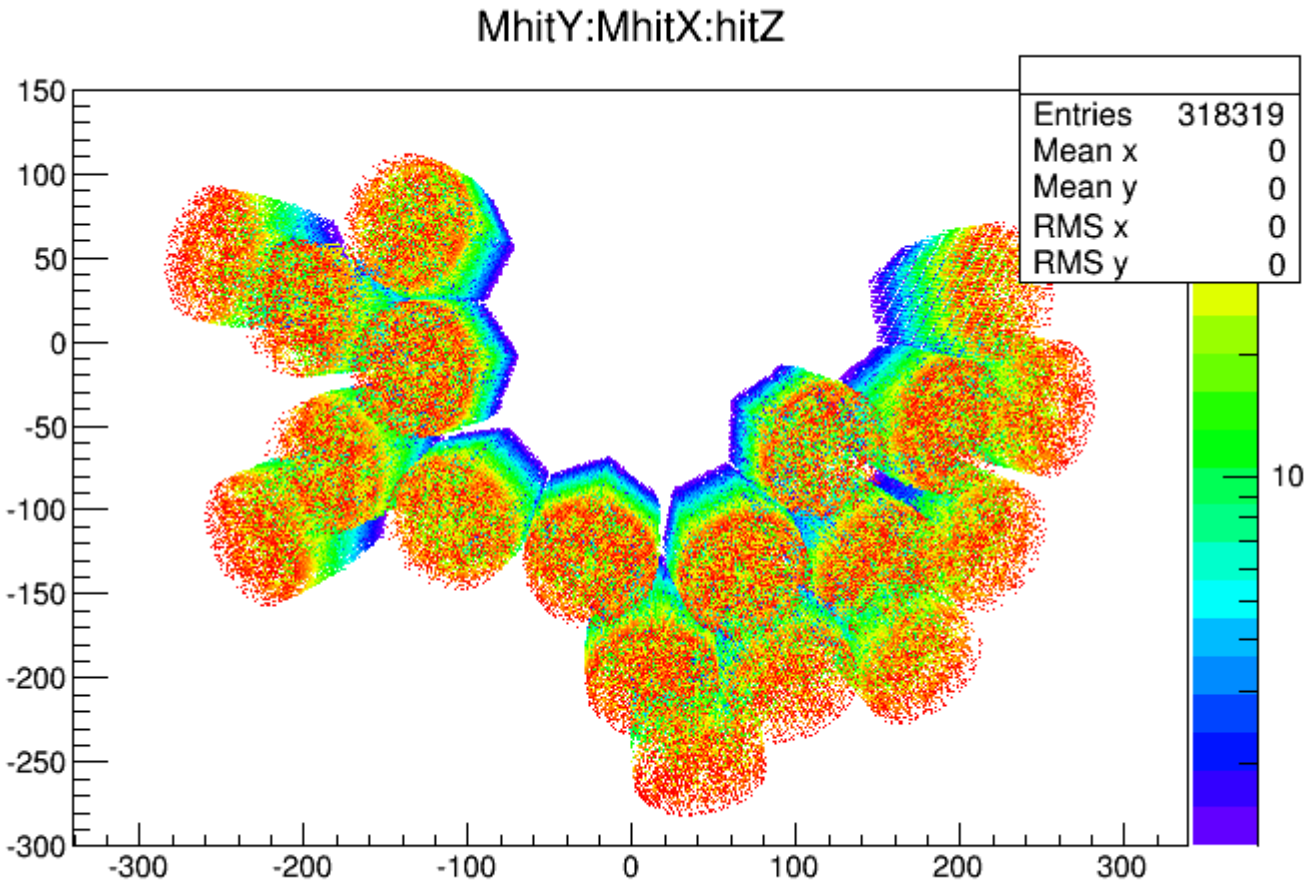
Then, inside the measurement report, the y and z axis-es are well defined, but there is an uncertainty in the x axis. How are we going to know if the AGATA crystal offsets in the x axis are in right-handed or left-handed system?

Thanks!

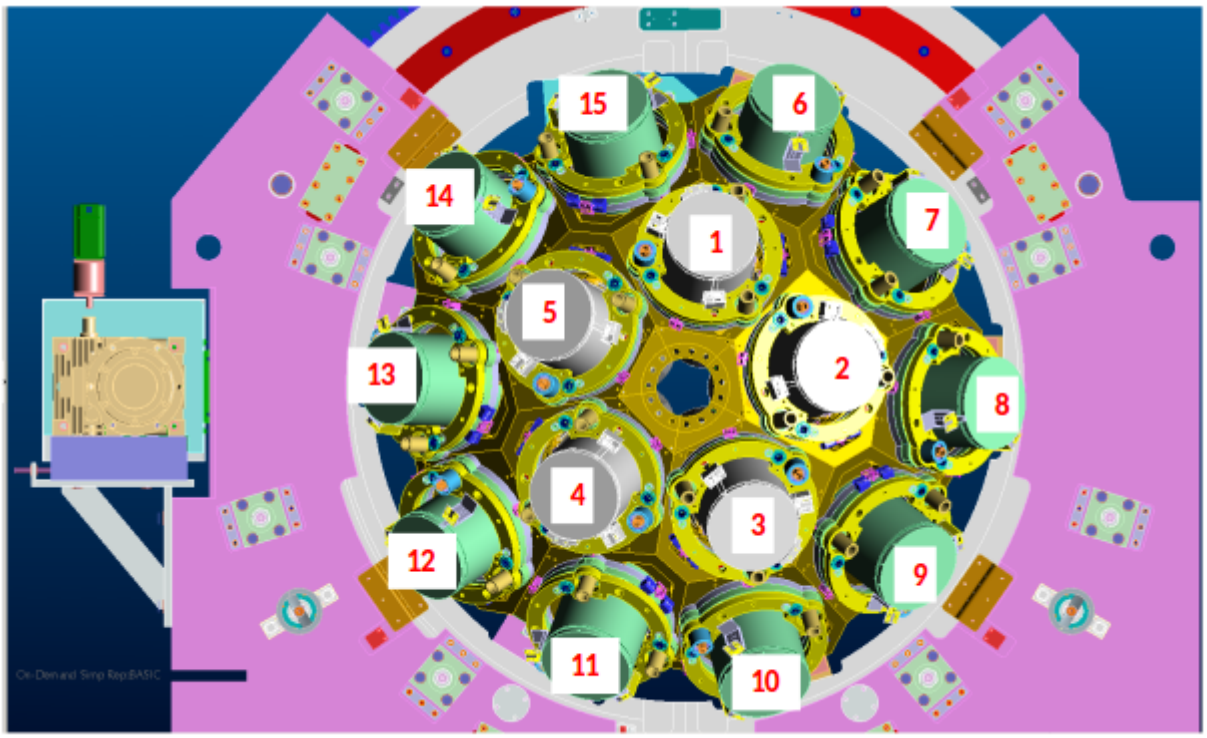
Tayfun

File Attachments

1) hit_position_depthCryst.png, downloaded 1650 times



2) agata-report.png, downloaded 1717 times



Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Wed, 25 Mar 2015 15:25:43 GMT
View Forum Message <> Reply to Message

Dear all,

I made a table to convert different naming conventions each other for myself, and thought that it might be useful also for somebody else.

So, as far as I understand, the crystal mapping between three different conventions is as the following:

cr# AGATA GSI
---
1 -> 3B -> 00C
2 -> 3G -> 00B

4 -> 2B -> 01C
5 -> 2G -> 01B

13 -> 4B -> 04C
14 -> 4G -> 04B

18 -> 9R -> 06A
19 -> 9G -> 06B

22 -> 8G -> 07B
23 -> 8B -> 07C

36 -> 13R -> 12A
37 -> 13G -> 12B
38 -> 13B -> 12C

39 -> 12R -> 13A
40 -> 12G -> 13B
41 -> 12B -> 13C

42 -> 11R -> 14A
43 -> 11G -> 14B
44 -> 11B -> 14C

Please let me know if you see anything wrong with it.

cheers,
tayfun

edit: this is for the 2012 campaign. I don't know if it is modified for the 2014 campaign, but for sure more crystals were added. So, if you let me know them, I could modify the table to include the two added crystals.

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by miree on Wed, 25 Mar 2015 17:28:52 GMT
View Forum Message <> Reply to Message

Hi,
as far as I know, the mapping is described by a formula:

The letters {A,B,C} are interpreded as numbers {0,1,2}, respectively.
Given the crystal_id, the letter can be computed as crystal_id%3 and the number in front of the letter is just crystal_id/3

(a%b is the integer modulus operation and a/b is the integer division)

Example:
cyrstal_id = 10
crystal_id % 3 = 1 -> A
crystal_id / 3 = 3

consequently: crystal_id 10 = 3A

I think this scheme agrees with this picture:
https://lxagata0.ganil.fr:8989/2012-08-27-perf-com/92

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by wieland@mi.infn.it on Wed, 25 Mar 2015 17:45:24 GMT
View Forum Message <> Reply to Message

Hi,
thanks again for Michael to introduce the rotation,
but what is the value, how many degrees is the best value ?
7,8,7.5 degrees ?

What about 2014 ?
same values ?

With the 2012 values i dont see 2plus structure.

Oliver

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Wed, 25 Mar 2015 17:50:27 GMT
View Forum Message <> Reply to Message

Hi Oliver,

According to the drawings in this post, the rotation is most likely 7.8 degrees.

cheers,
tayfun

edit:
sorry! I'm wrong. 7.8 degrees of rotation is introduced to the Legnaro configuration from the original configuration of the array. Please ignore my message.

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by a_boso on Wed, 29 Apr 2015 07:31:57 GMT
View Forum Message <> Reply to Message

Hi guys,

I made some attempts but I am a little bit confused...

Did someone figure out which is the right look up table or the right frame rotation to apply for the 2014 data?

Thanks,
Alberto

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by miree on Wed, 29 Apr 2015 08:05:18 GMT
View Forum Message <> Reply to Message

Hi Alberto,

the look-up table was always the same.
The only thing you have to add is the aforementioned rotation. Either use the recently introduced parameter [in units of deg] in the AgataAdapter, or do the transformation yourself at a later point.
I would try + or - 7.8 and see which one improves the Doppler corrected peak resolution. However, I didn't try this myself yet.

Michael

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Thu, 14 May 2015 09:36:25 GMT
View Forum Message <> Reply to Message

Hi Michael,

The LASER survey results that Oliver shared show the exact positions of the components of the setup including the positions of the AGATA crystals.

If one would adopt those positions into the look-up table then there would be no worries concerning the rotation, traslation, etc.., is that right?

I did a such thing, I re-created the look-up table referencing the crystal positions from the

LASER survey. I cannot tell whether this improved the resolution since I have still other fundamental problems with the setup, and not able to apply the Doppler correction properly.

Best regards,
Tayfun

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by miree on Fri, 15 May 2015 08:13:07 GMT
View Forum Message <> Reply to Message

Hi Tayfun,

> If one would adopt those positions into the look-up table then there would be no worries concerning the rotation, traslation, etc.., is that right?

That is correct for the positions. For the rotations (the rotational matrix that is specified in the "crystal_position_lookup_table") I'm not sure: did the laser measurement report contain any angles?
Thank you for your efforts. Just keep in mind that the rotational matrices also have to be changed to account for the rotation of the AGATA frame.

Best regards,
Michael

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by thuyuk on Tue, 15 Sep 2015 14:06:23 GMT
View Forum Message <> Reply to Message

Do you mind, everybody, post your Lookup table here? I'm posting mine.

Thank you in advance!
tayfun

File Attachments
1) Adapter.CrystalPositionLookUpTable__michael, downloaded 432 times

---

Subject: Re: AGATA Crystal positions (Look-Up Table)
Posted by Damian Ralet on Tue, 15 Sep 2015 14:13:57 GMT
View Forum Message <> Reply to Message

Hi Tayfun,

if it helps. This is mine.

File Attachments

1) CrystalPositionLookUpTable.dat, downloaded 555 times