Problems / Challenges in Analyzing AGATA@LNL Data

Experiments from Autumn 2011

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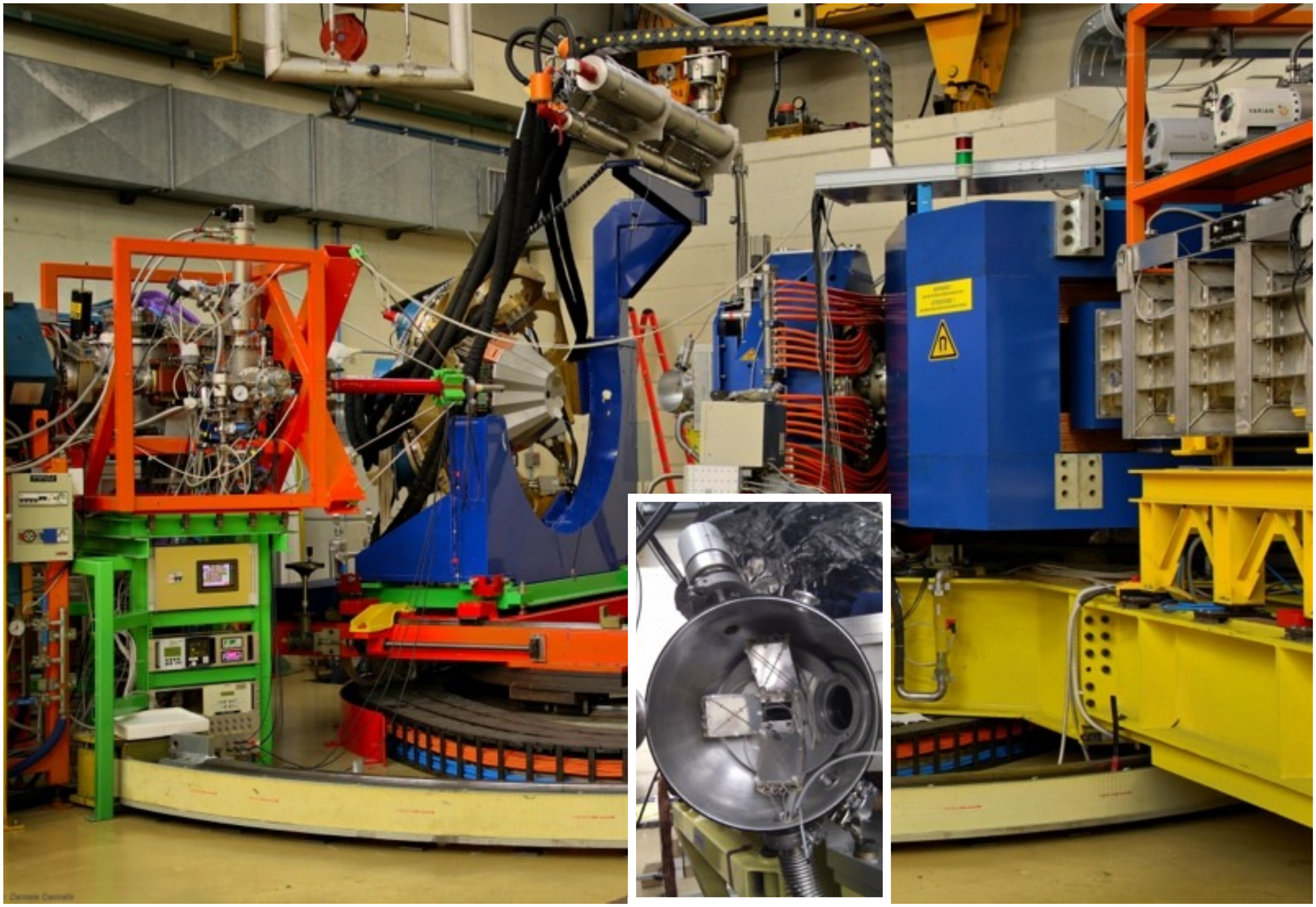
in cooperation with Philipp John

Experimental Setup: AGATA + PRISMA



Complementary Fragment Technique

Study the nuclei of interest using the complementary fragment technique

AGATA

Doppler corrected γ rays for both projectile-like (PLFs) and target-like fragments (TLFs)

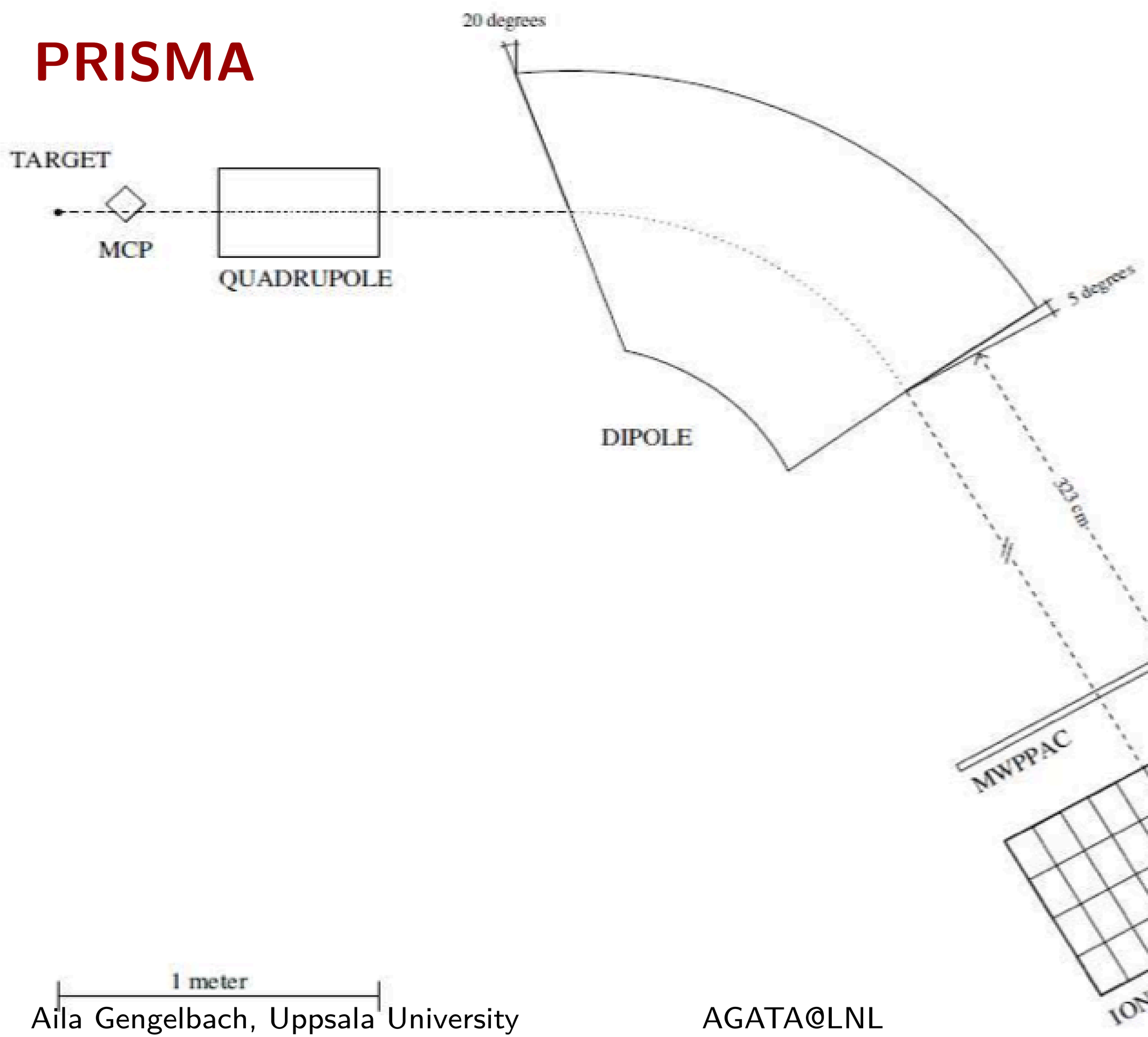
PRISMA at grazing angle

Detect PLFs: Z identification, A/q, velocity, ...

Procedure to analyze AGATA + PRISMA data

- Calibrate the PRISMA spectrometer and AGATA
- Identify the binary partner of the nucleus you're interested in
- Gate on this nucleus and study the γ-rays detected by AGATA
- Build up a level scheme

PRISMA


20 degrees
TARGET
MCP
QUADRUPOLE
DIPOLE
5 degrees
323 cm
72 cm
MWPPAC
IONIZATION CHAMBERS
1 meter

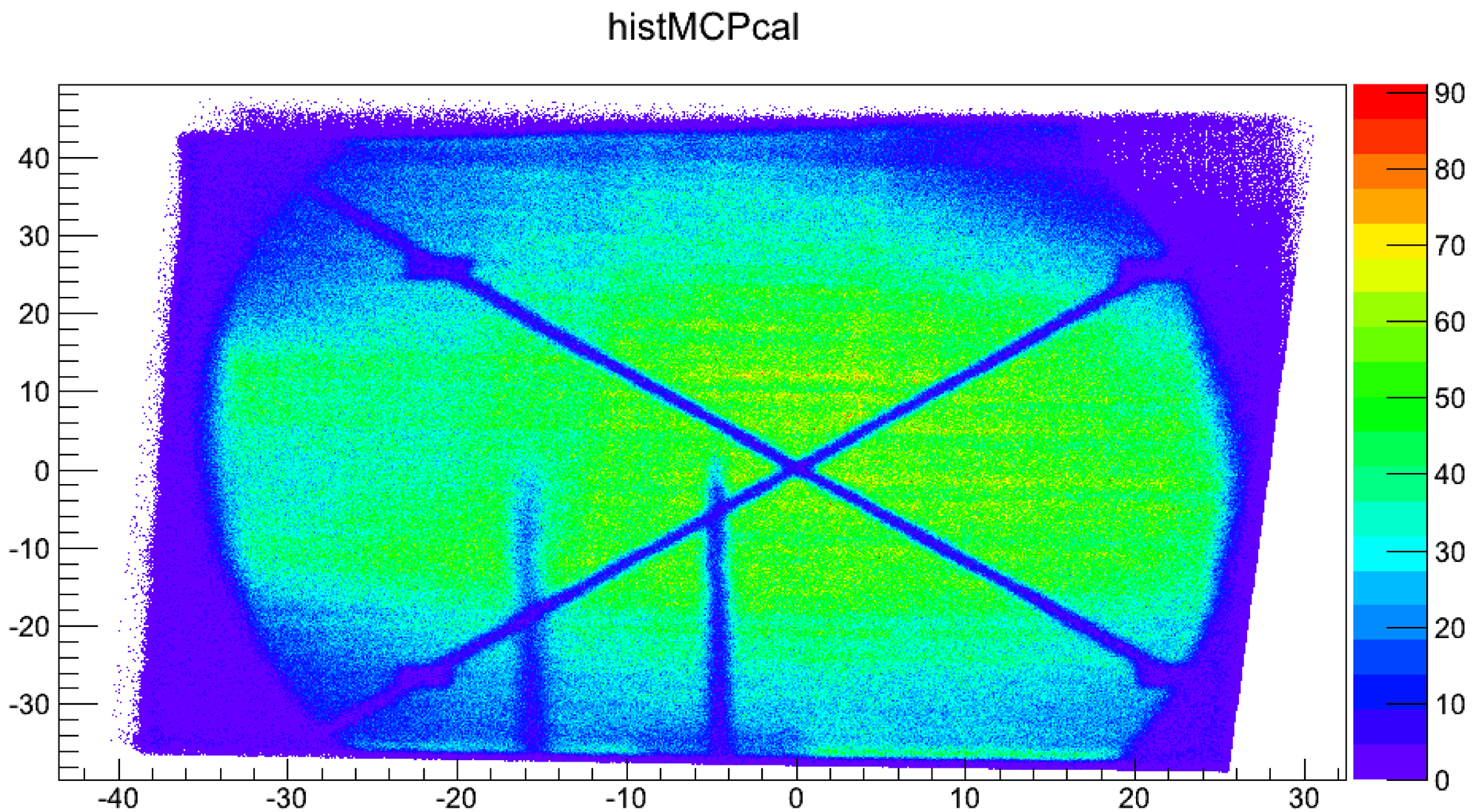
Data Analysis

MCP

`START`

Use cross for calibration:

The central ion trajectory does NOT pass through the center of the MCP!



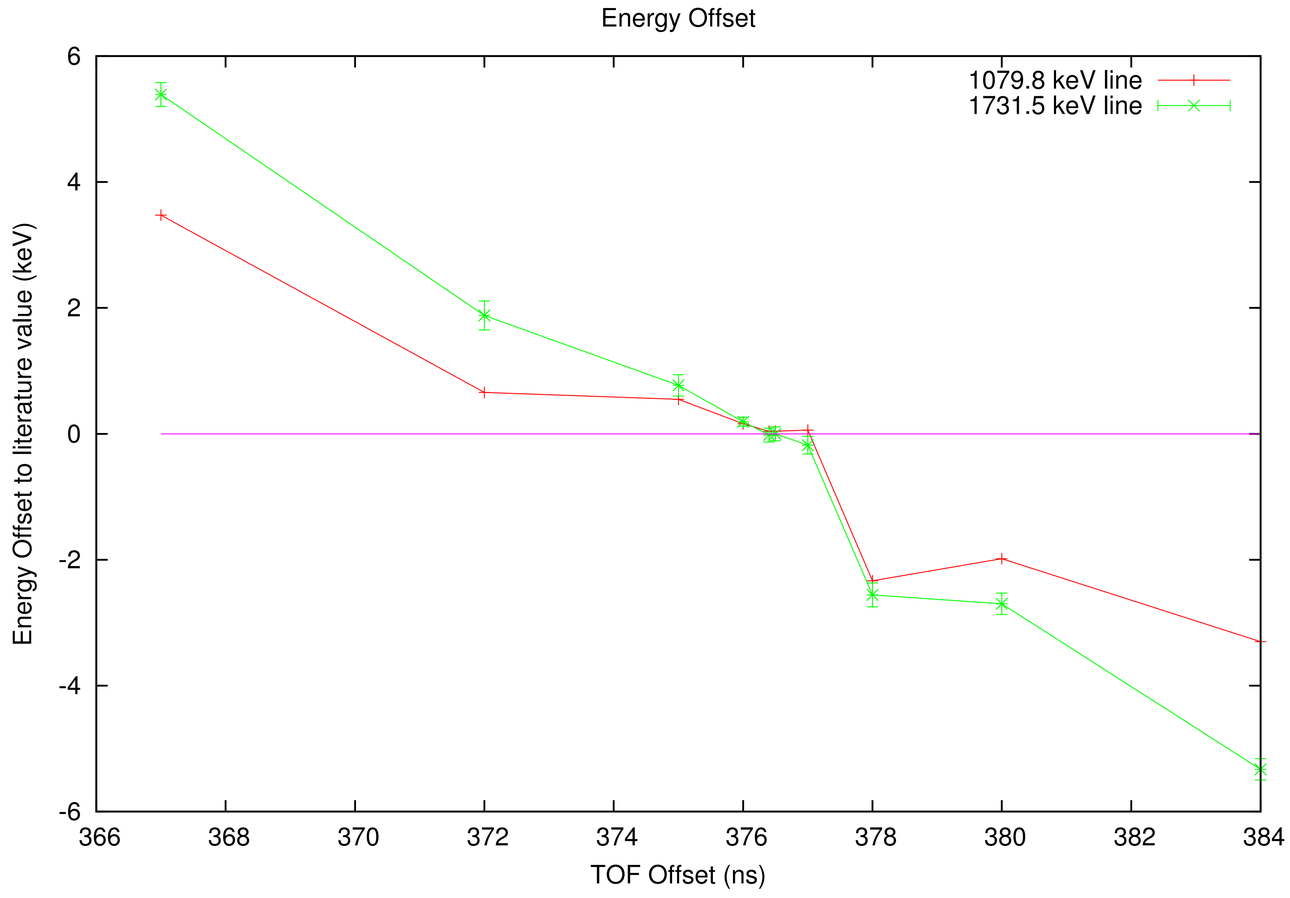
Data Analysis - PRISMA

MWPPAC

TOF between PPAC and MCP

Good alignment
$\Rightarrow$ good mass resolution

Position of DC peaks for TOF finetuning

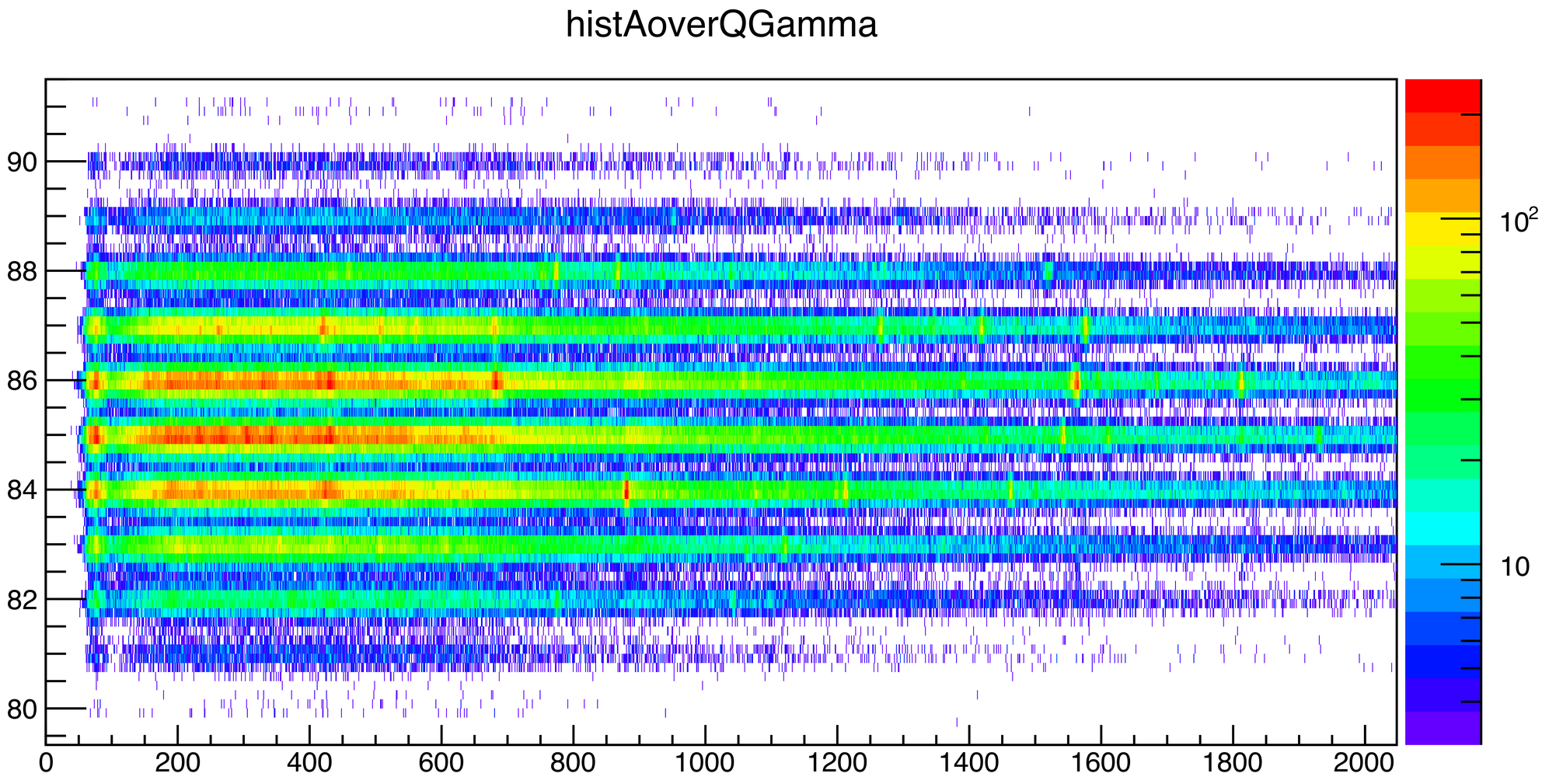


Data Analysis - PRISMA

Trajectory Reconstruction

Approximation for length of trajectory might be too crude

Change `quad_length` and `target_quad_distance`



Data Analysis - PRISMA

Ionisation Chamber

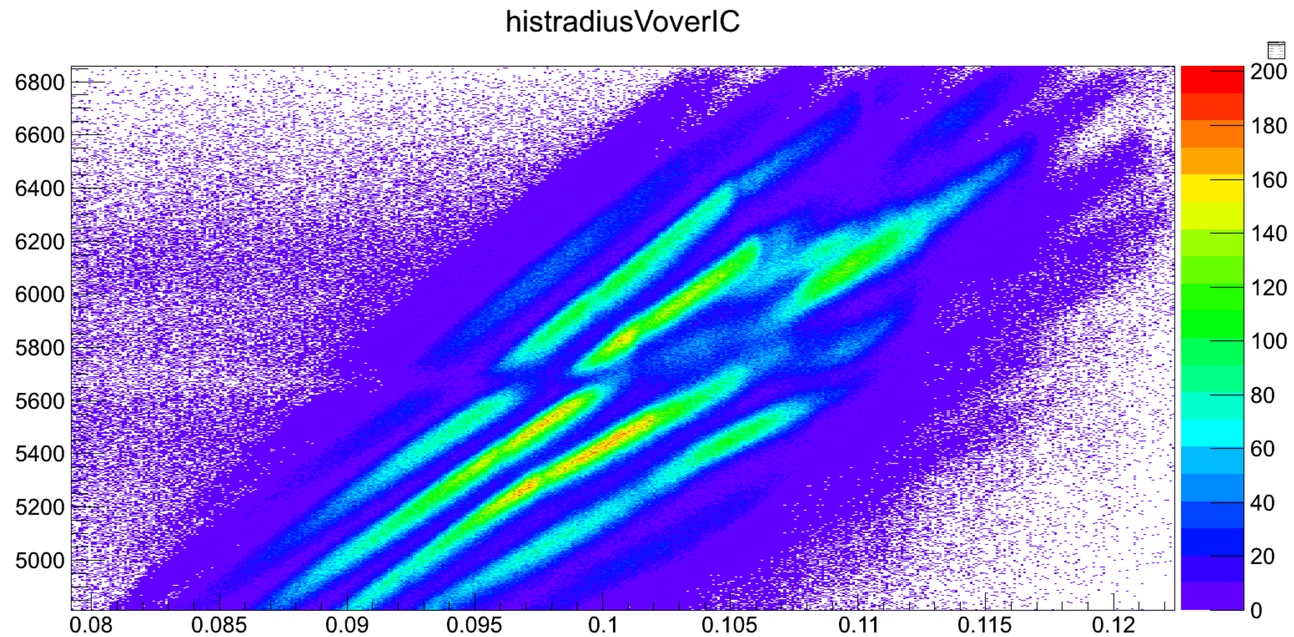
Used for Z-Identification

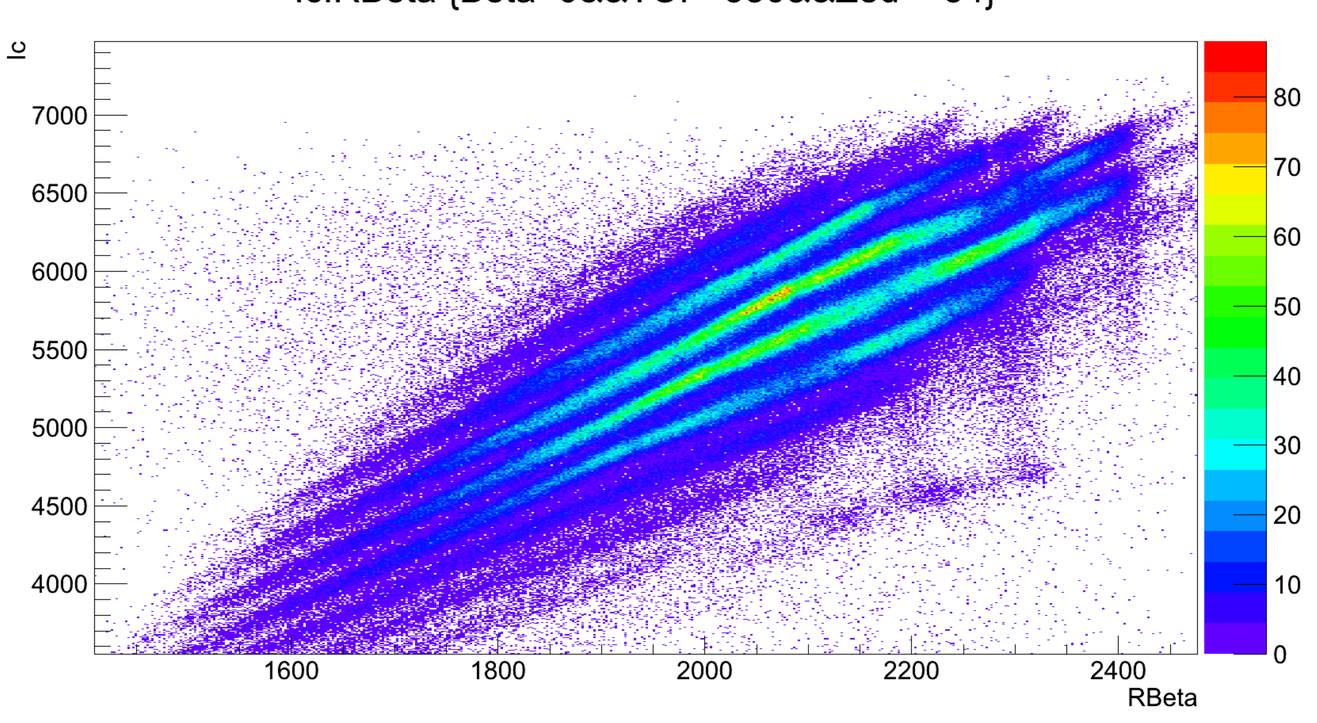
Different calibrations for each gain

Adjustment may be needed

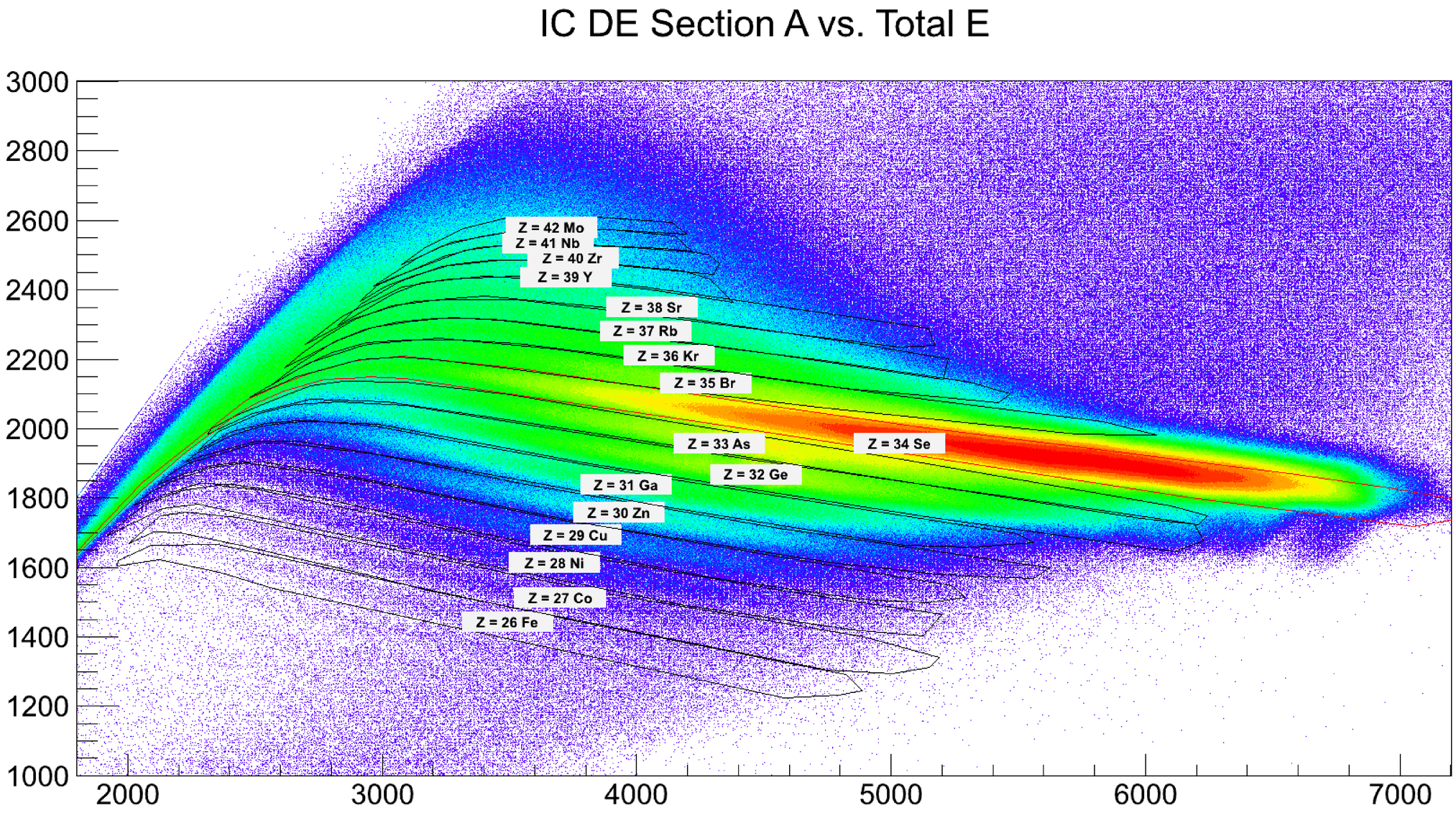
One pad is broken!

Instead of analyzing each section separately: Align TOF!





Data Analysis - PRISMA

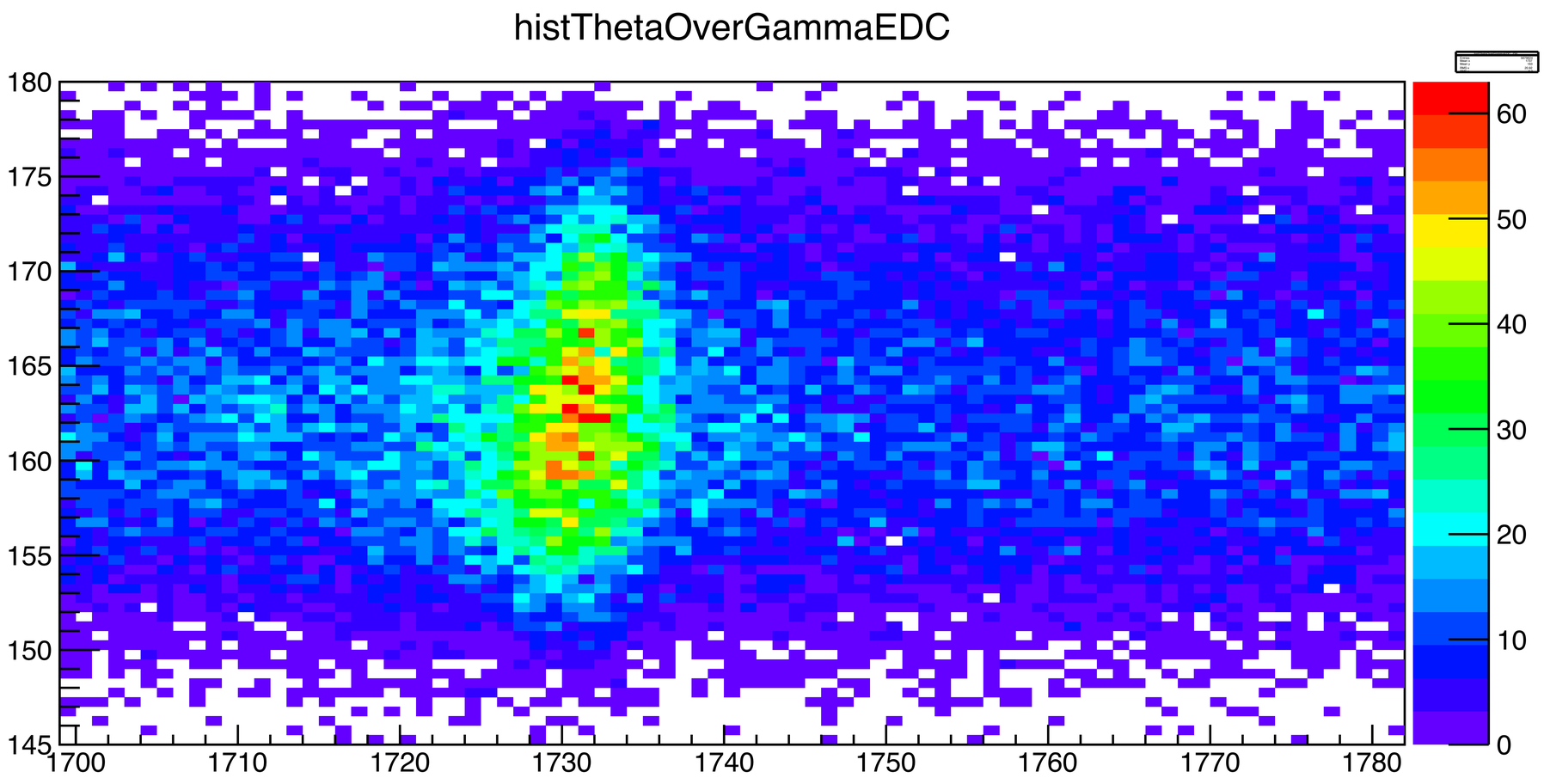


Data Analysis - AGATA

Distance AGATA - PRISMA

Need to be checked

Use FWHM of one peak



Position of AGATA moved by a few cm

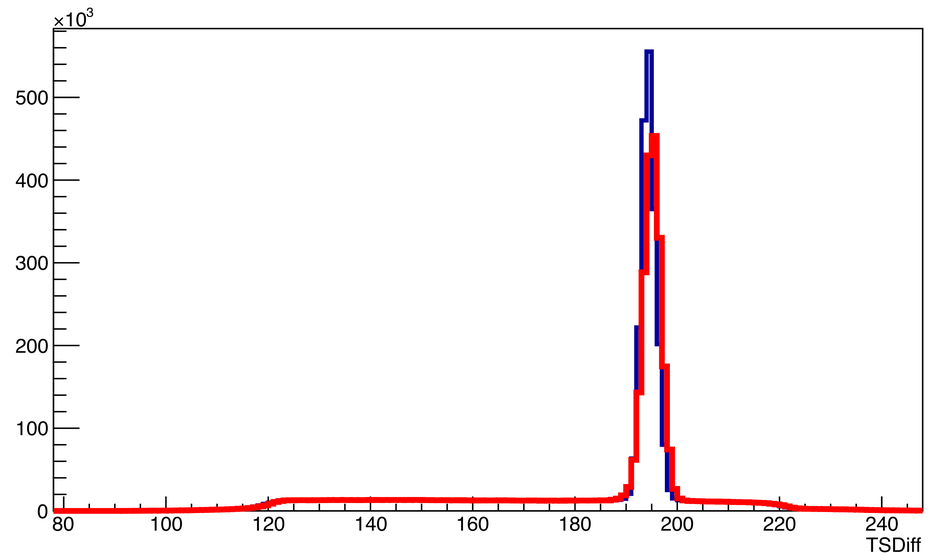
Data Analysis - AGATA

TSDiff

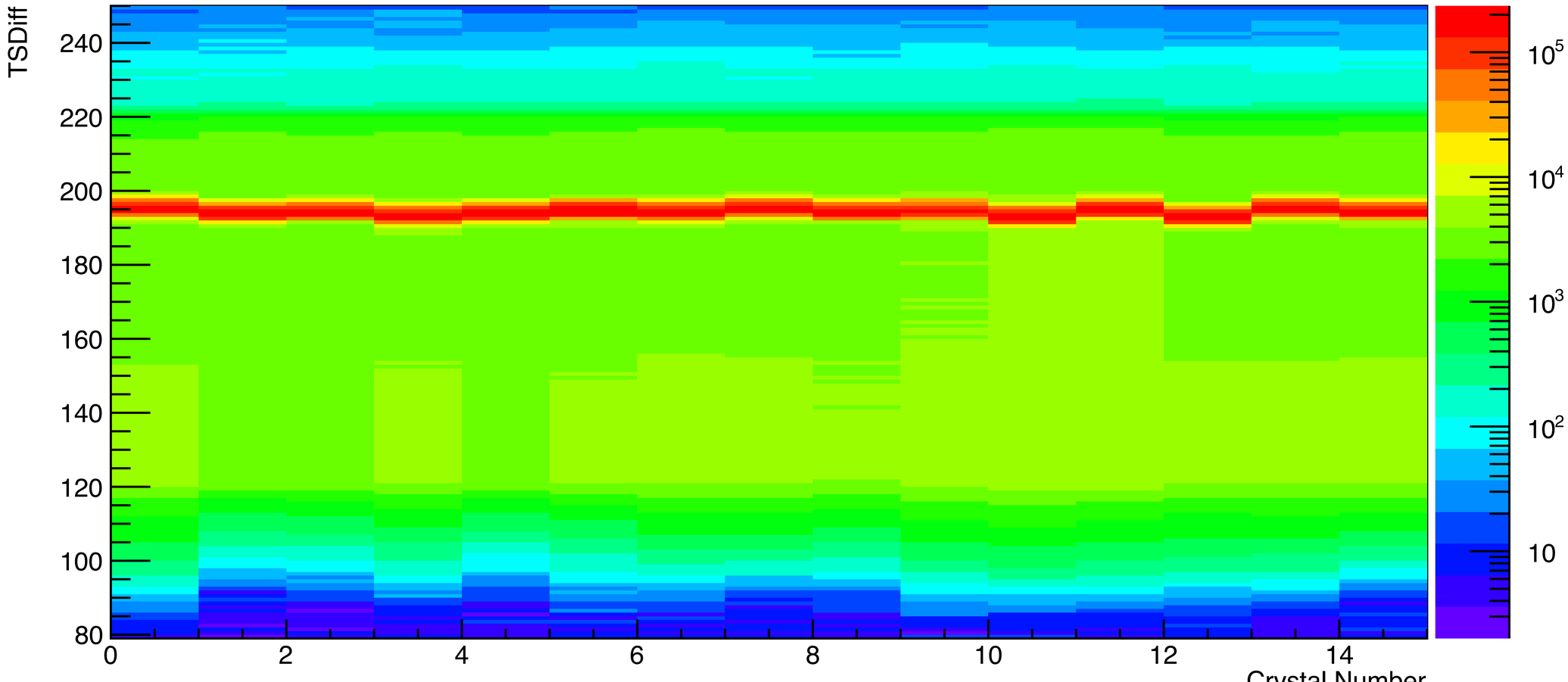
When MWPPAC is used as a trigger:
Correct the time difference by
$\texttt{TSDiff} + 0.1 \cdot \texttt{TOF}$

If timestamps are not aligned properly, do it manually

Difference with TOF included



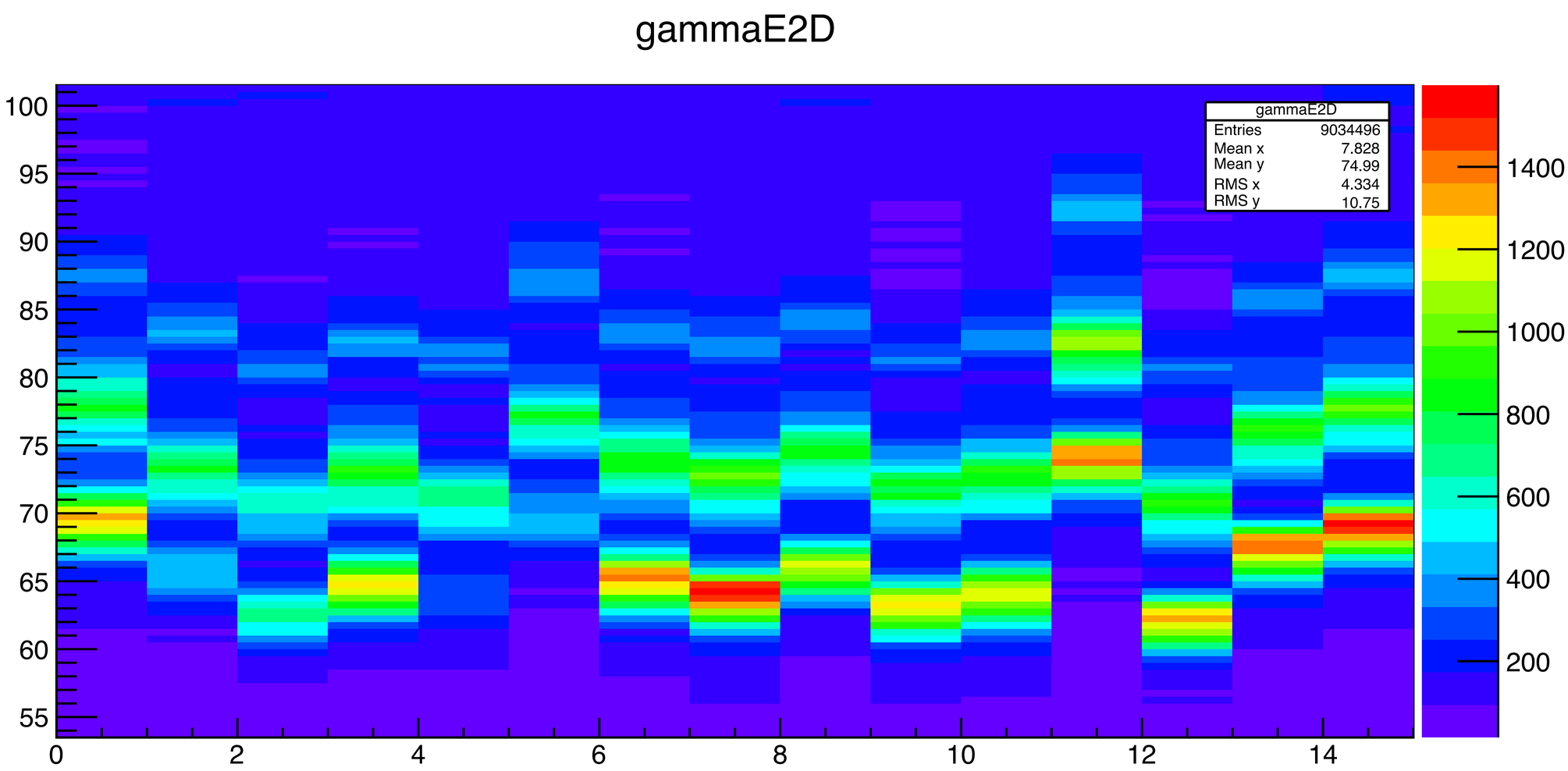
Time Stamp Difference



Data Analysis - AGATA

Energy Calibration

Check your energy calibration (and the input files for the tracking)!



Data Analysis

AGATA

- Check the distance between AGATA and PRISMA using the FWHM of one peak
- For background suppression use the acceptance level of the tracking (difficult!)

PRISMA

Do the analysis within the PRISMA library!

- Check where an event is rejected (error codes) and what might go wrong there
- Try to take as many events as possible
- Try to go down in energy as far as possible
- Use all information available for Z identification
- Nice spectra when using the Q value (plunger experiments)

Try to automize your analysis!

Results

Philipp John, LNL Annual Report 2011