OASIS Corona Workshop 2020

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What is OASIS

Optimization of AGATA science production

The argument given to the ANR is that a little more work by us to try to assure that everything is done as good as it can be done has the potential of increase the added value to the AGATA project more than the cost of the OASIS project...

How will we do this...

1. By improving the PSA and γ-ray tracking, and by introducing a stronger coupling between the two (mainly via error estimates in the PSA) (task 1+2)
2. By learning how to exploit AGATA, as it is working now, to extract as much physics as we can from data taken with it.

What we will see presented today

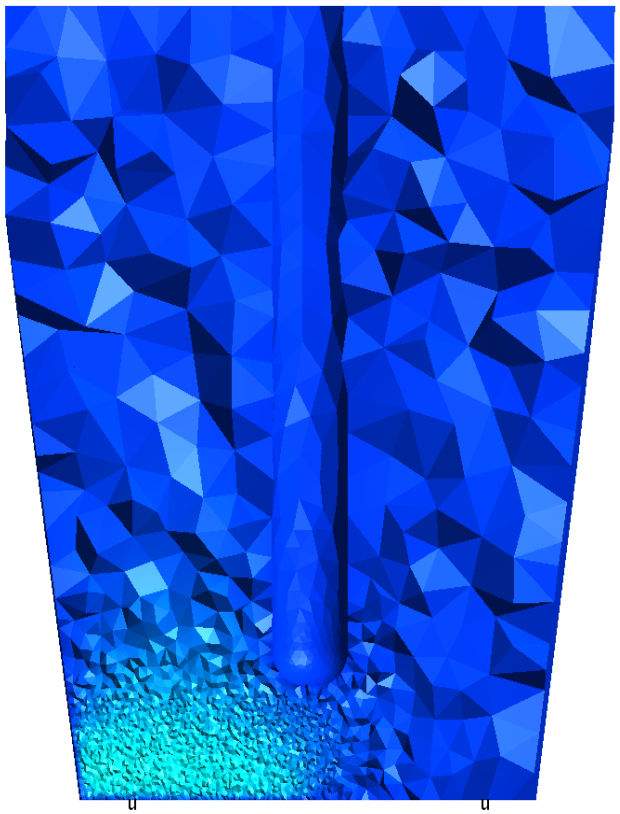
- This presentation
- Jeremy
- Fraiser
- Sylvain
- Marco
- Bart

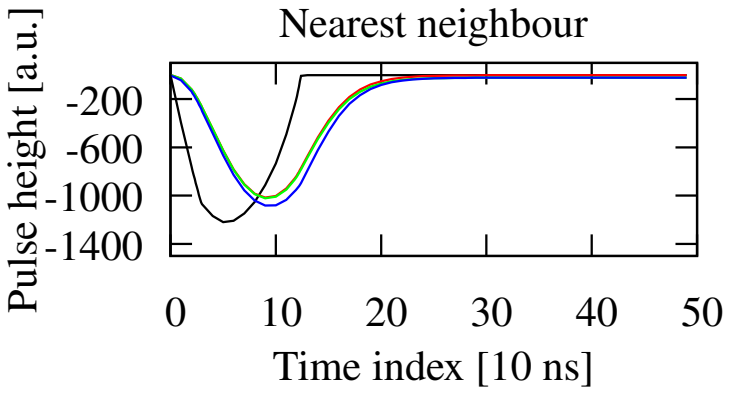
AGATAGeFEM - a very old story

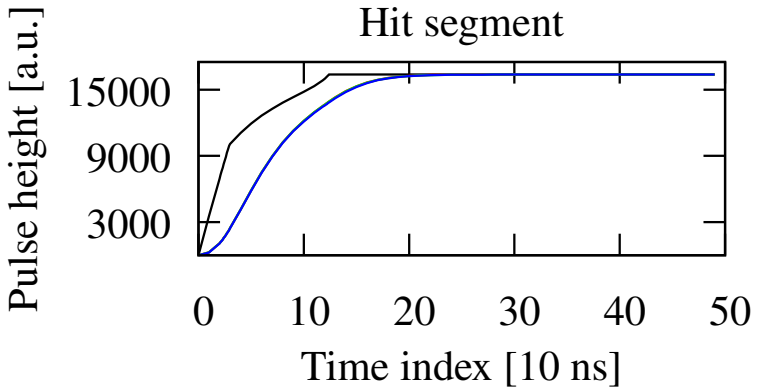
- Developed on and off since 2008 (!!!)
- Based on finite element methods
- Nothing really special about it

AGATAGeFEM - a very old story

Example of field calculation and pulses







AGATAGeFEM - What I plan to present

Sensitivity for different parameters

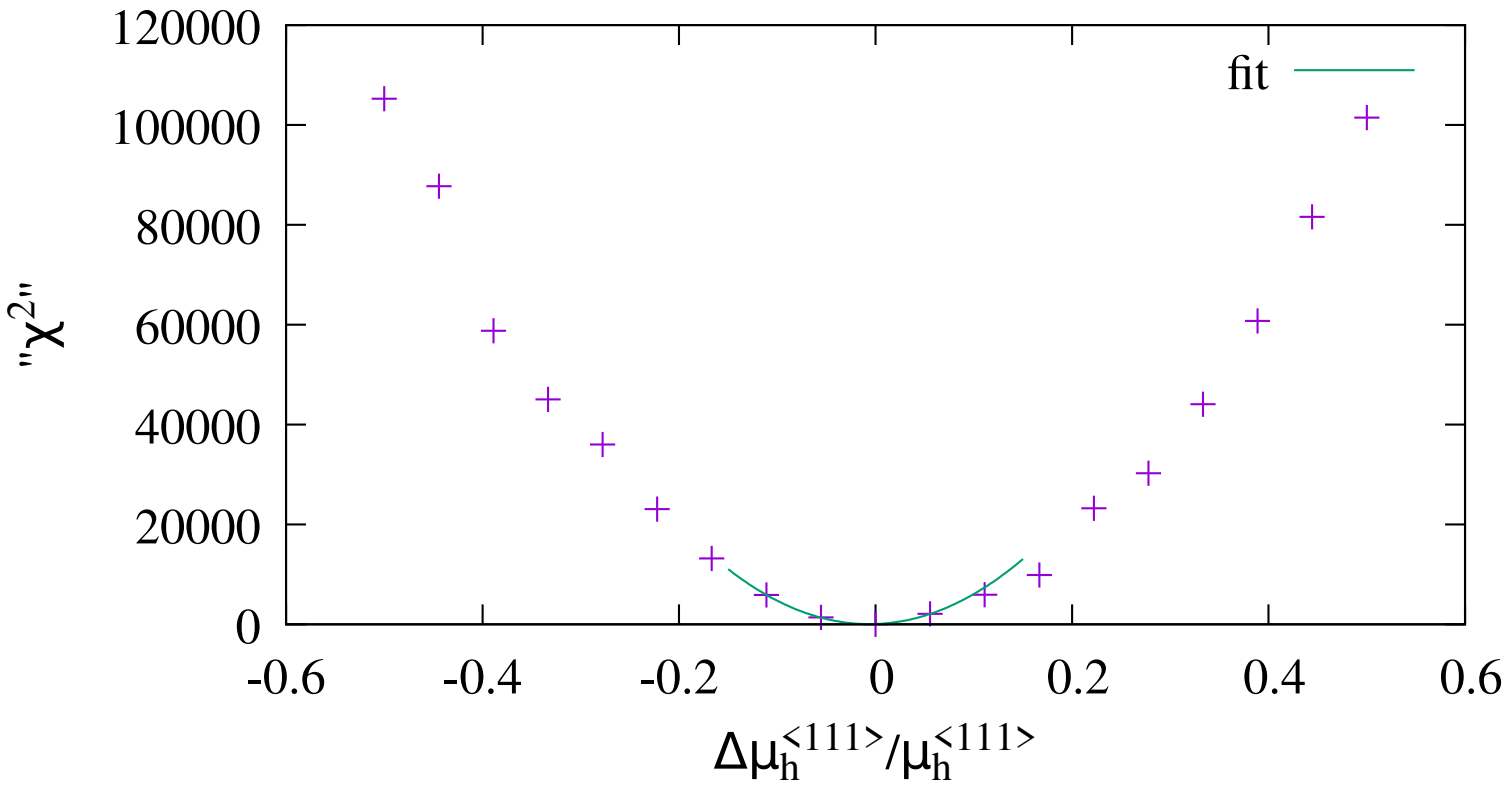
By varying the different parameters in for the charge carrier transport and compare how much the signals change for a given positions.

What have I done

I have calculated a basis on a fixed geometry. Then varied the geometry and/or added cross talk and noise.

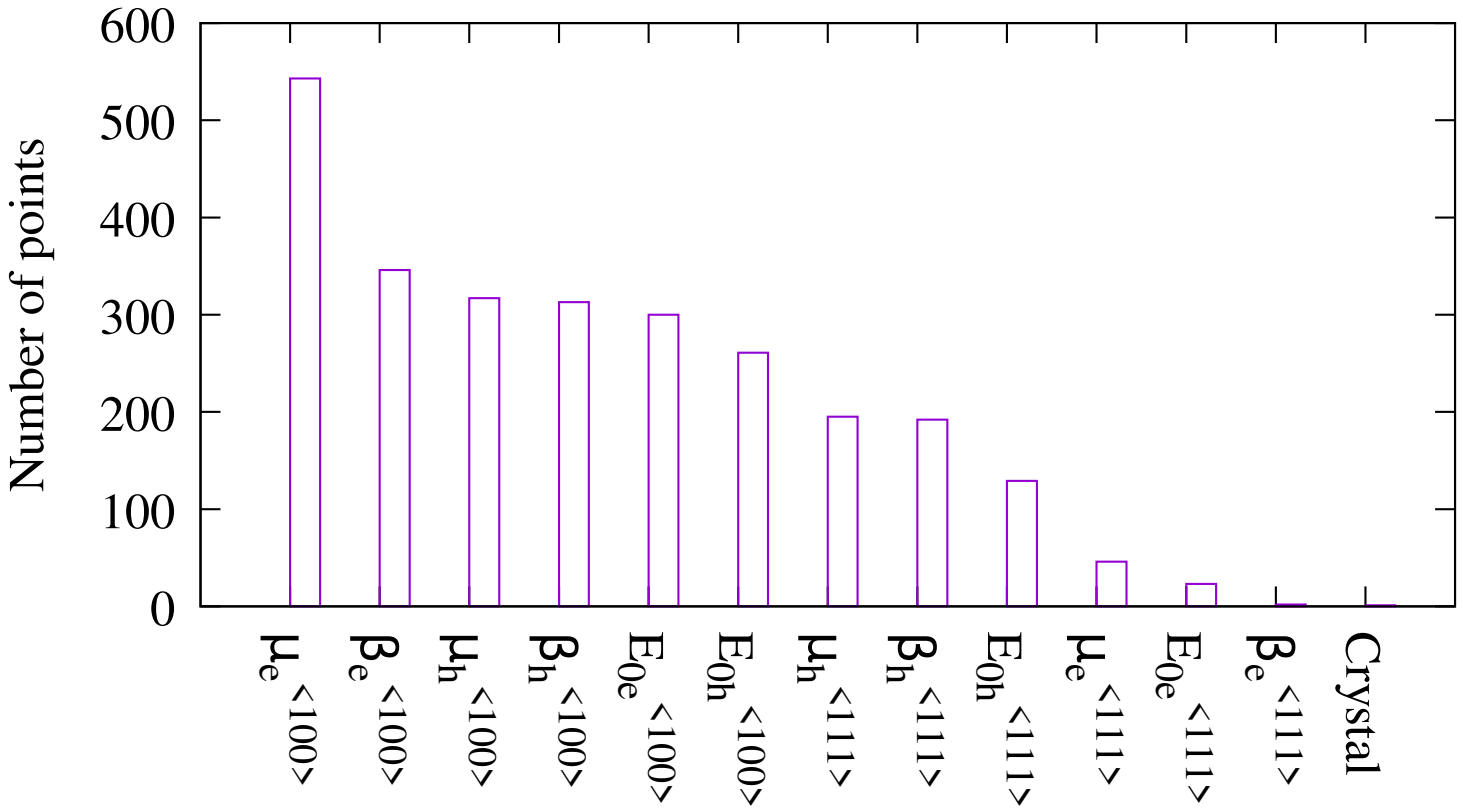
Sensitivity analysis

How to extract comparable numbers



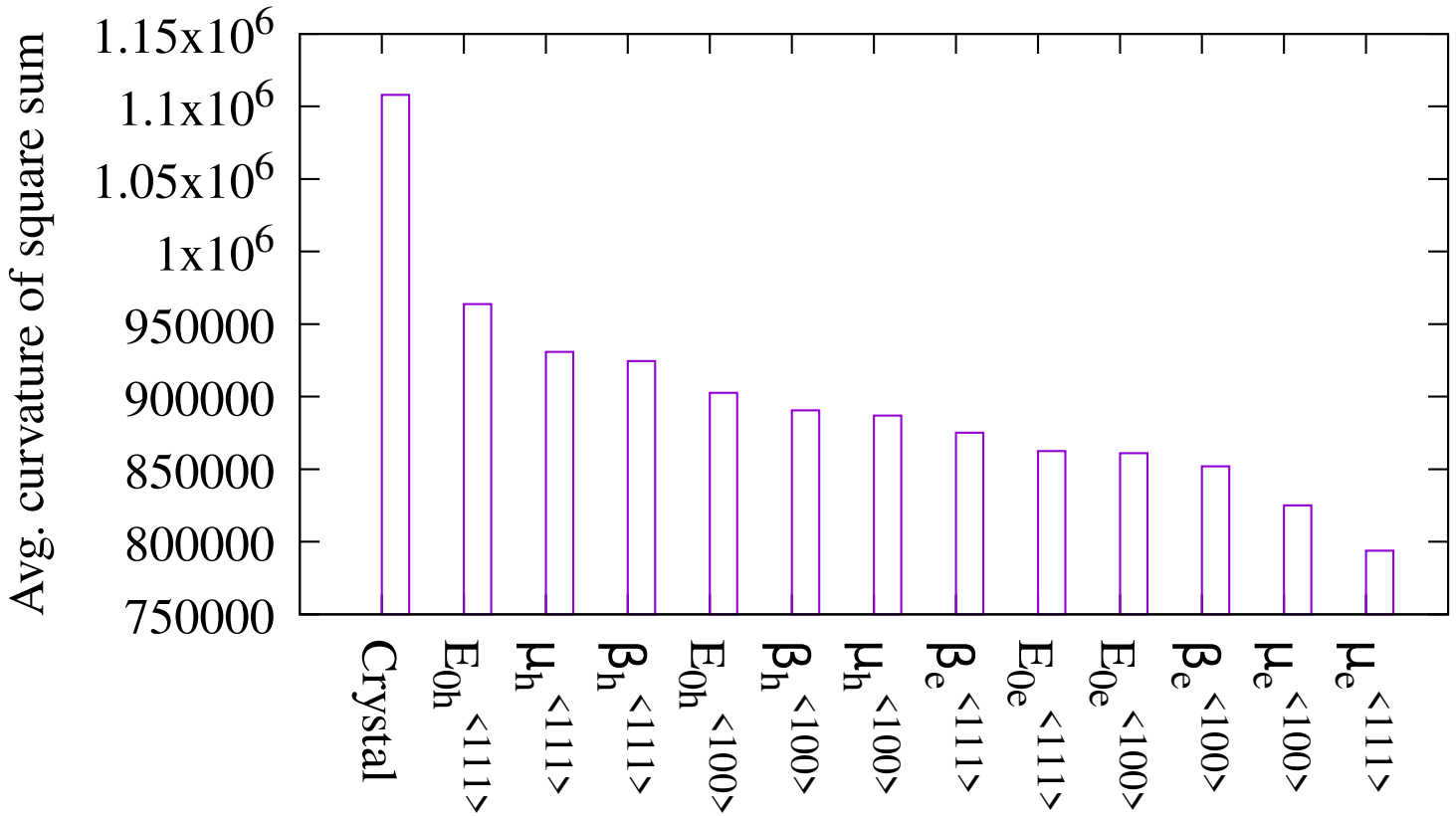
Sensitivity analysis

Which parameter is most sensitive at most positions



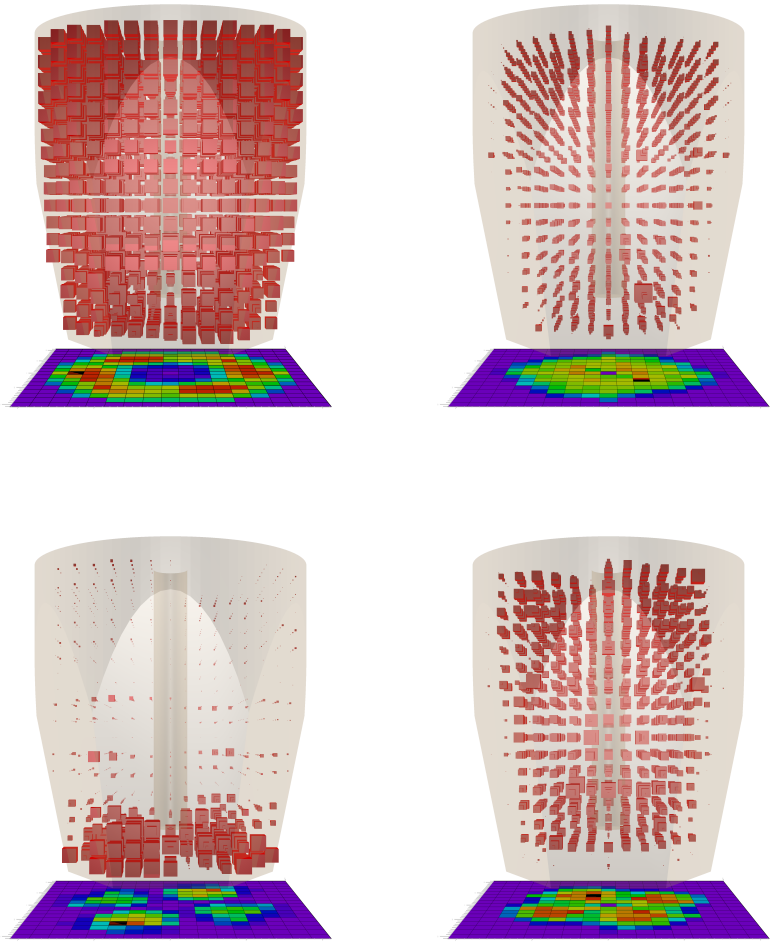
Sensitivity analysis

How strong is the effect of changing it



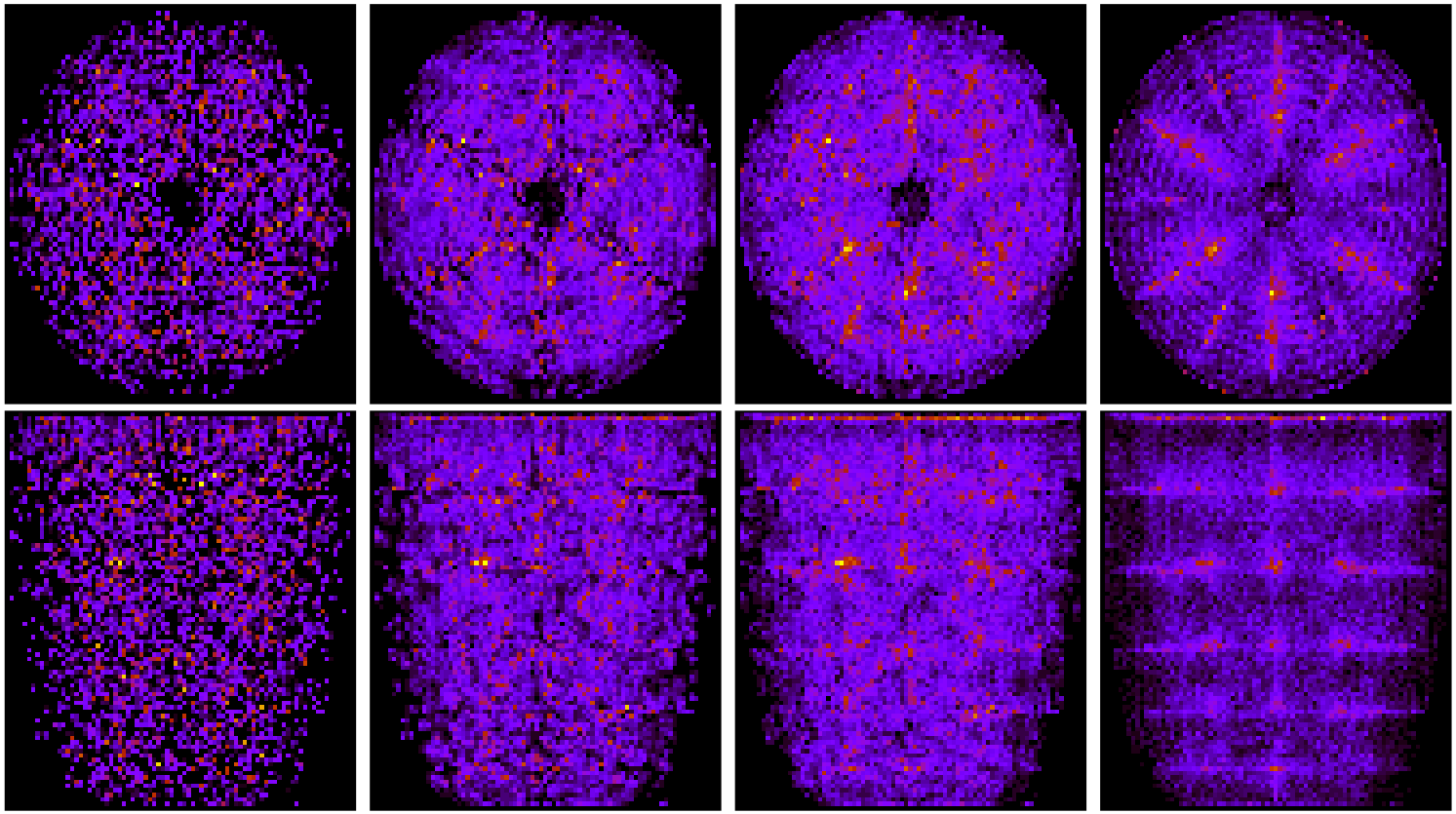
Sensitivity analysis

Example of sensitivity to parameters in the detector volumes



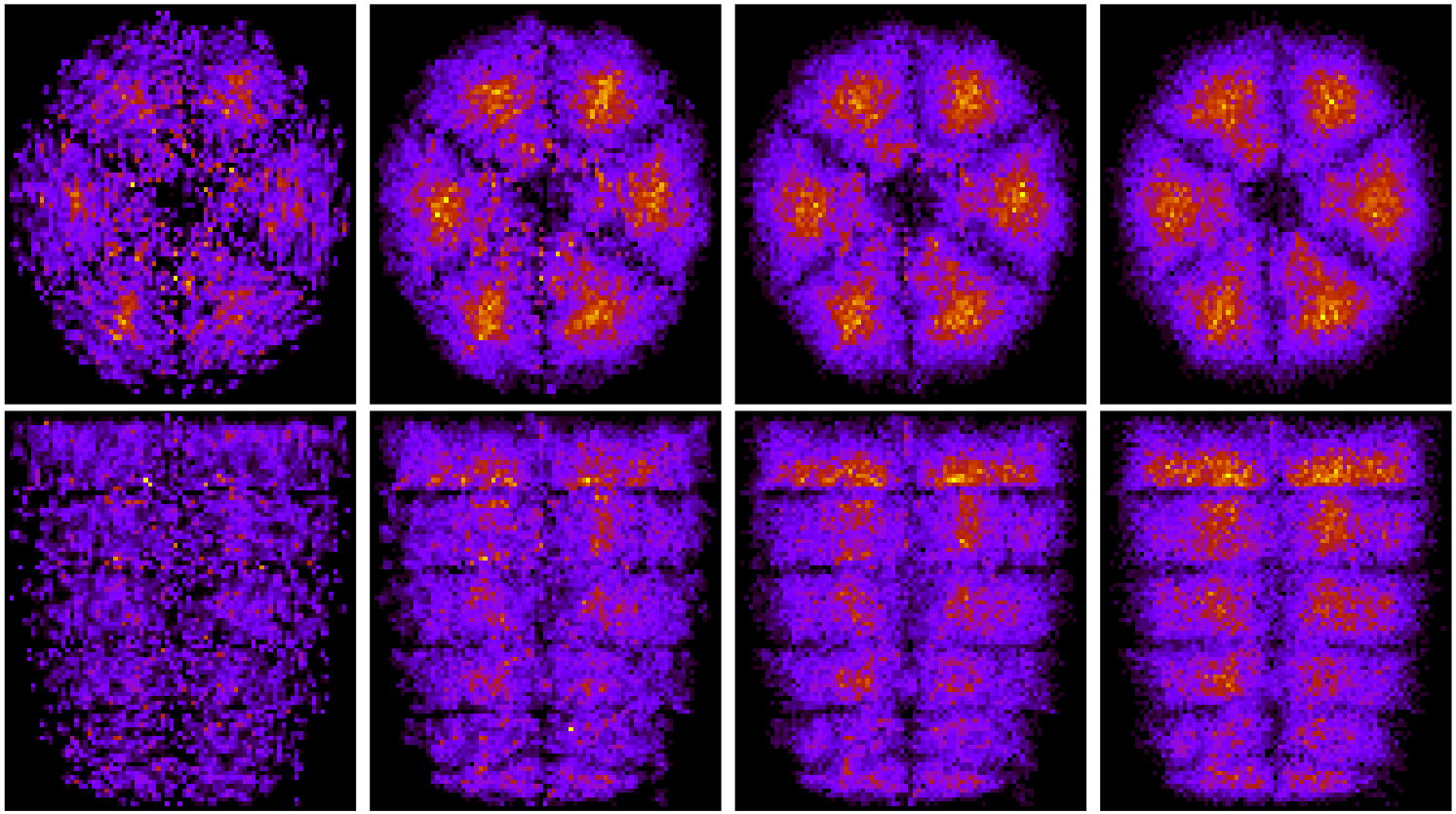
What has an impact of the PSA results - xt and noise?

Different amount of noise for grid search



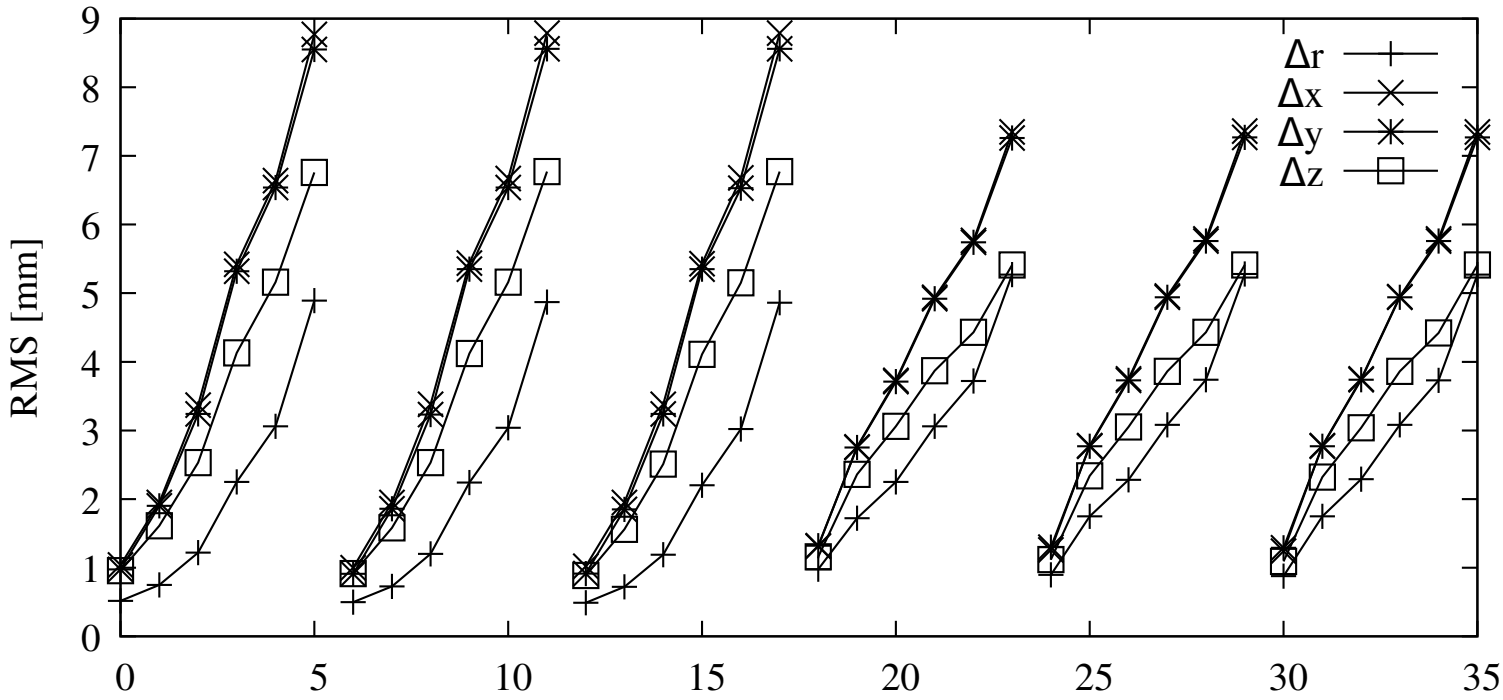
What has an impact of the PSA results - xt and noise?

Different amount of noise for matrix inversion method



What has an impact of the PSA results - xt and noise?

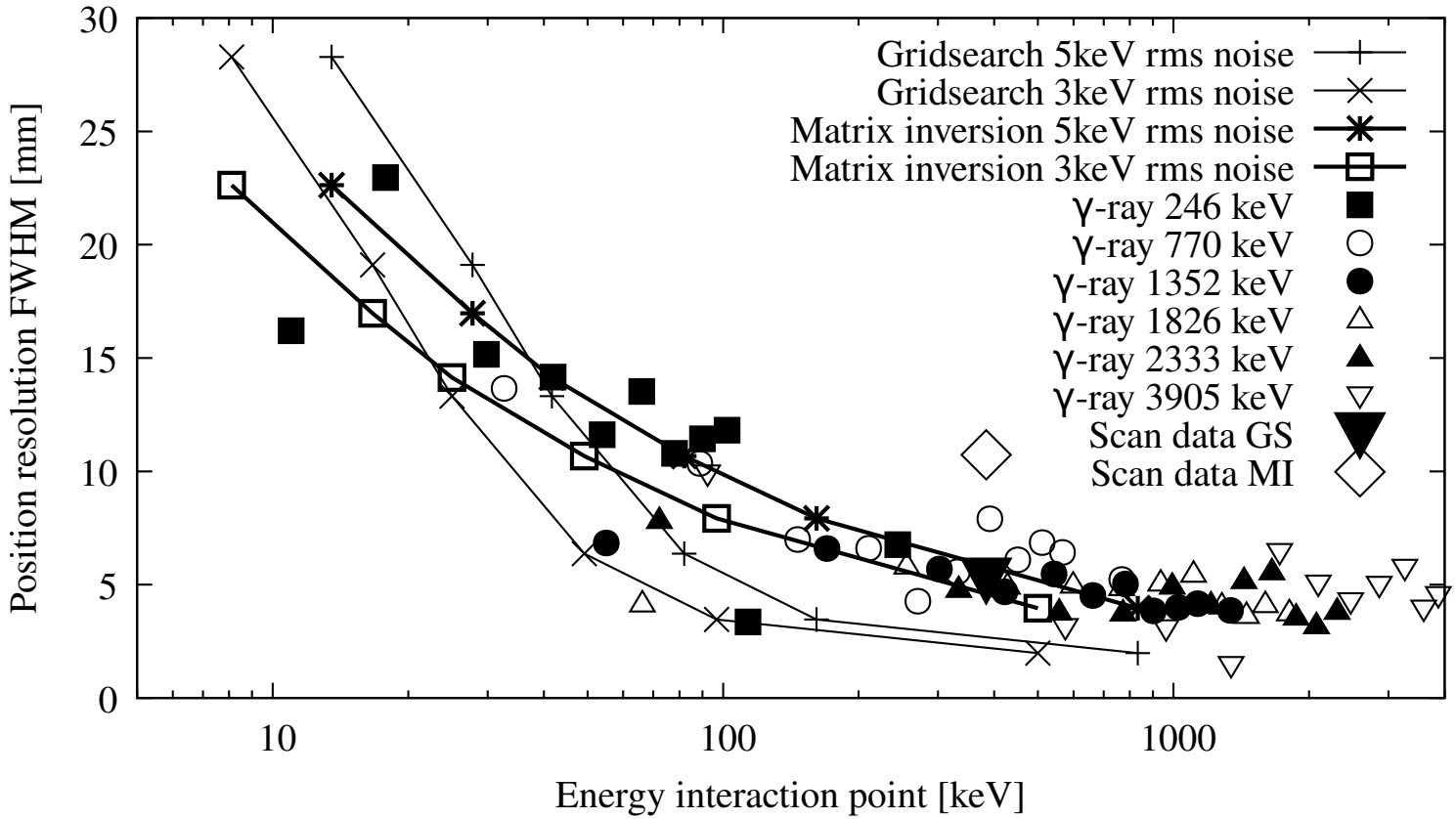
Results for different amount of noise and cross talk



0-17 Gridsearch, 18-35 Matrix inversion.
0-5(18-23) Full crosstalk, 6-11(23-29) Linear crosstalk, 12-17(30-35) No crosstalk
0-5, 6-11,...,30-35 Noise 0.6%, 3.1%, 6.1%, 12%, 18%, and 37%.

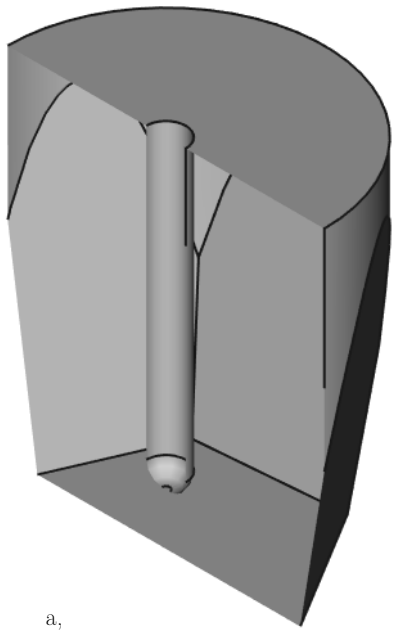
What has an impact of the PSA results - xt and noise?

Compare with real world results

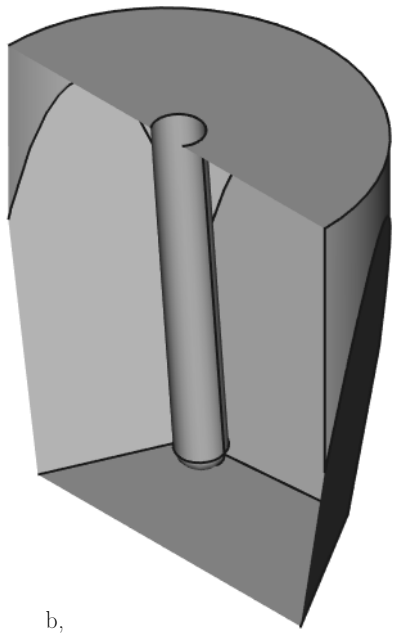


What has an impact of the PSA results - detector geometry?

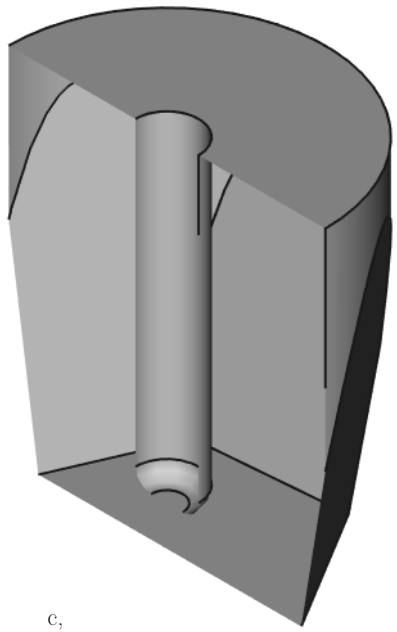
Doing PSA with data base not corresponding to correct geometry



a,



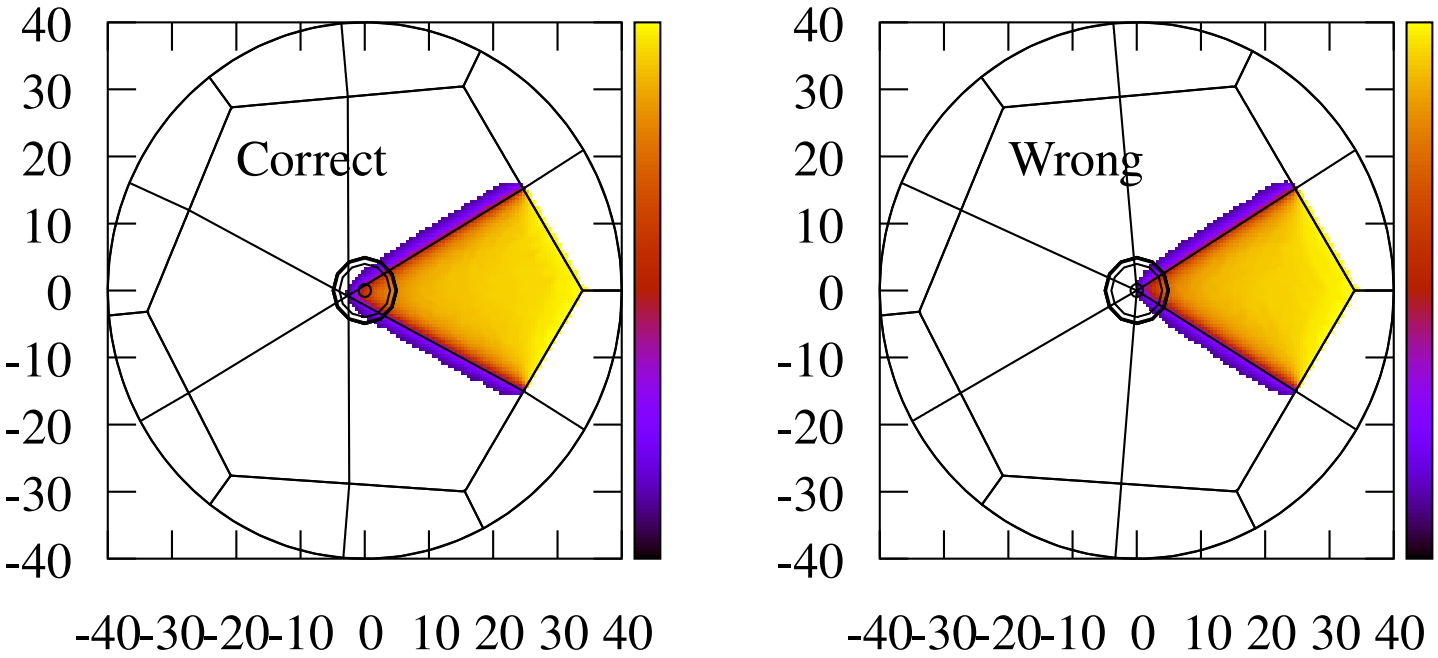
b,



c,

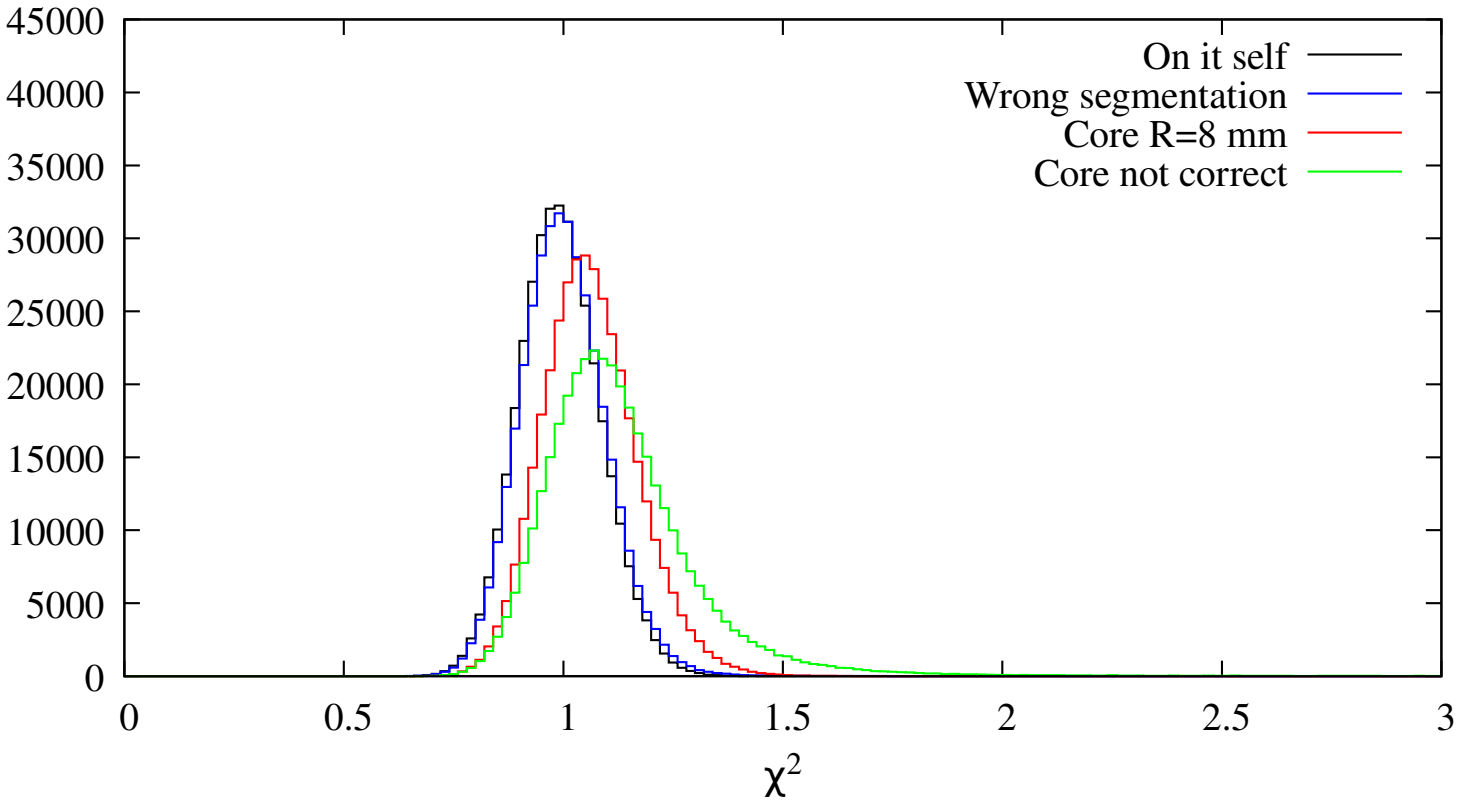
What has an impact of the PSA results - detector geometry?

Doing PSA with data base not corresponding to correct geometry



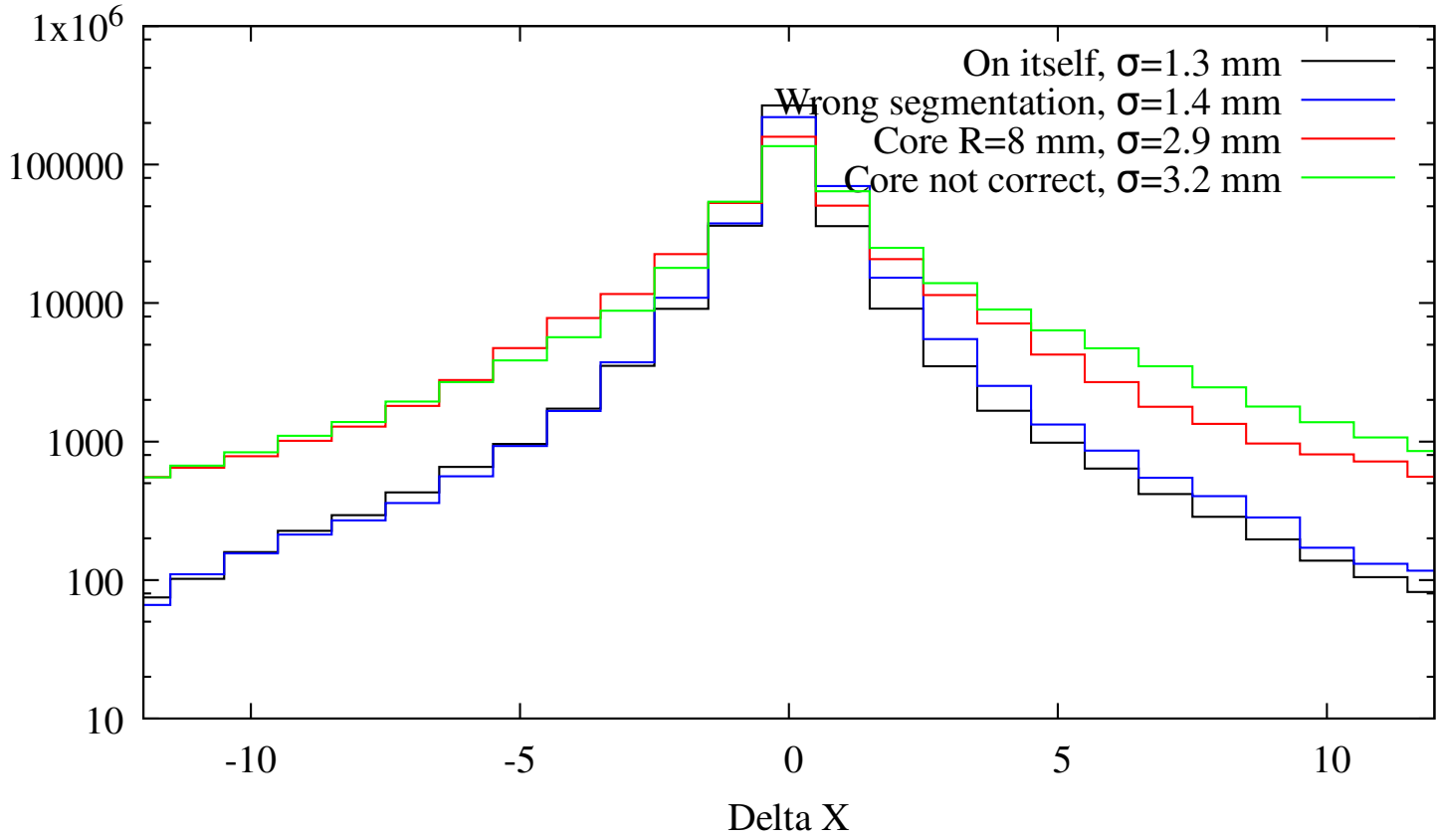
What has an impact of the PSA results - detector geometry?

Chi square does not give us hints of this error...



What has an impact of the PSA results - detector geometry?

Even for rather wrong geometry average position resolution not so bad



What has an impact of the PSA results - detector geometry?

But the spacial distribution of found interaction points is...