AGATA at GSI Efficiency: A First Step Towards Isomeric Ratios

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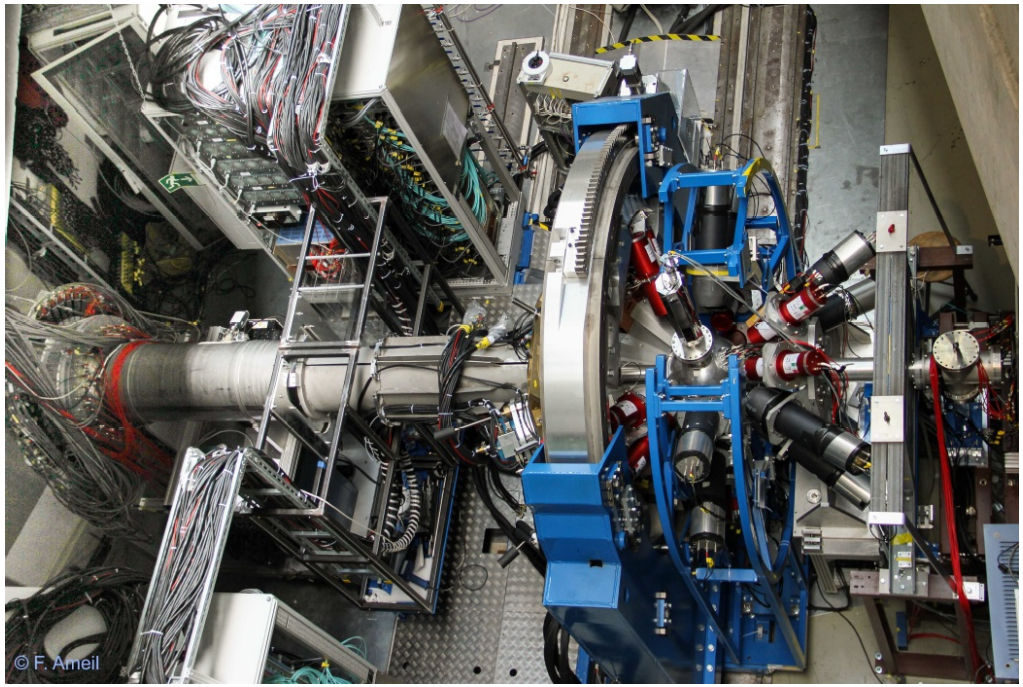
Corinne Louchart and Rosa Perez

EGAN Workshop, GSI, 2014

Content

Motivation



PreSPEC-AGATA

Motivation

- Relativistic Coulomb excitation around doubly-magic ^{208}Pb
- Determine transition strengths

→ Almost all nuclei we are interested in have isomeric states

→ On the secondary target: **ground states** and isomeric states

→ Isomeric compostion of the beam via isomeric ratios

Motivation

- Relativistic Coulomb excitation around doubly-magic ^{208}Pb
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→ Isomeric compostion of the beam via isomeric ratios

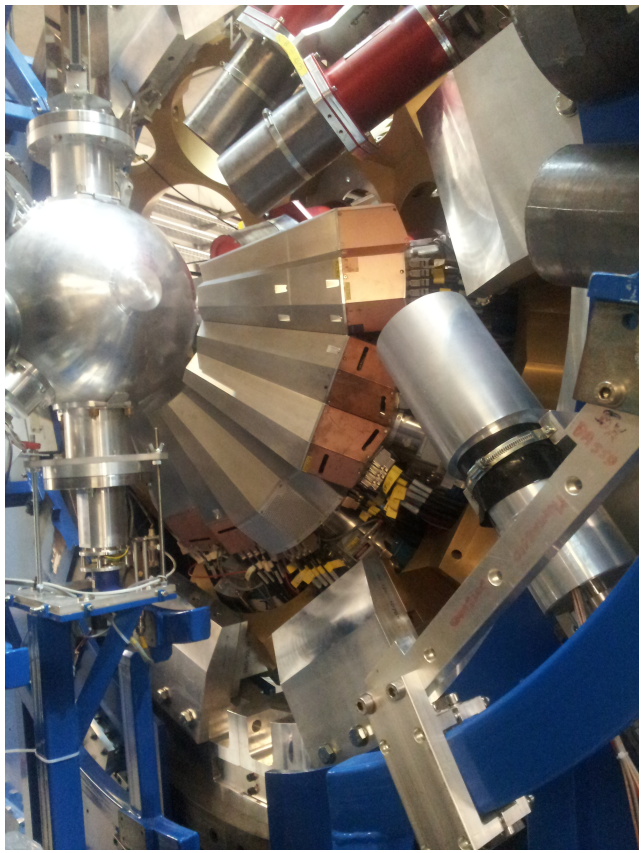
- To quantify all above, *efficiency* of our array is mandatory!

Dedicated Measurements

Source Run

- At the beginning of and after the campaign measurements with different sources conducted
- ^{60}Co, ^{152}Eu, ^{133}Ba, ^{166}Ho, ^{56}Co
- Idea: use the external detector as a trigger: *Euroball*
- finally: obtain the efficiency curve

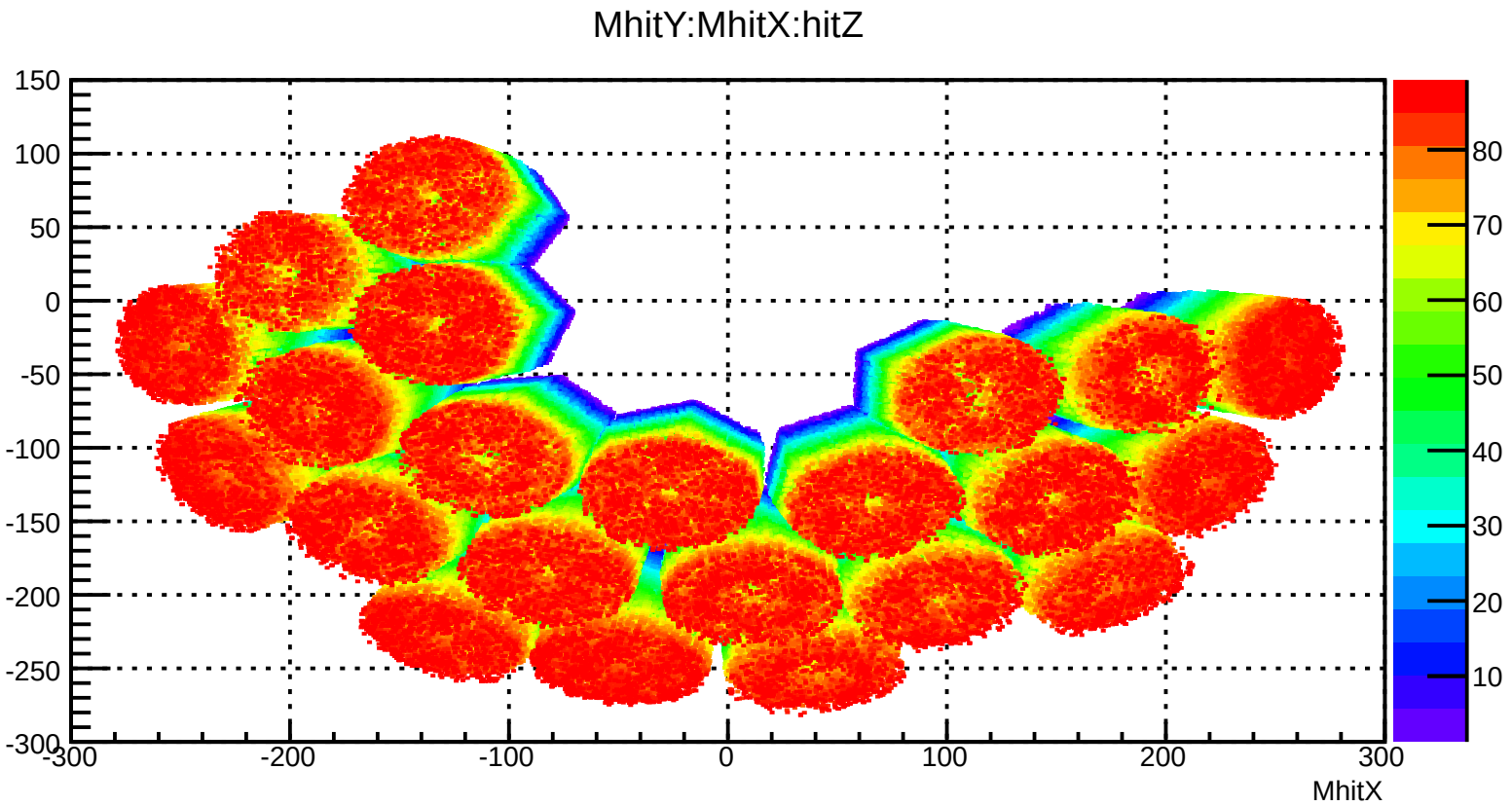
Setup



Euroball detector

Position of the Euroball detector

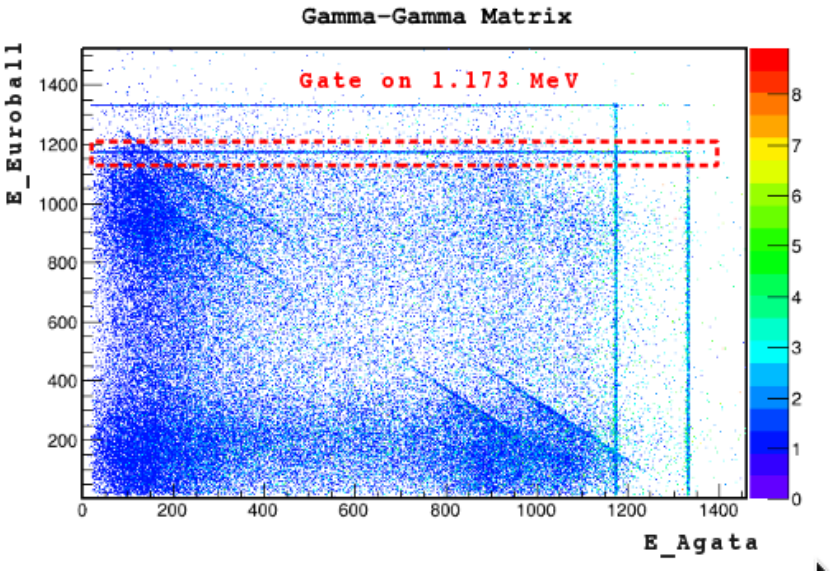
Setup



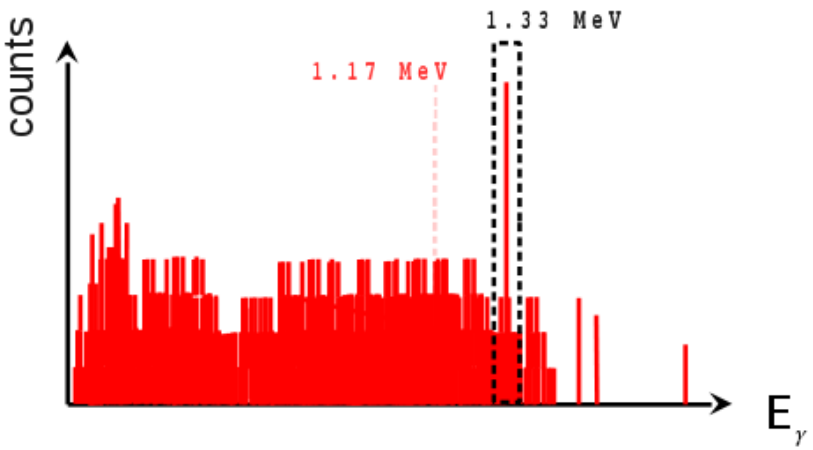
Hit Pattern, as of April 2014

Methodology

Method to get *absolute efficiency*

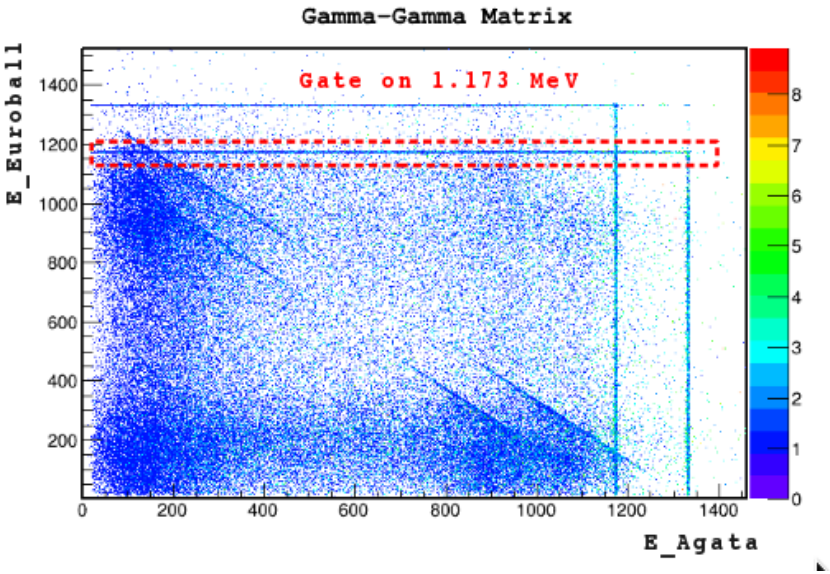


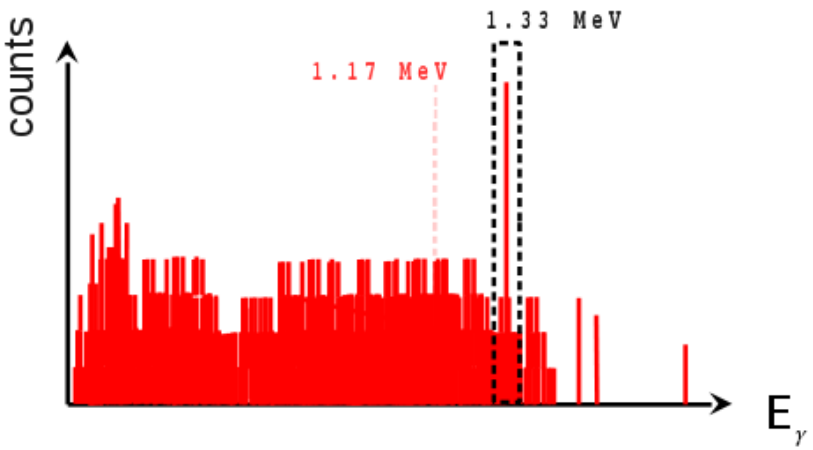
- Gamma-gamma matrix of energies deposited in Agata and Euroball
- Criterion: Agata core energy & Euroball energy



- Clean spectrum, without the 'gated' line

Method to get *absolute efficiency*





- Gamma-gamma matrix of energies deposited in Agata and Euroball
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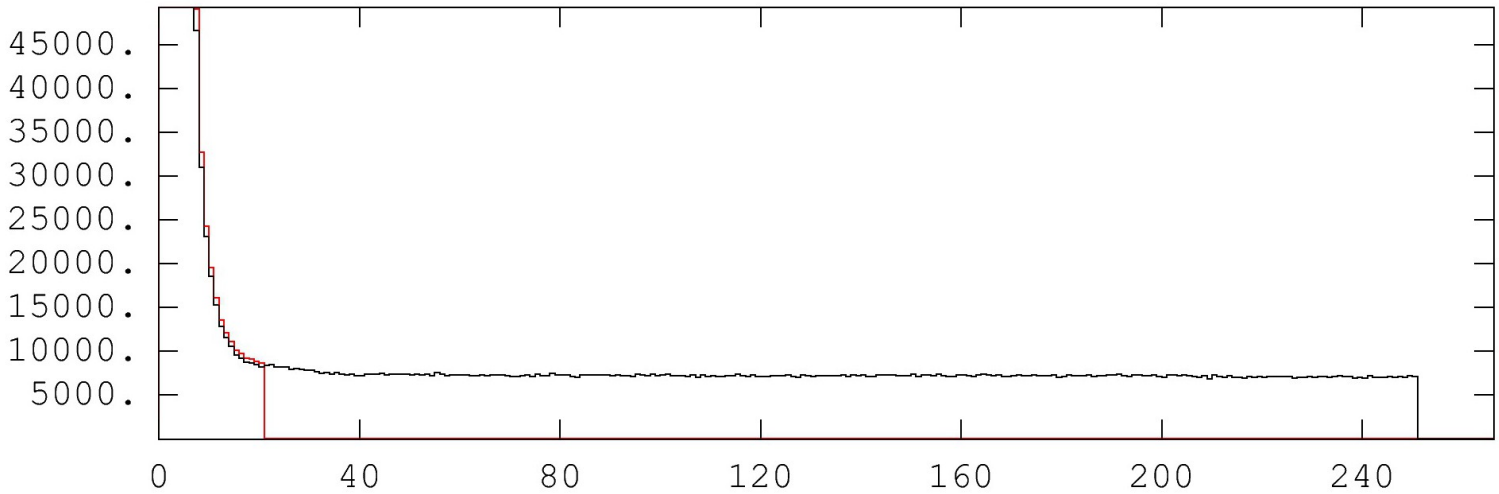
$$\epsilon = \frac{^{1.33}I_{Agata}}{^{1.17}I_{Euroball}}$$

Performed recently

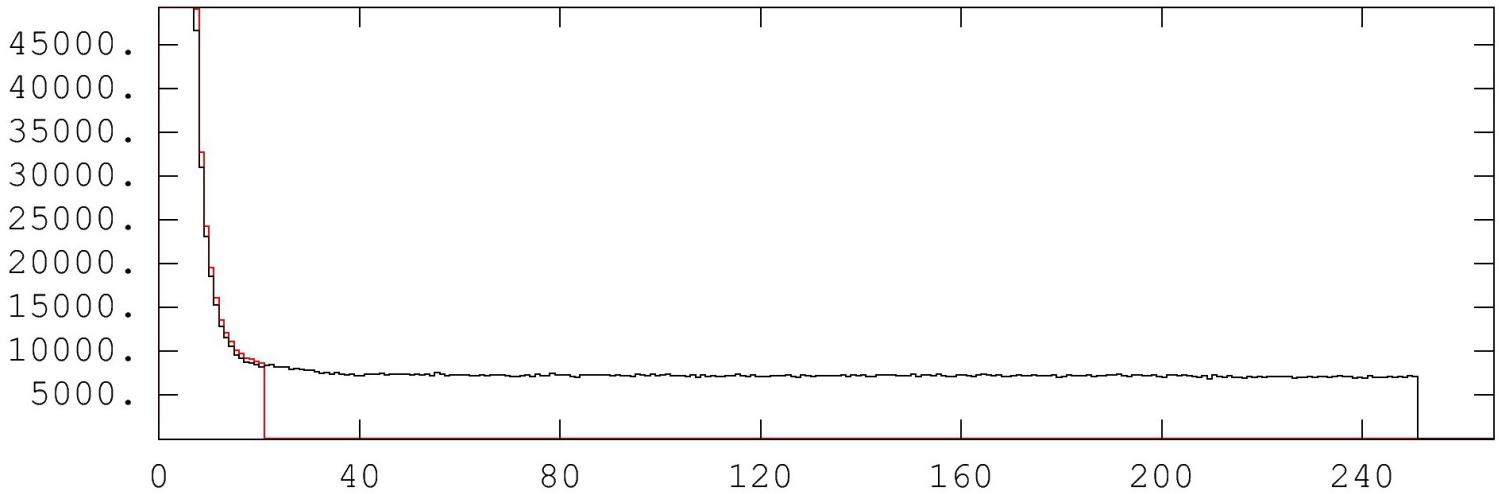
- Time Window on the Event Builder level



Time-stamp difference between successive hits

Performed recently

- Time Window on the Event Builder level



Time-stamp difference between successive hits

- When aquiring data, the window was 250* Time-stamp units

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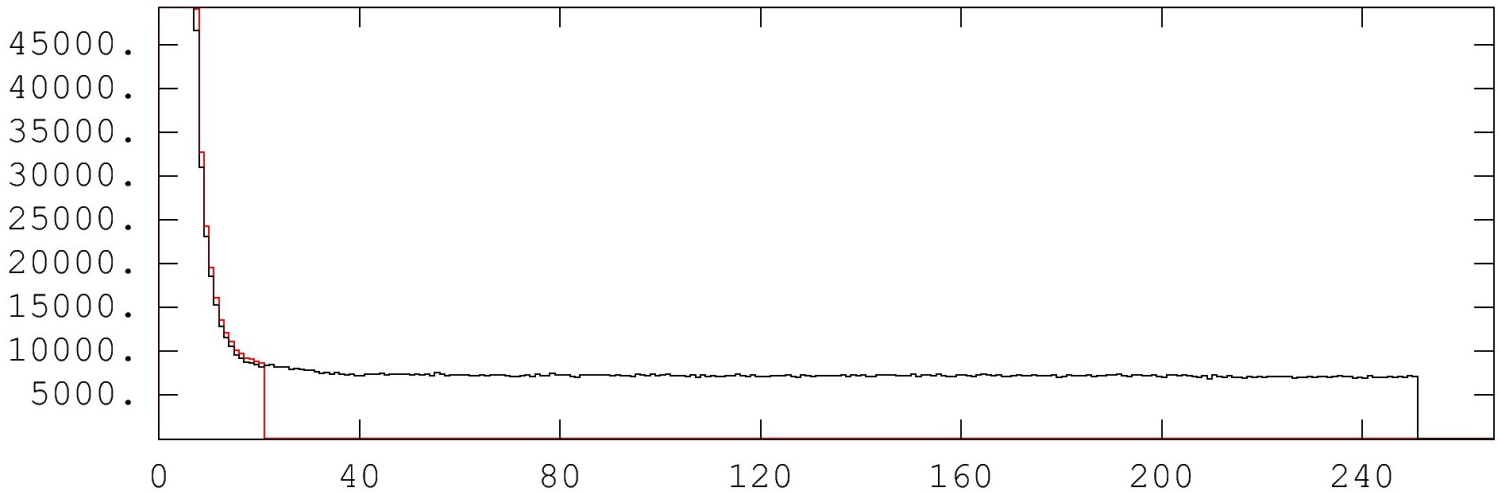
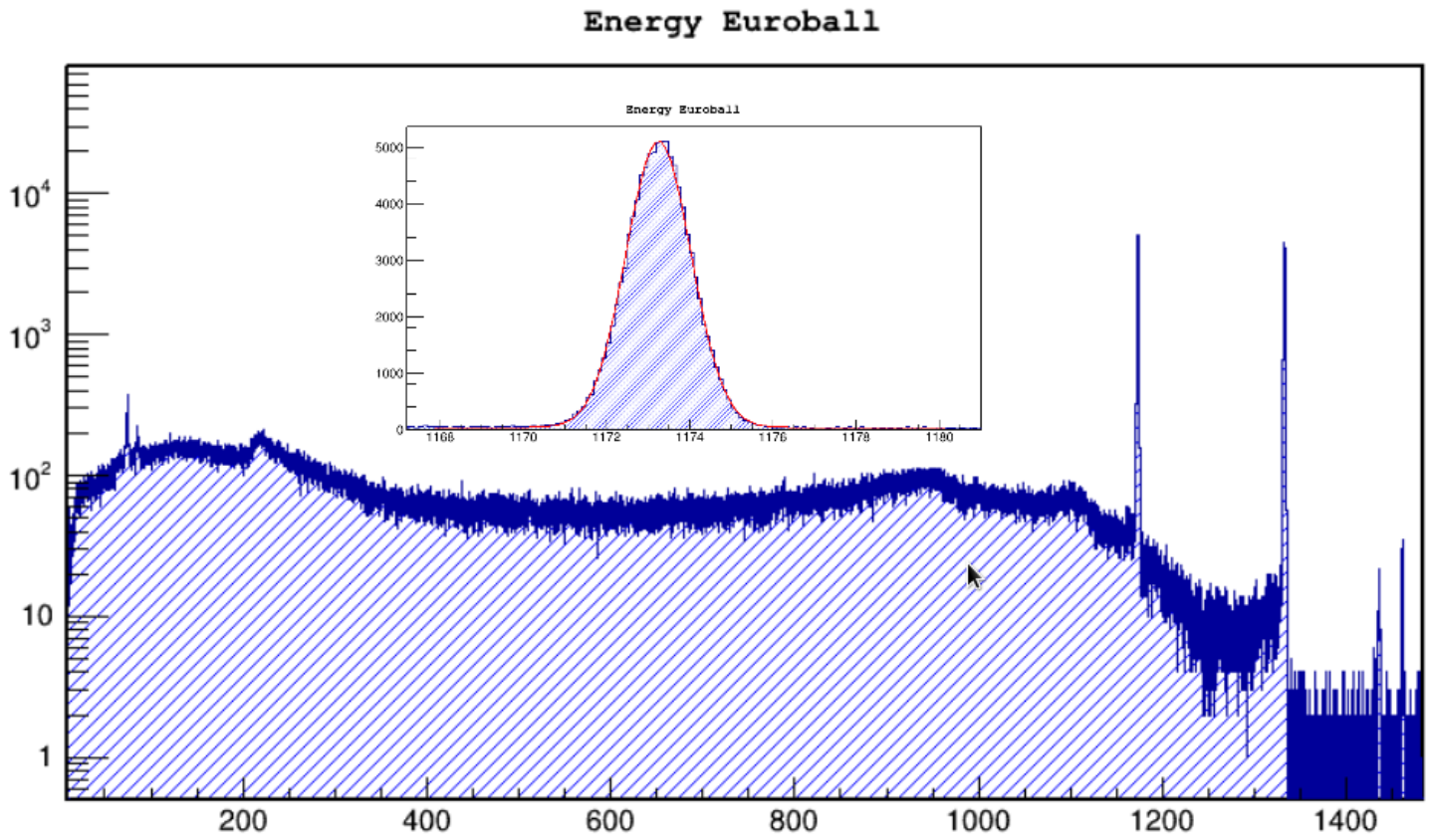


Time-stamp difference between successive hits

- When aquiring data, the window was 250* Time-stamp units
- New replays done with: 20* Time-stamp units and Time Alignment performed

Efficiency

- Gammaware, collaboration framework for data analysis was used



Efficiency

→ Online...

Efficiency

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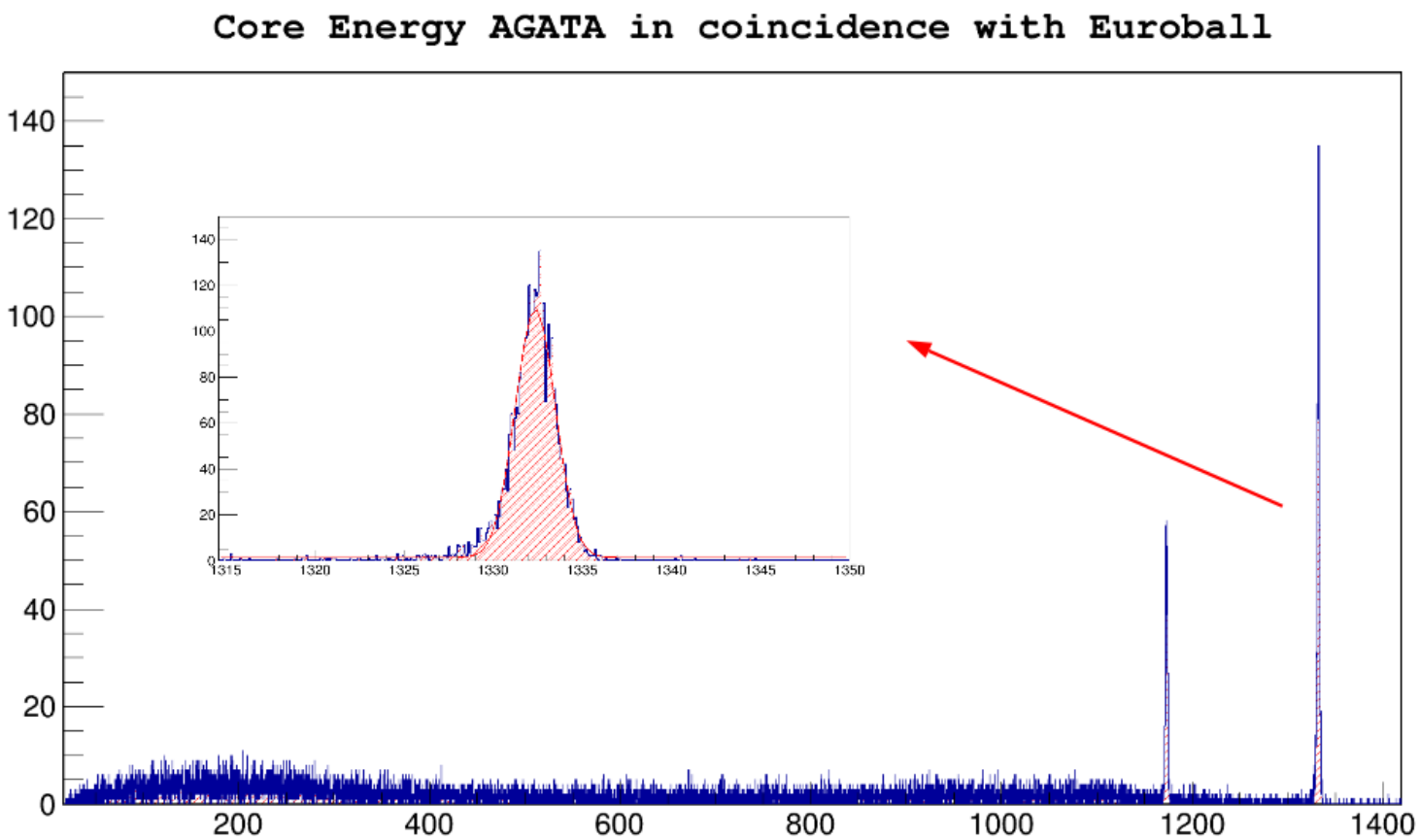

Efficiency

→ Data after the Replay with the Event Builder Time Window of 200 ns

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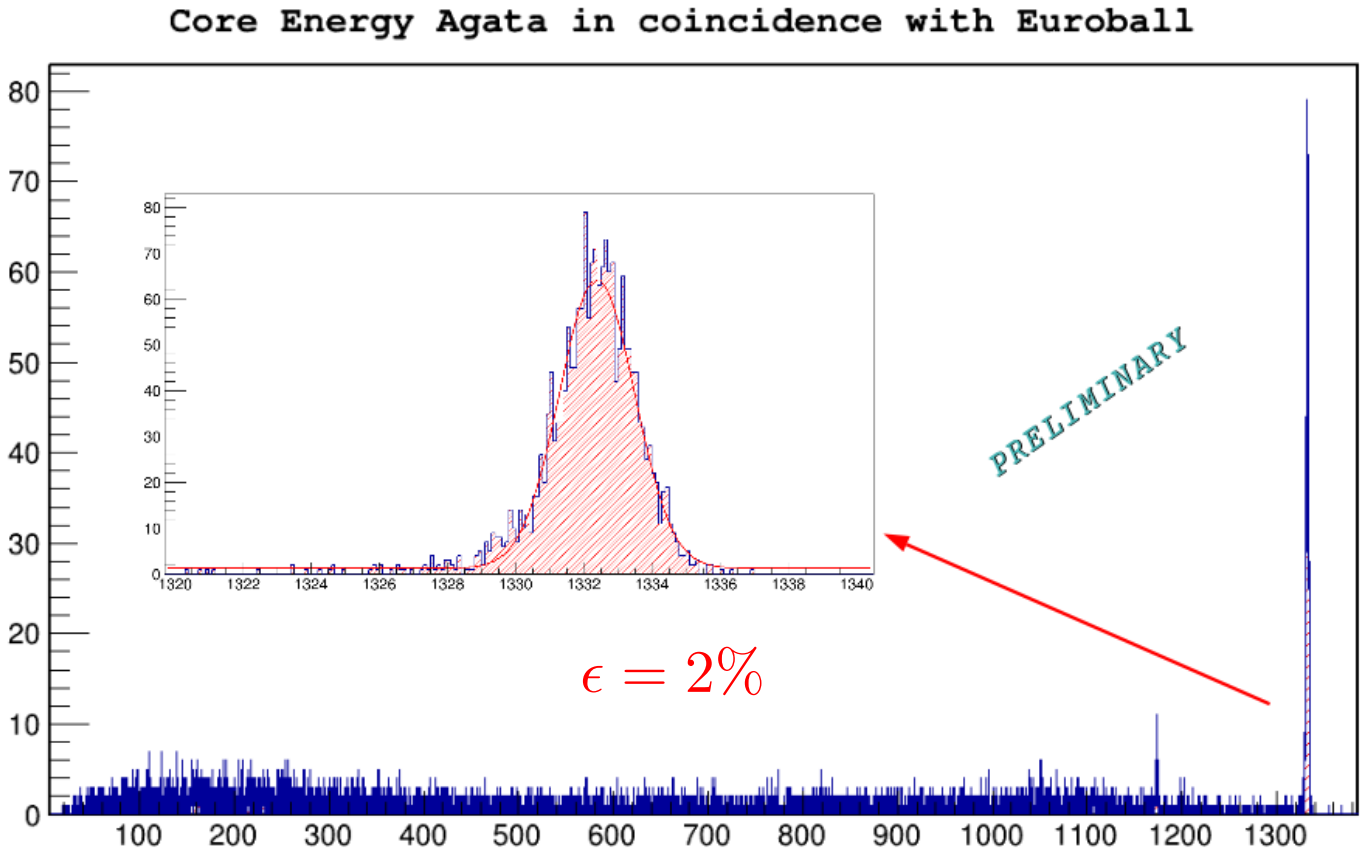


Summary and Outlook

Summary

- Agata data with different sources taken in April is under analysis
- First idea about the absolute efficiency, but not implementing tracking yet
- Absolute efficiency of $\epsilon = 2\%$ for 21 crystal

Outlook

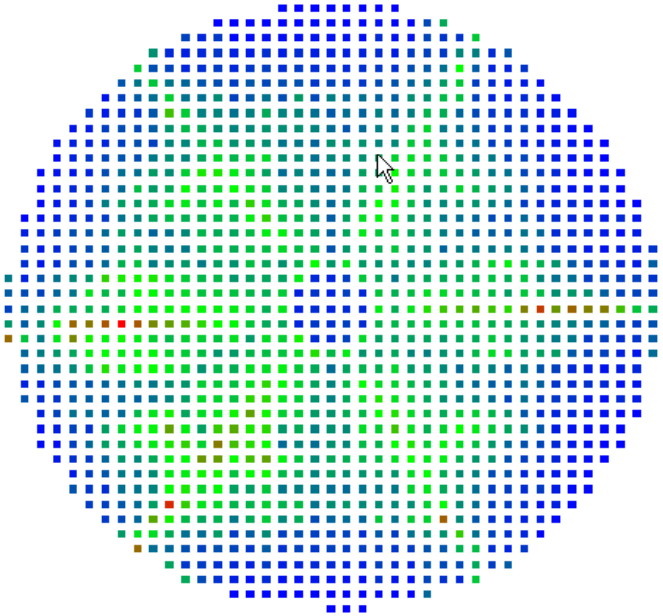
- Perform more detailed simulation for the actual setup

Outlook

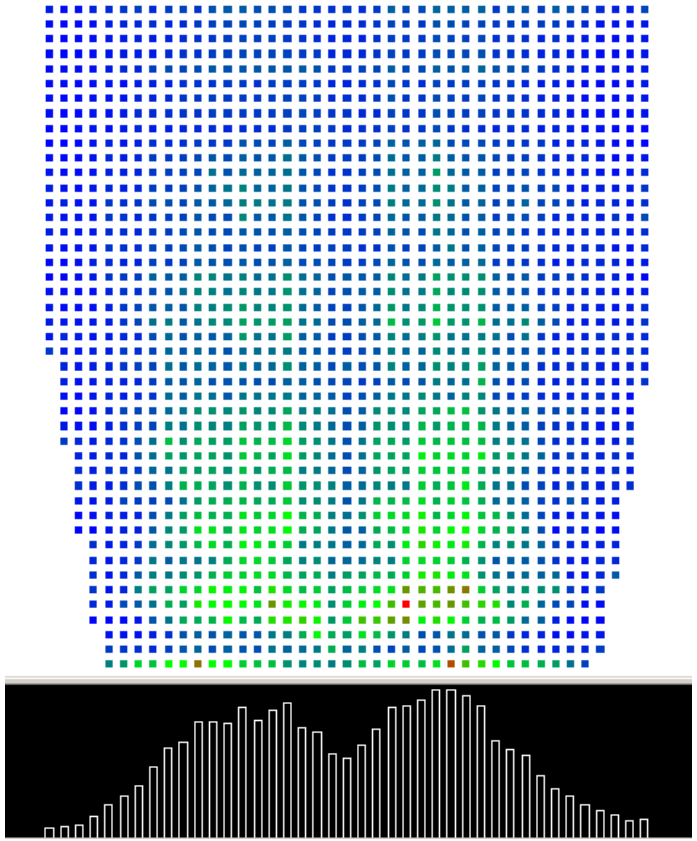
- Perform more detailed simulation for the actual setup
- PSA-quality check and Tracking ongoing
- For those detectors very "affected", correct for the radiation damage effects

Thank you for your attention

Appendix



Appendix



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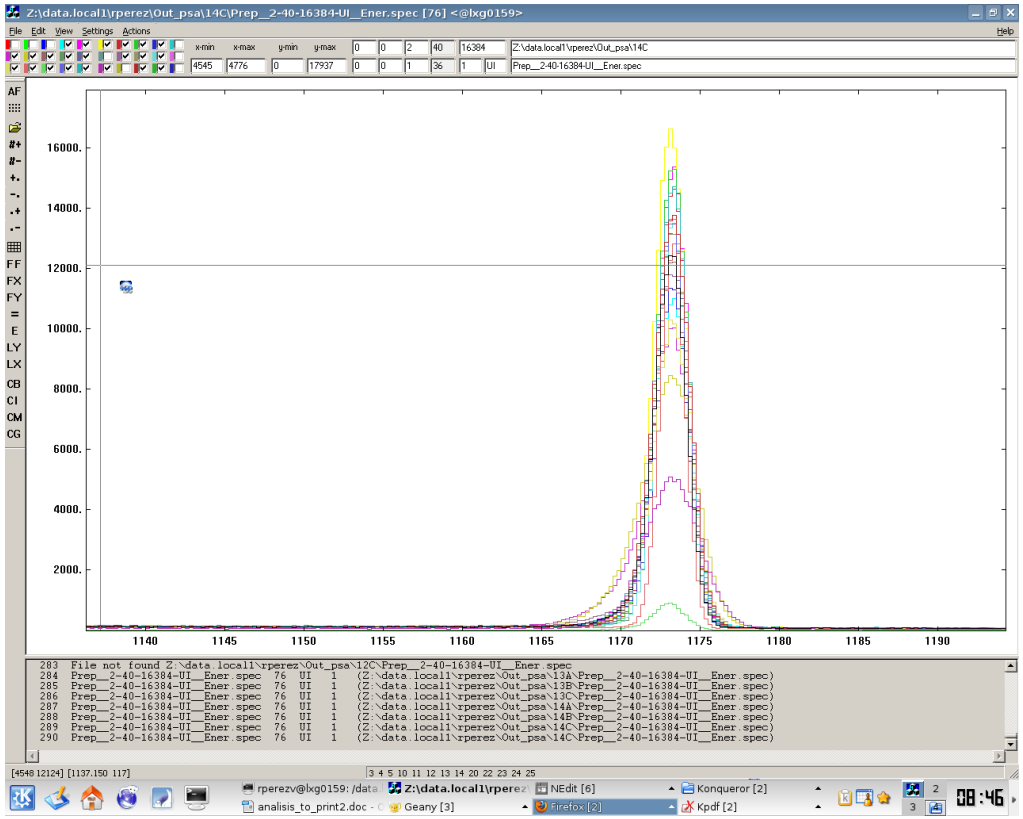
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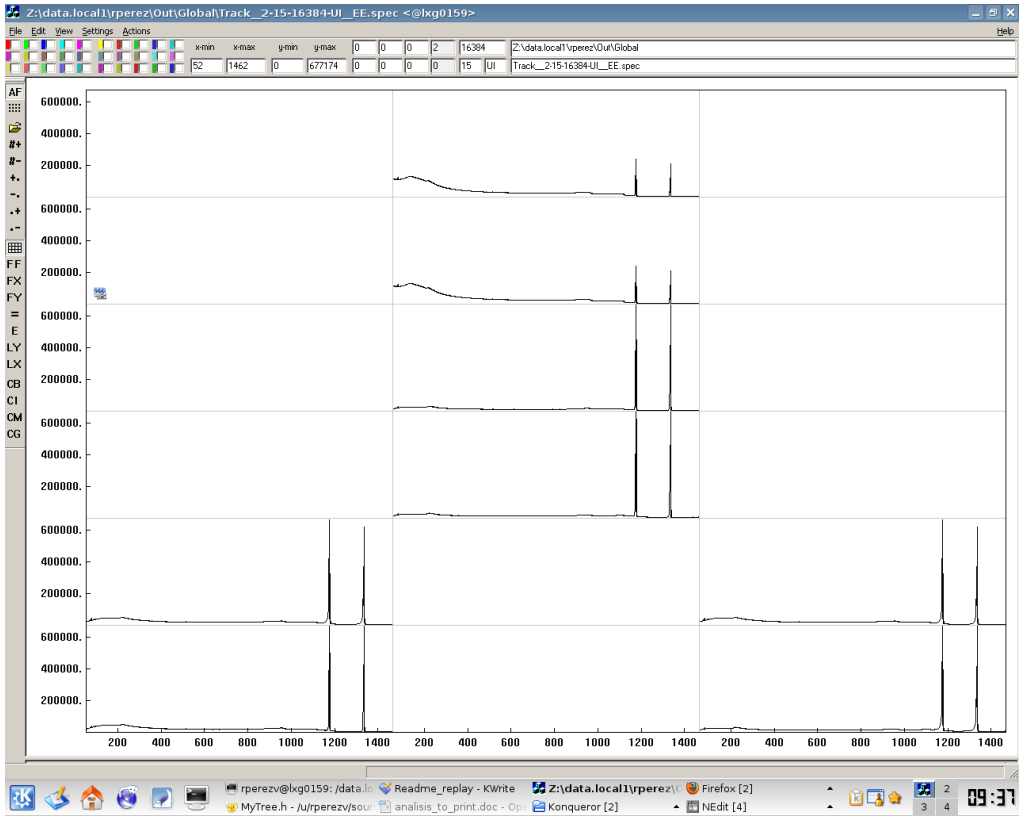
Appendix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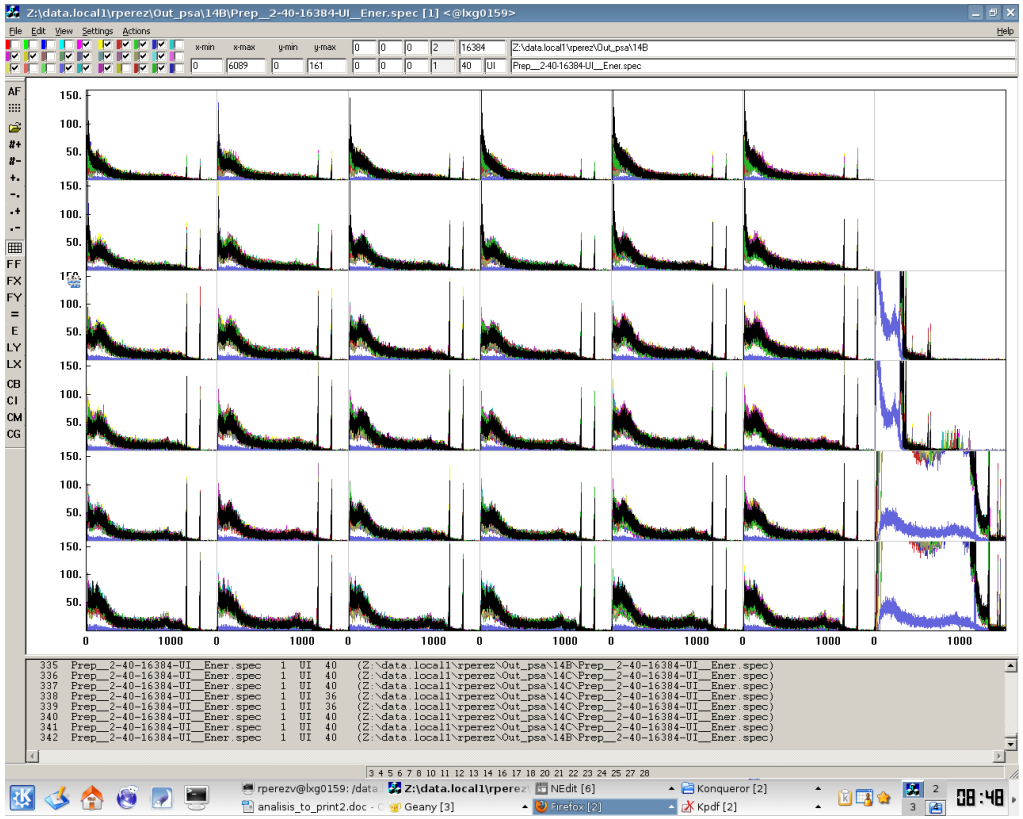
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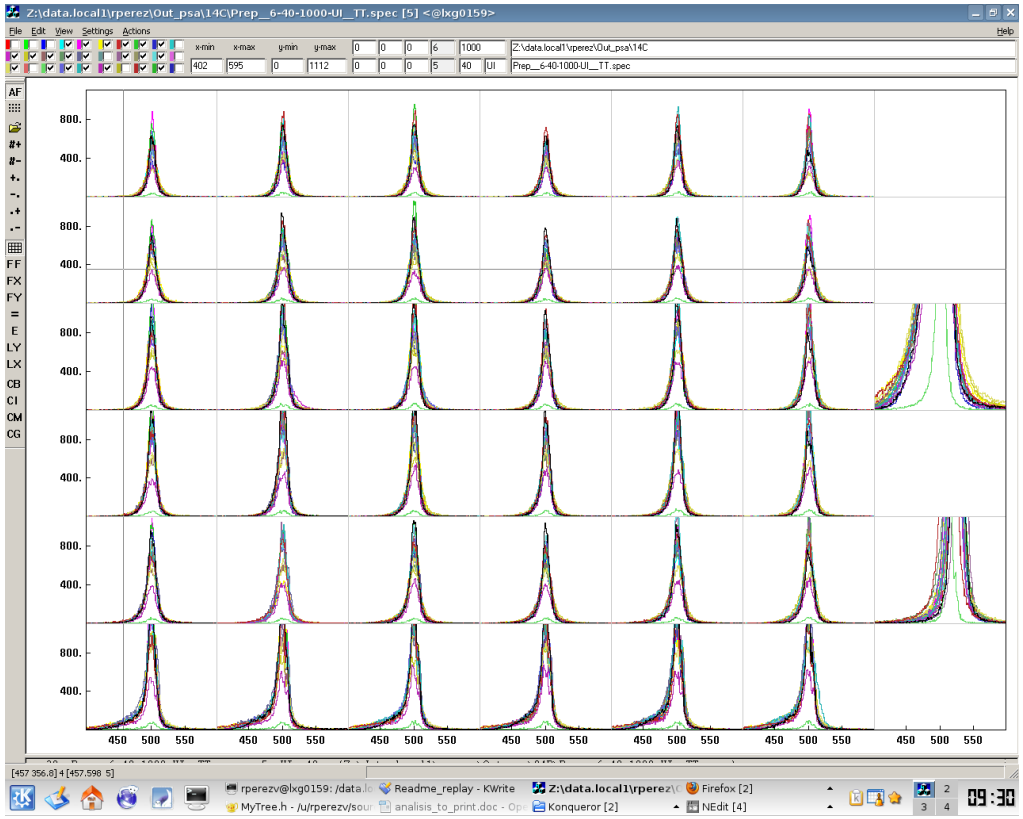

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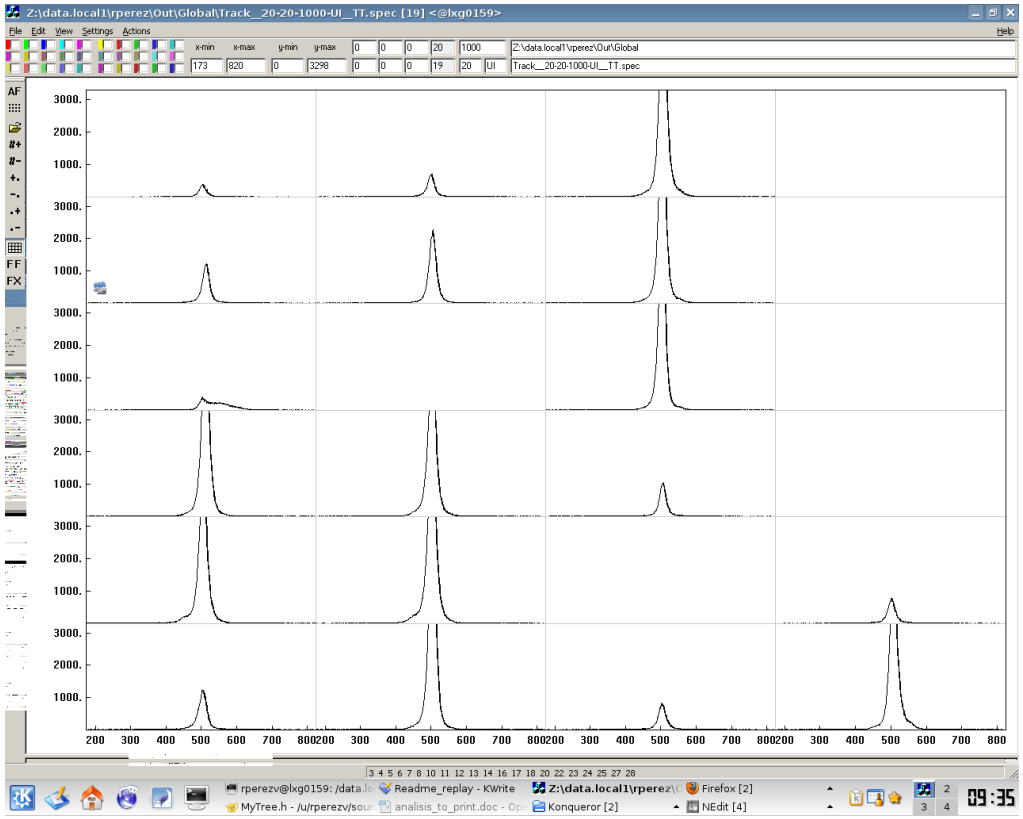
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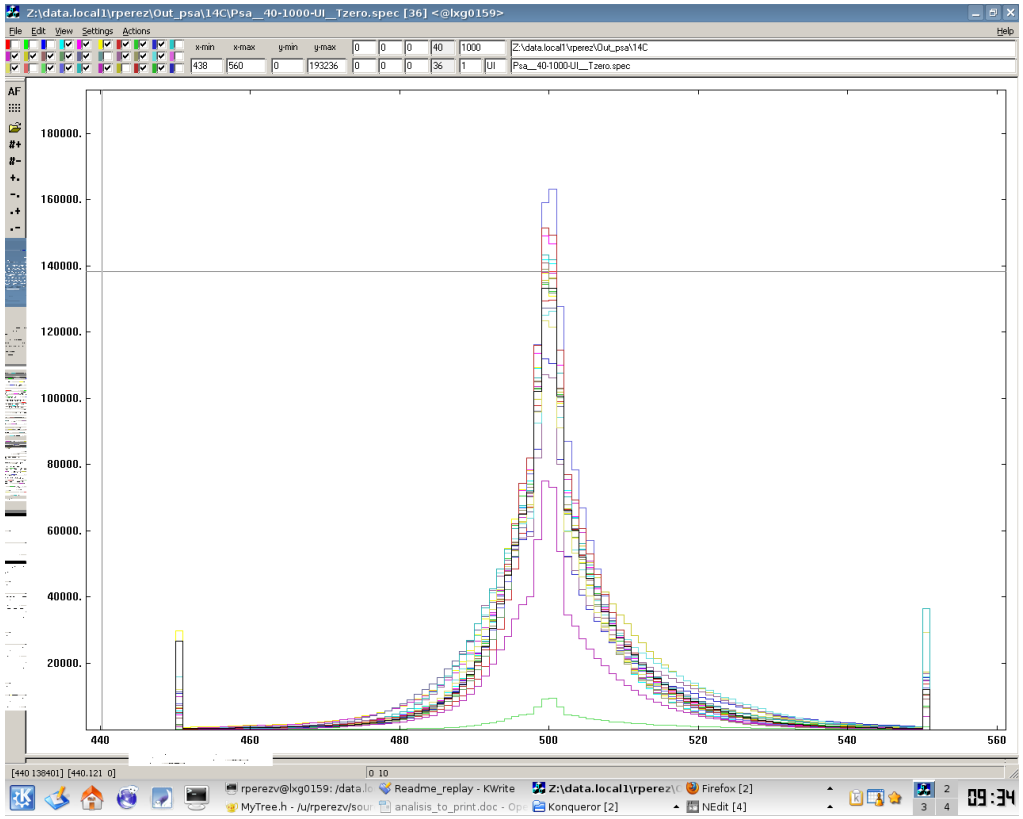
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