Muon matching using the Backing Calorimeter of ZEUS

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ZEUS Summer Student Closing Session

- The Backing Calorimeter
- Motivation
- The BACMATCH algorithm
- Results of tests with MC
- Conclusions and plans on the future

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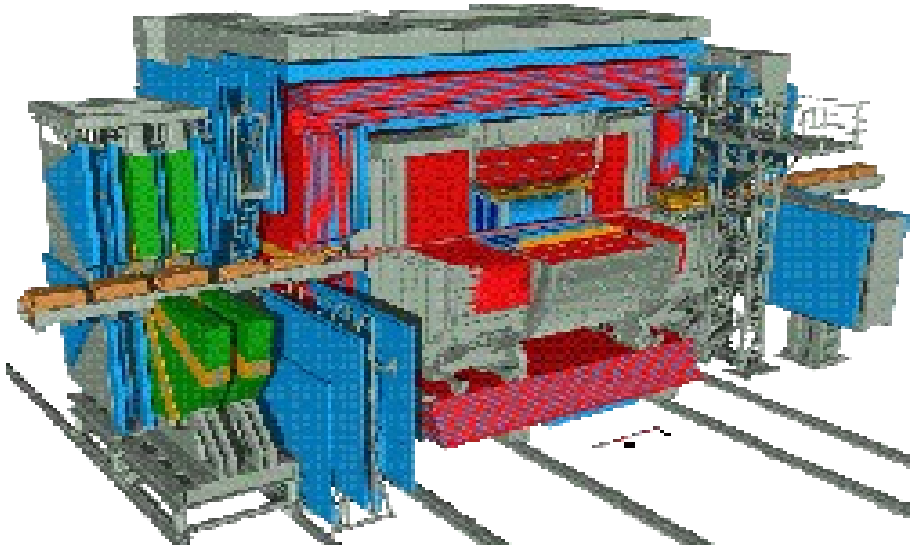
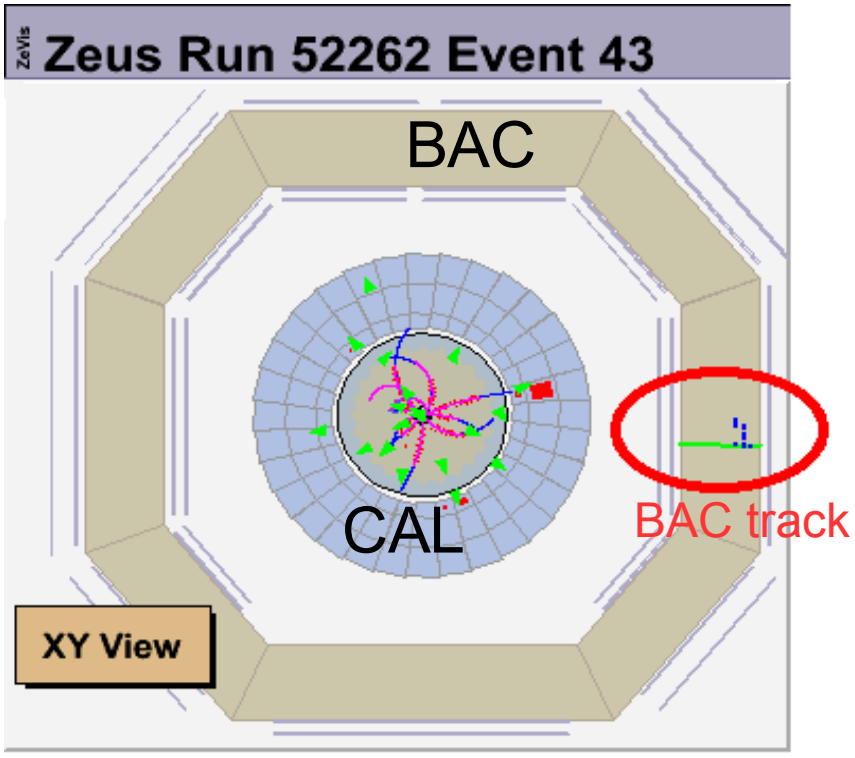
The Backing Calorimeter (BAC)



- Gaseous detector with full coverage.
- Remote – only muons can reach it.



Which inner track corresponds to the BAC track?

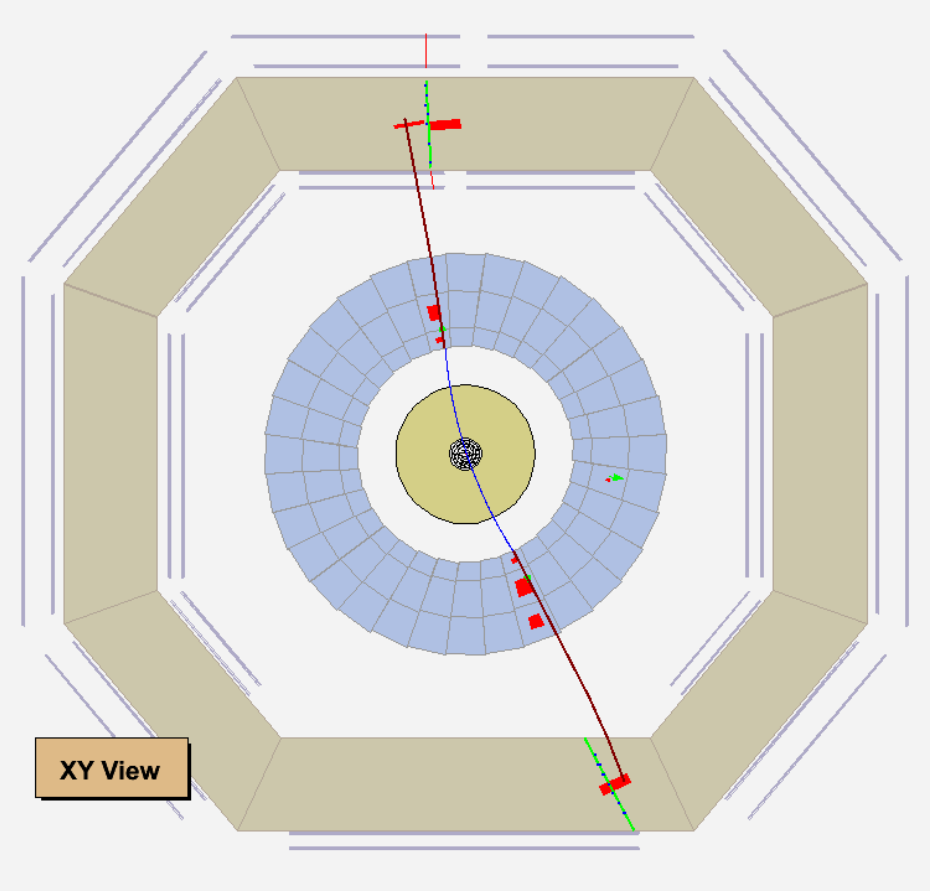
Motivation

BAC muon matching algorithm already exists, but it extrapolates tracks linearly. I want to create more sophisticated one, that has to:

- take the magnetic field and multiply scattering into account
- estimate the error of the track extrapolation
- use χ^2,rather than distance deviation ,as a quality of matching.

A decrease of muon background expected

The BACMATCH

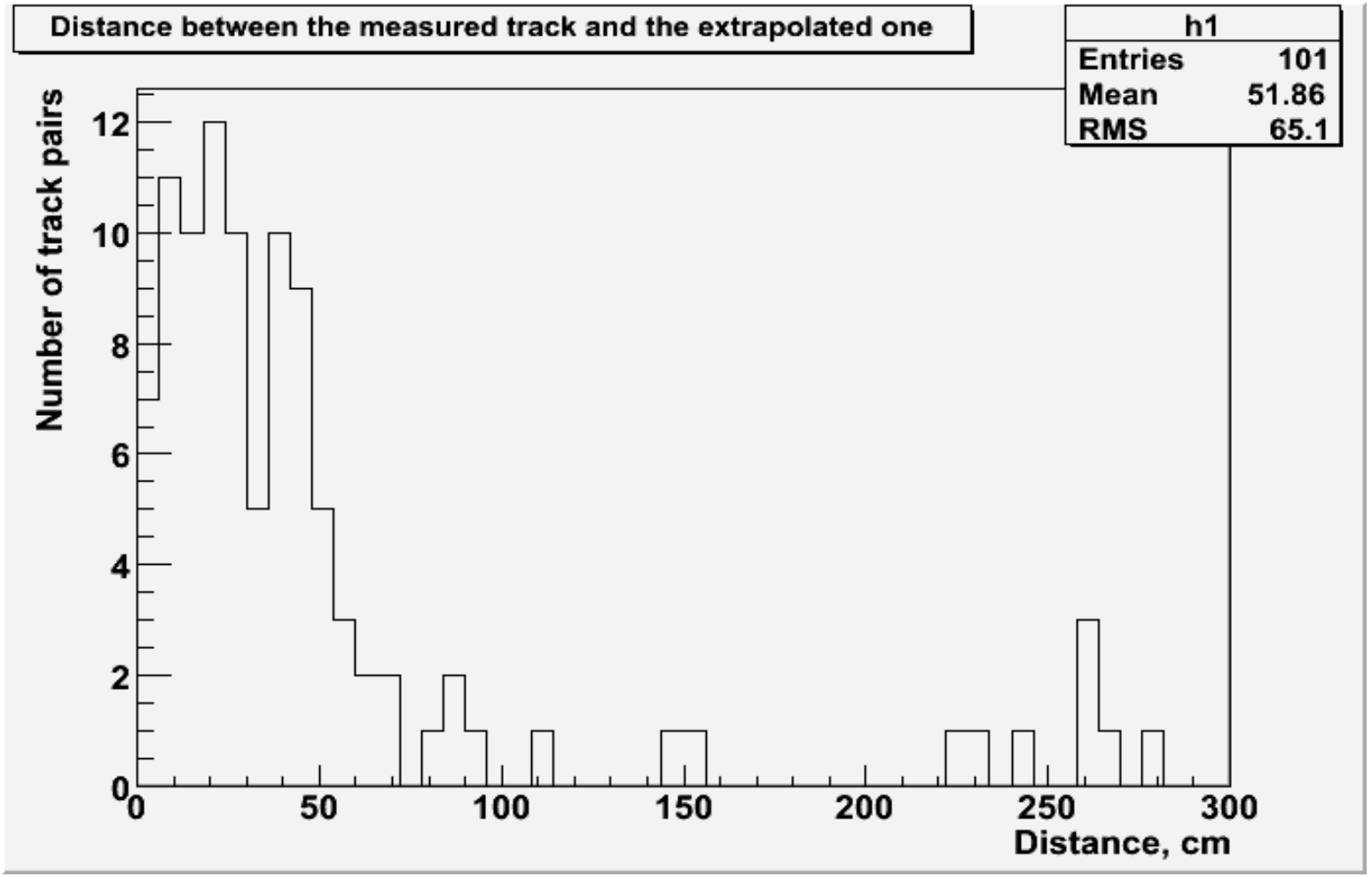


MC dimuon event, XY View
—— GEANE extrapolation

- Extrapolate inner tracks... Done!
- Give a quality of the matching (e.g. χ^2) – Not yet...
- Write out result to ORANGE block... The block already exists.

BACMATCH repeats the idea of the BREMAT algorithm (by G. Abbiendi)

Results of tests with MC



Cuts:

- Both the wire and the pad readouts are present
- The track has enough momentum to reach BAC

- Most of the extrapolated tracks deviate less than 50 cm from the BAC measured track

Conclusions and plans on the future

- BACMATCH algorithm is intended to distinguish good muon candidates.
- Significant part of the work was done.

I'm going to:

- Calculate χ^2 of matching
- Make BACMATCH a separate PHANTOM module
- Provide interface to it through the EAZE_JOB control card
- Lots of tests, error handling, documentation, ...

I need more time to finish my work

Thank you for attention