Electron-Muon Ranger (EMR)

Progress Report

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On Behalf of the EMR Group

MICE Collaboration Meeting 34
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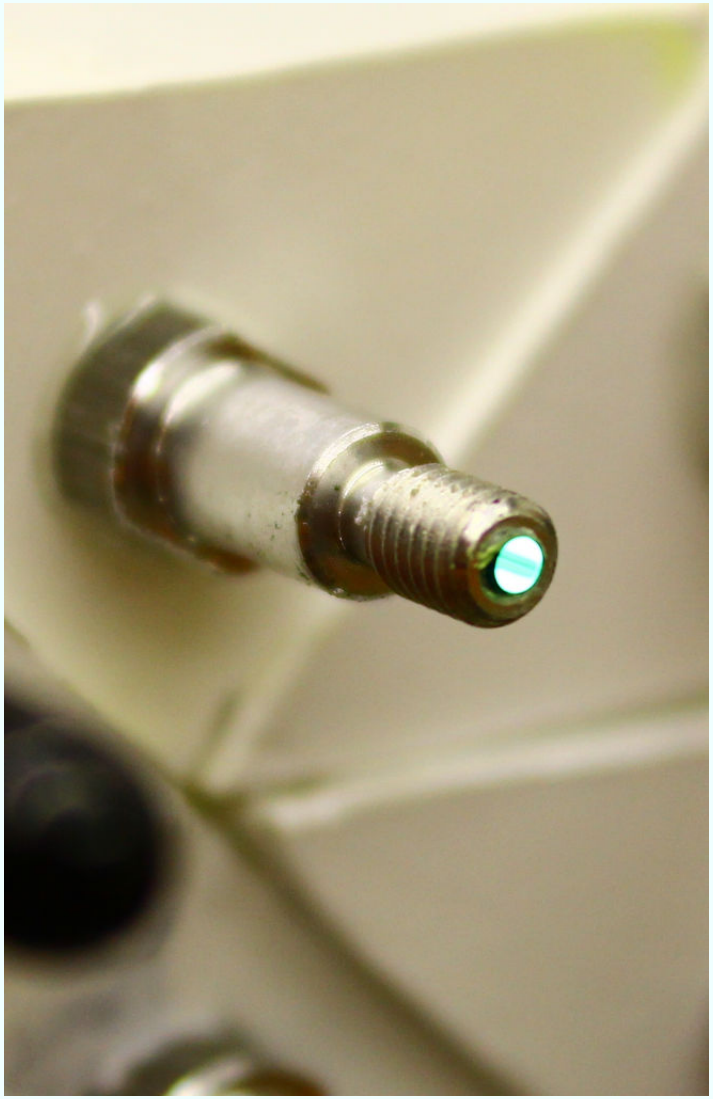
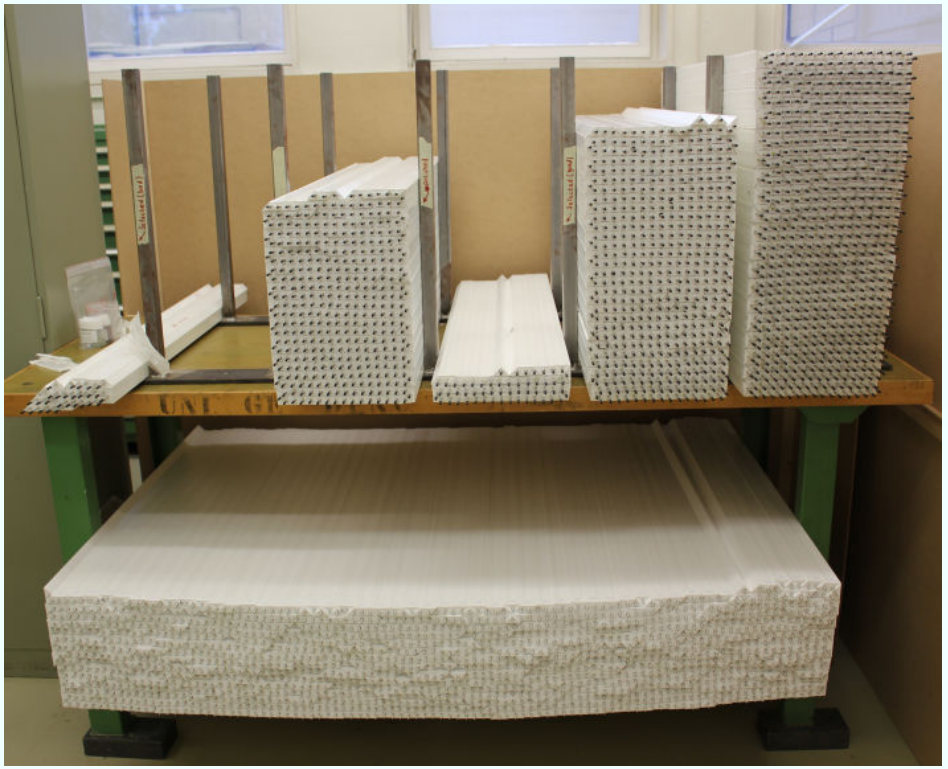
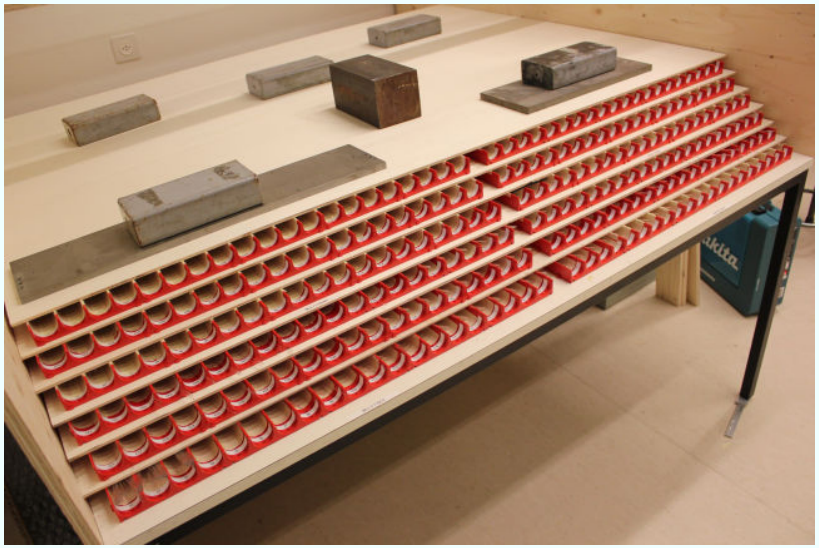
Production Status



- 100% of bars glued (∼3300)
- 50% polished

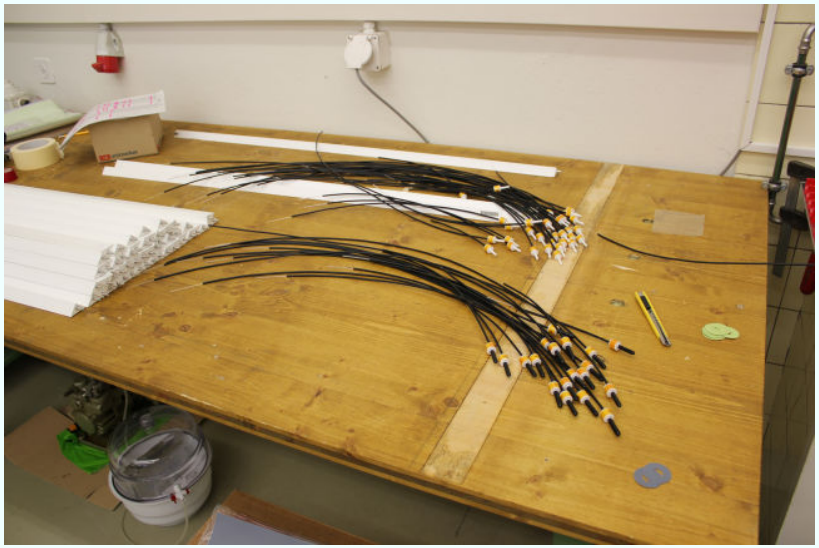


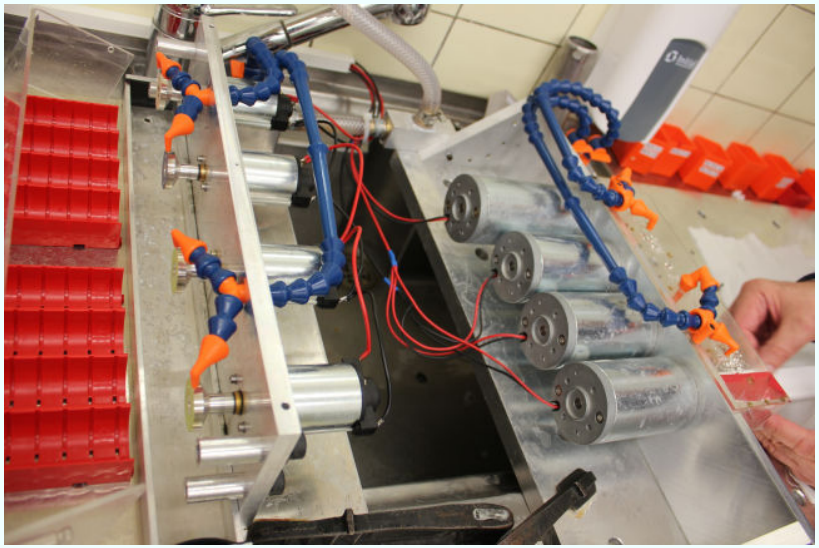
Clear Fiber Assembly Line



- each clear fiber has individual length in order to reduce stress due to bending
- special storage for clear fiber was made (left)

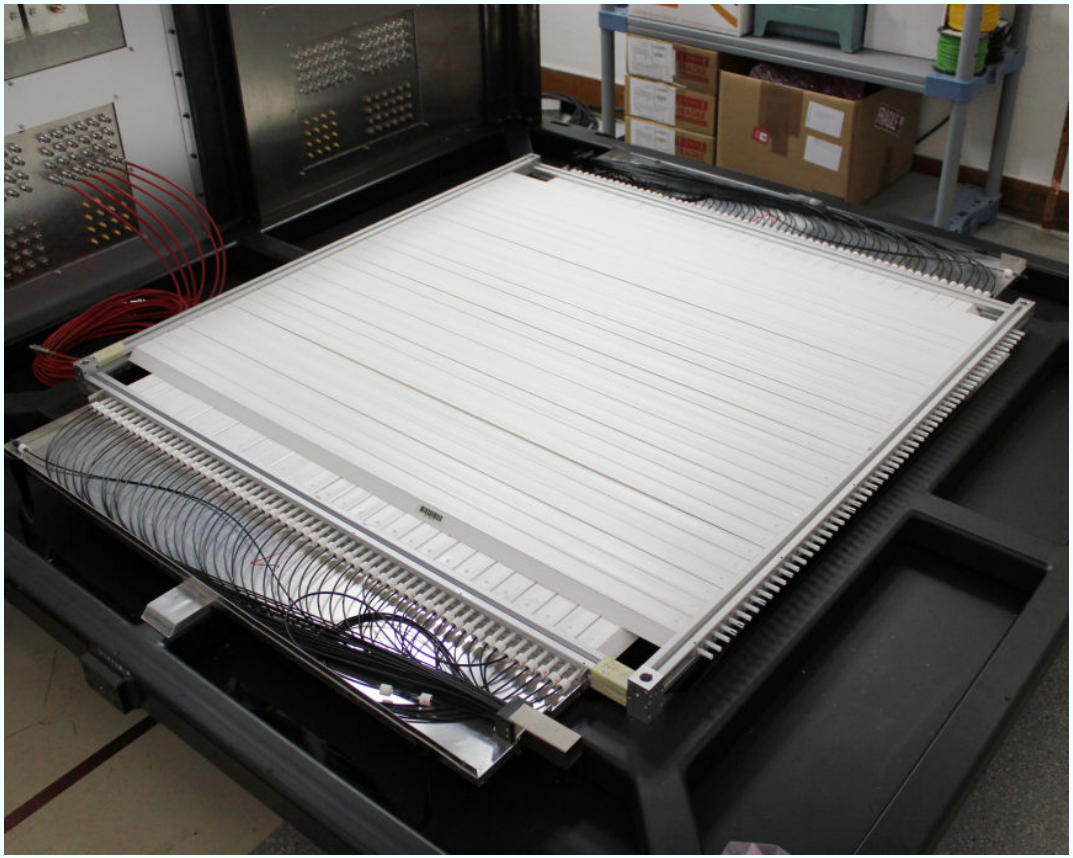
Clear Fiber Assembly Line





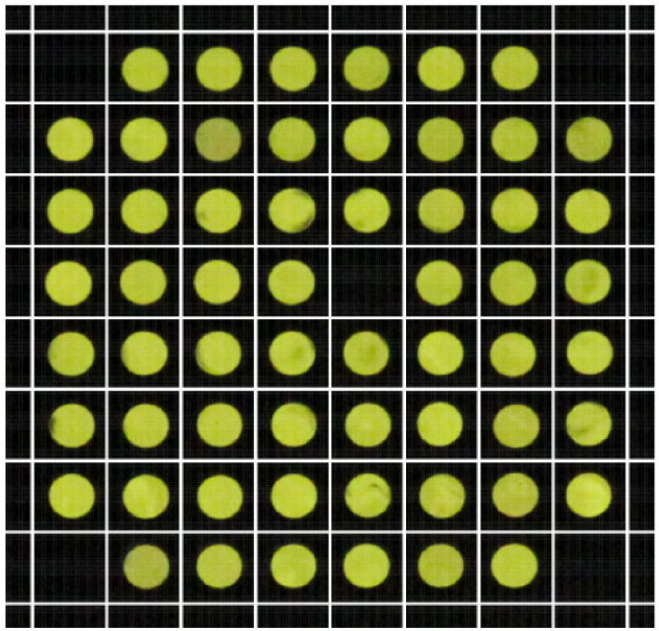
- small fiber connector is glued at one end of each clear fiber
- ... and polished

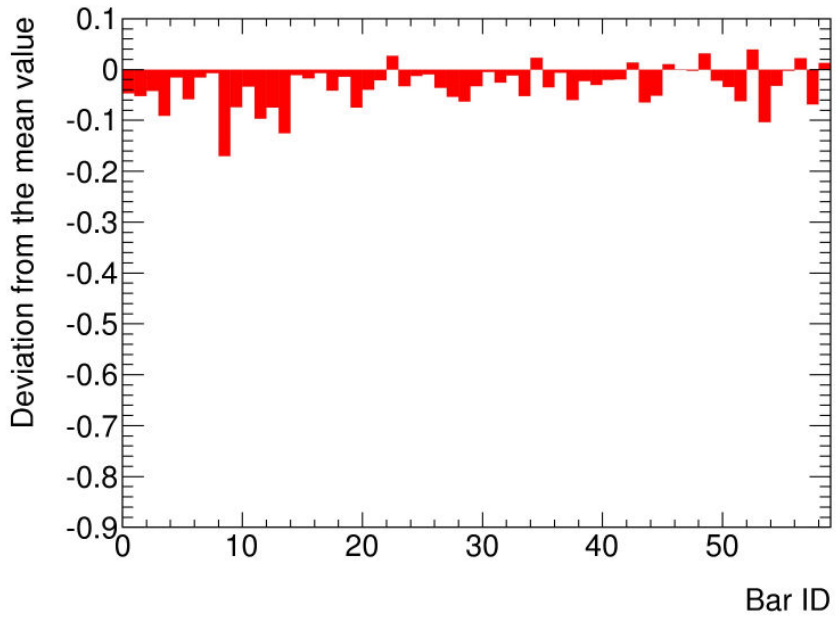
Final Module Assembly



- one plane was assembled in its final configuration
- ... and tested with digital camera

Final Module Optical Test





- light output of all the channels is within acceptable limits

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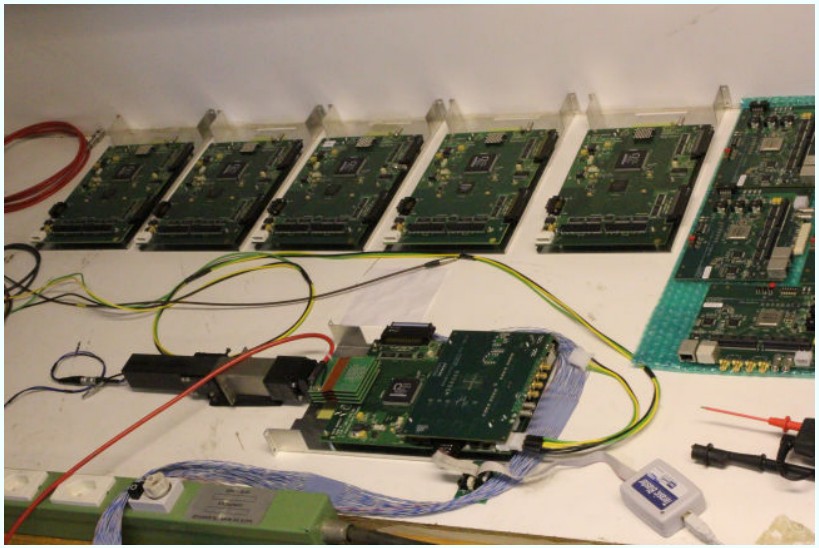
Front-End-Boards and Firmware



- next two months will be dedicated to the firmware revision and finalization

Single-anode PMT tests

- PHILIPS XP2972
- 217 PMT tested with LED/Cosmics
- $\sim$60 selected
- performance compared to HAMAMATSU R6427 (signal 4 times higher); this may be the future upgrade of the EMR

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Current State

Simulation

- MAUS software workshop this week was extremely useful
- EMR geometry refined in MAUS
- geometry details can be controlled via configuration files
- EMR development branch is compatible with the latest MAUS release

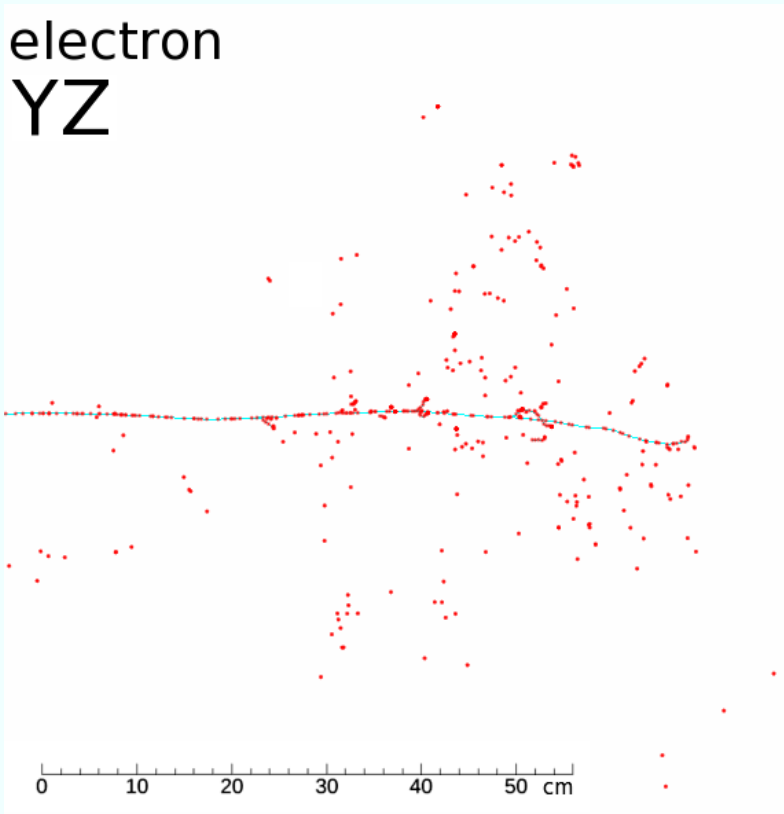
Digitization

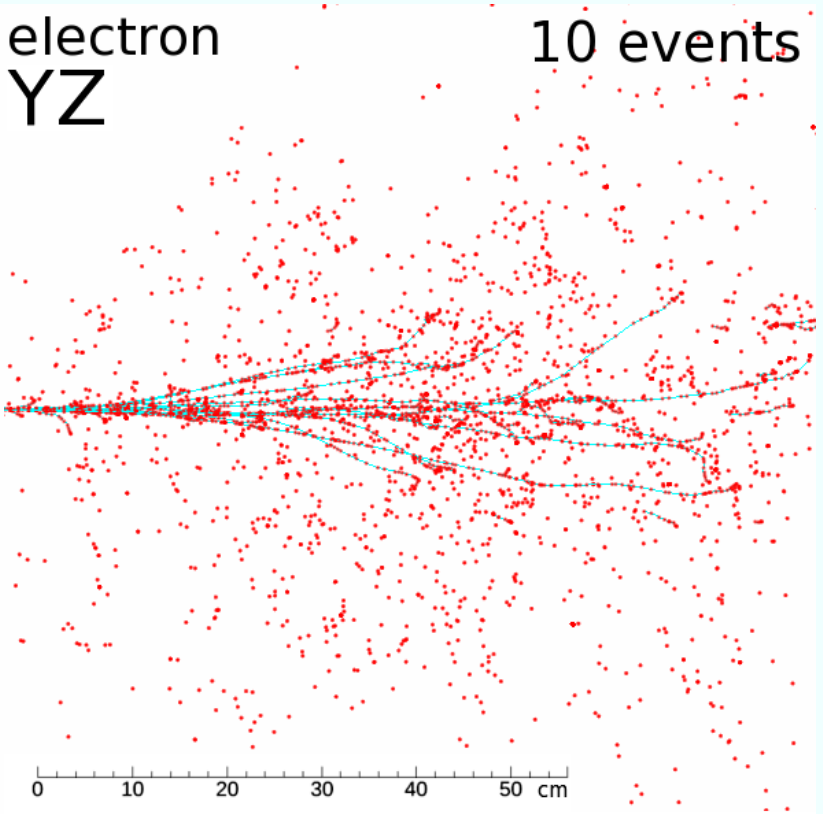
- Matt implemented EMR digitization framework in MAUS and developed simulation of photons inside scintillators

Reconstruction

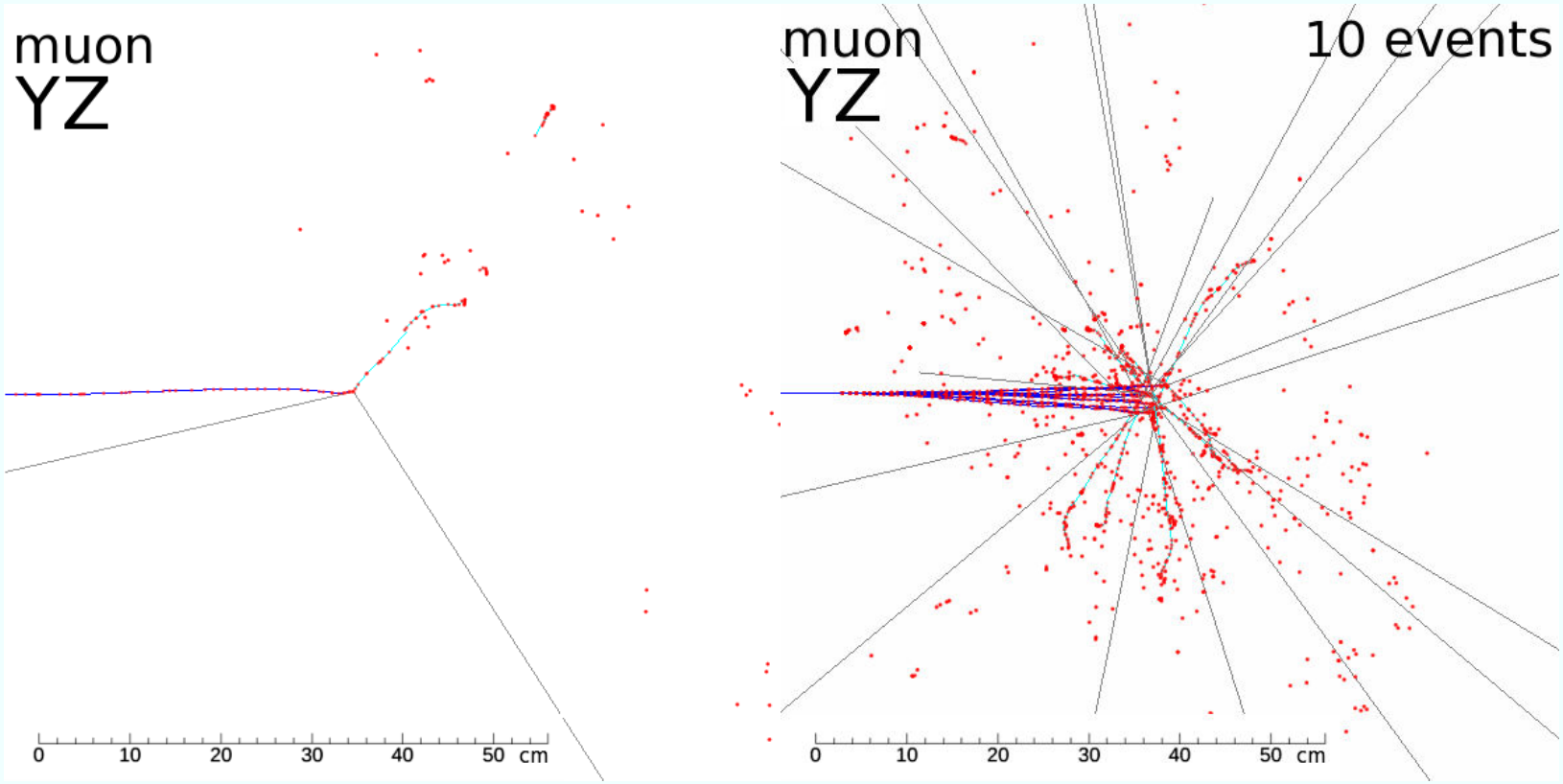
- still in the pipeline

Geant4 Simulation

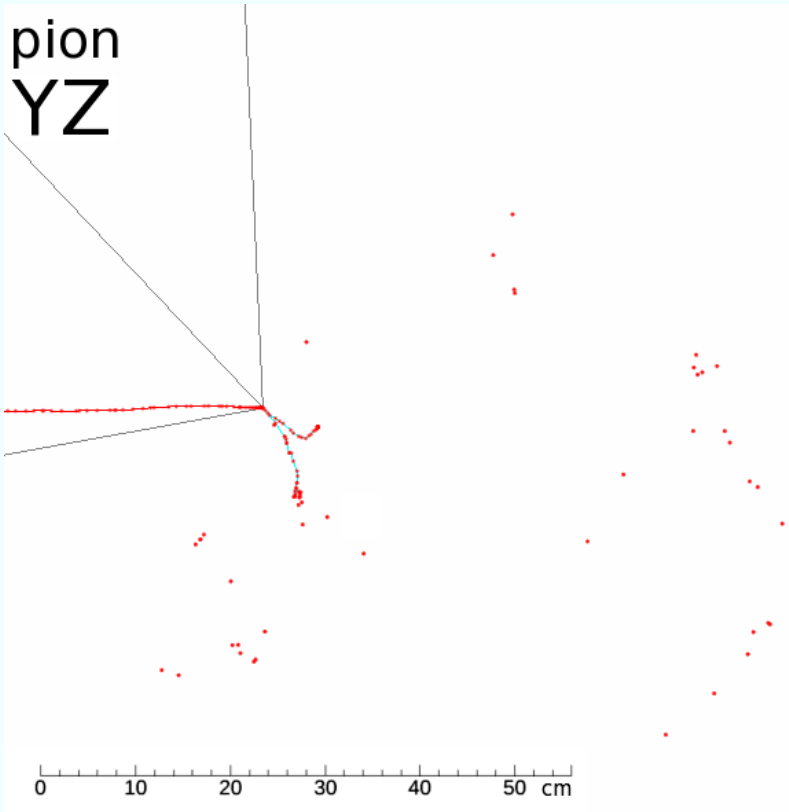


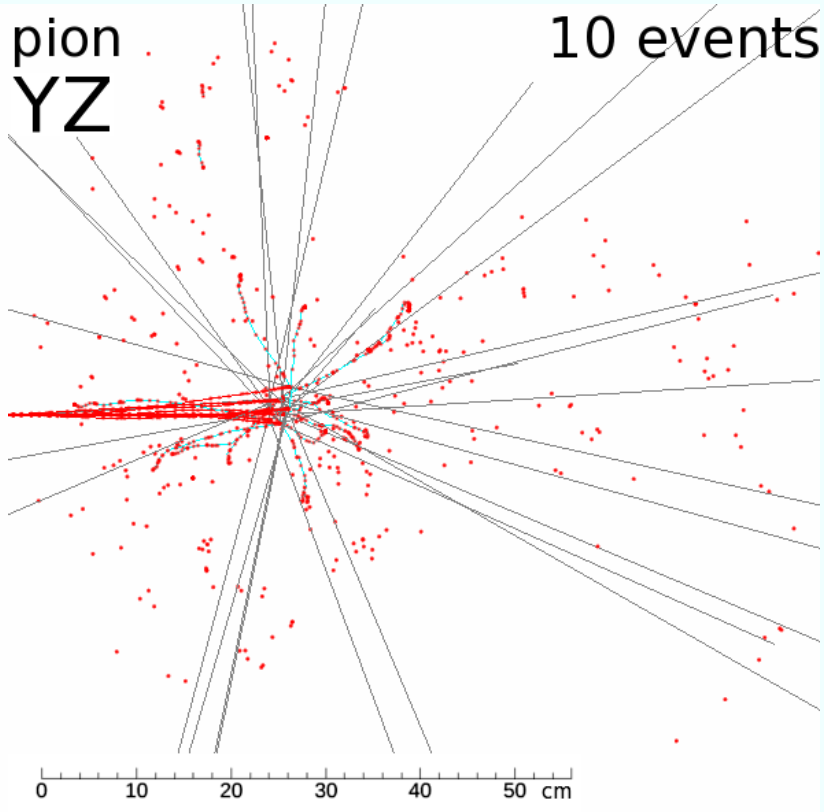


Geant4 Simulation

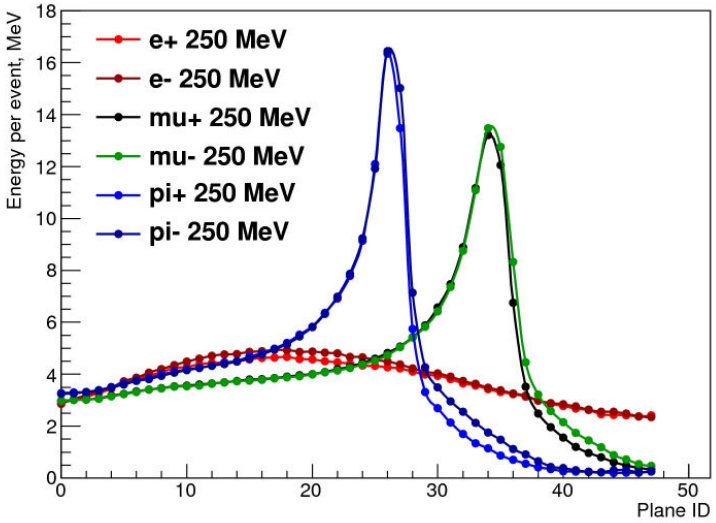


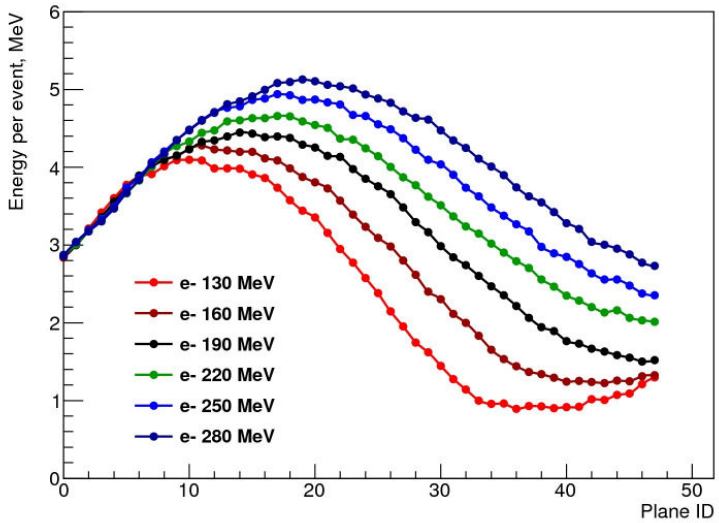
Geant4 Simulation

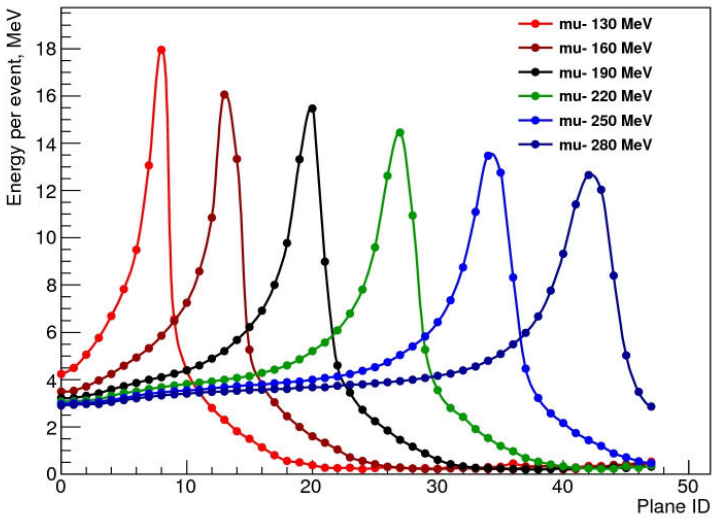


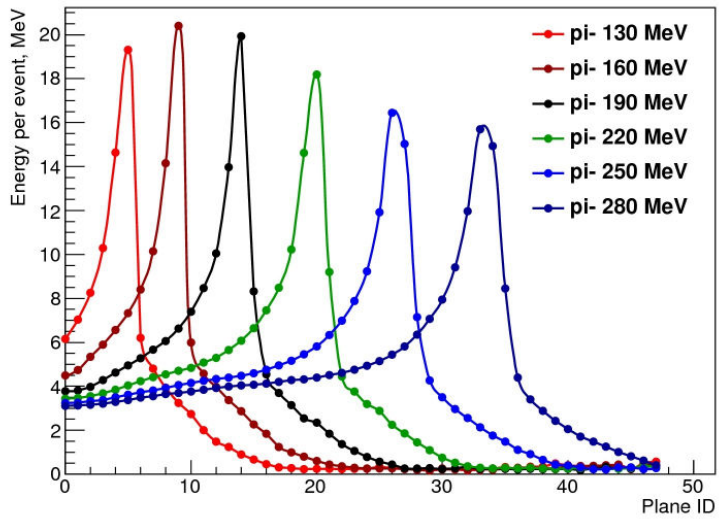


Geant4 Simulation

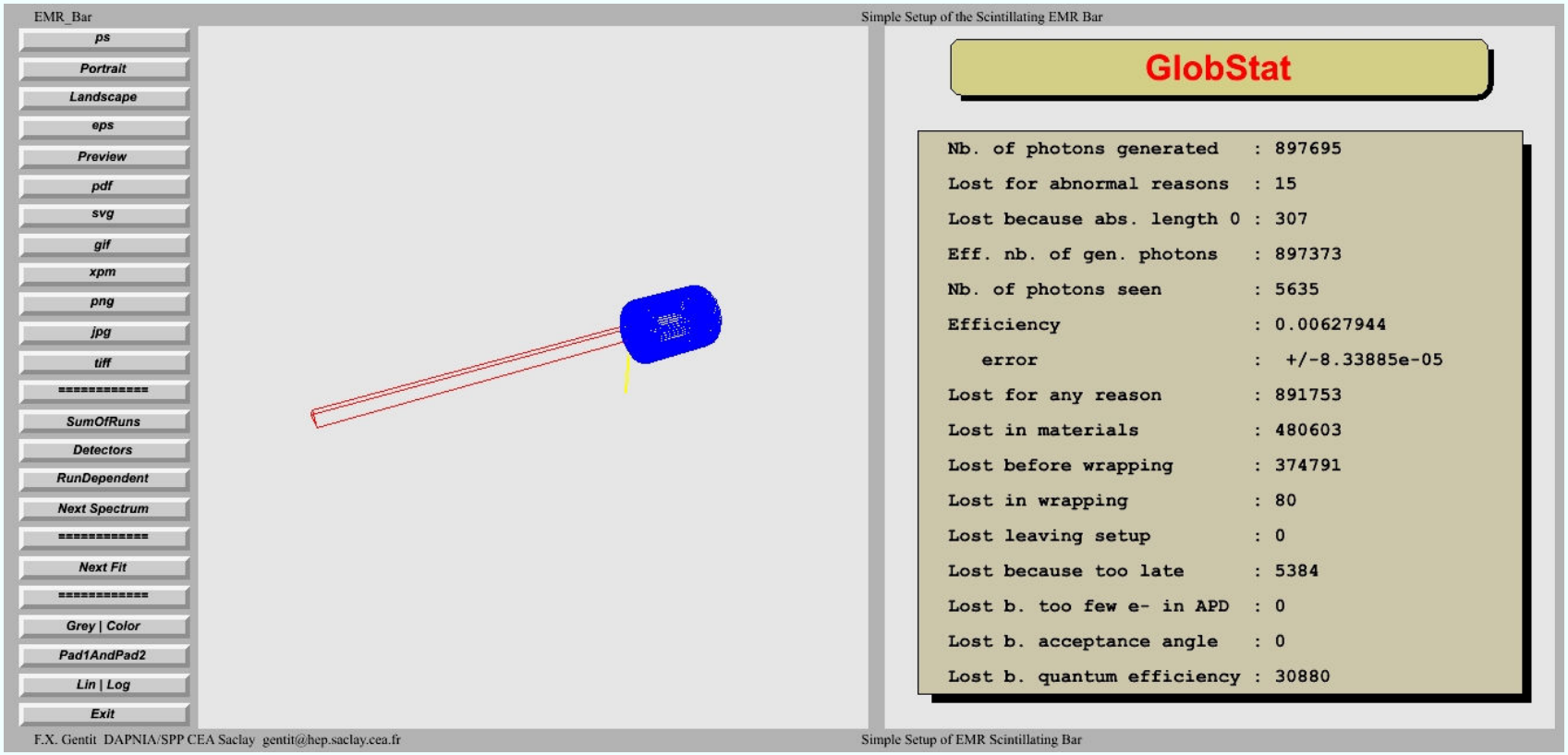






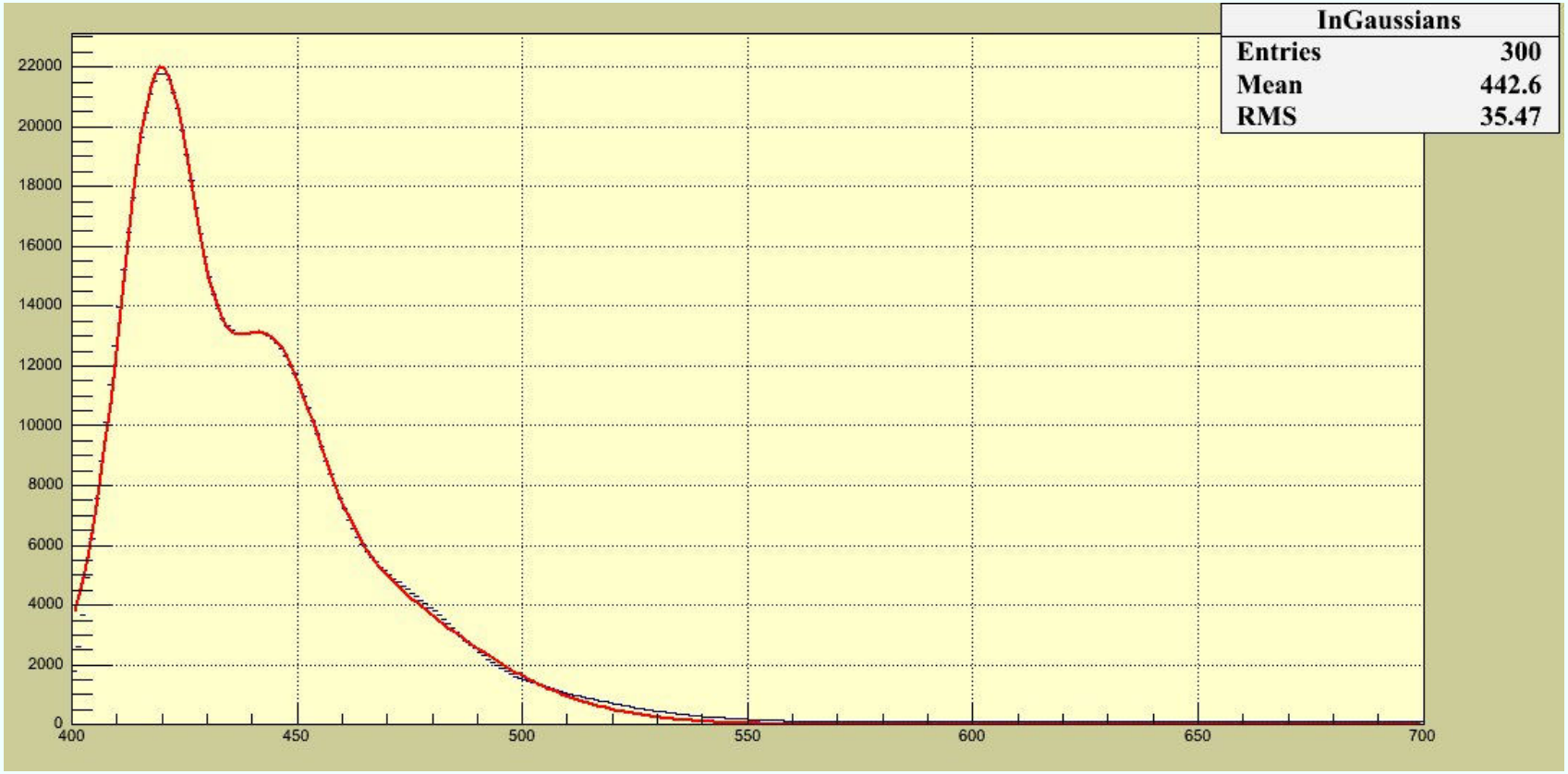


Photon Simulation (by Matt)



- SLitrani photon simulation was used to model emission spectra of the scintillator
- The simulation models a scintillating bar being radiated by muons with a PMT at one end

Photon Simulation (by Matt)



- the emission spectra was experimentally measured (black)
- experimental data well described by the simulation (red)

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Summary

Construction

- should be finished within next three months
- polishing is the most time consuming activity

Hardware

- firmware revision and final development before the end of the year

Software

- significant progress in EMR implementation in MAUS
- reconstruction is still missing

Thank you for your attention!