

# Results from the H8 Testbeam and GIF Tests in 2010

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MPI für Physik, München

MDT Gruppenmeeting – 29.11.2010



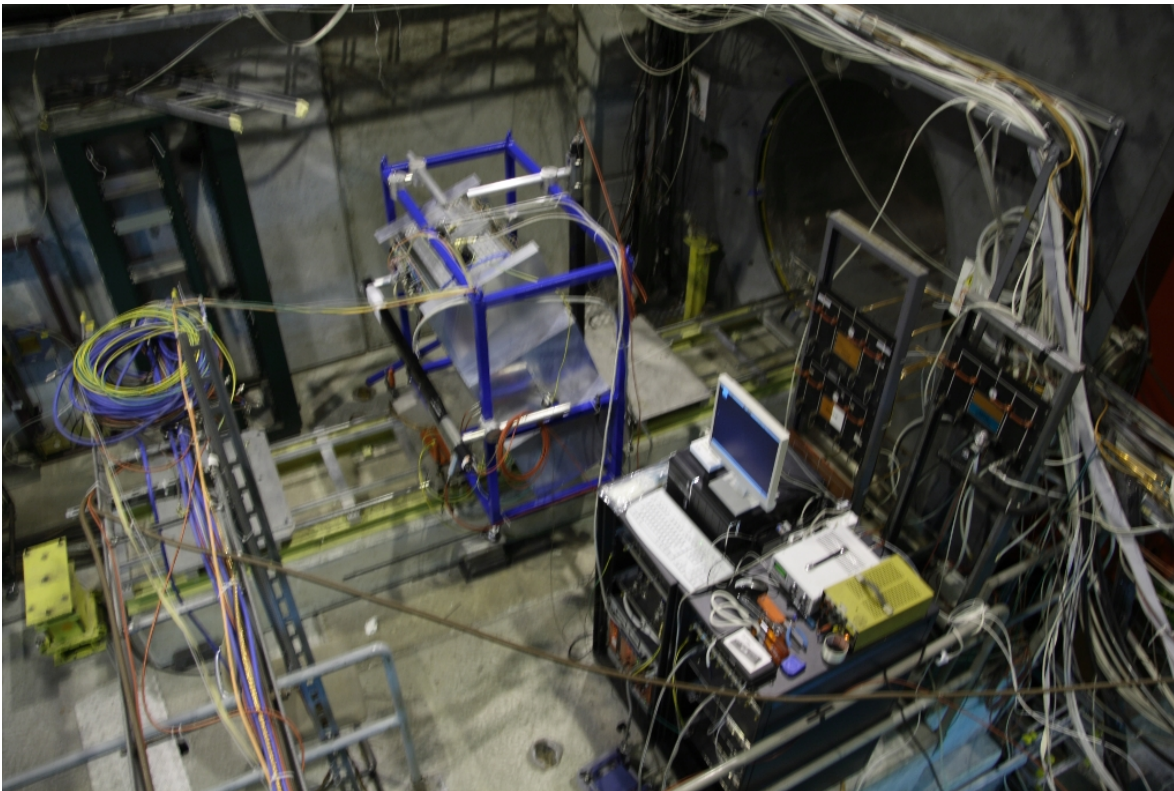
Max-Planck-Institut für Physik  
(Werner-Heisenberg-Institut)



# Testbeam and GIF Activities



- H8 Summer Objectives:
  - Test chamber in general
  - Check performance of auto calibration
  - Measure single tube resolution
  - Measure single tube efficiency w/o radiation background
  - First integration with RPC
- GIF Autumn Objectives:
  - Measure single tube efficiency with  $\gamma$  irradiation
  - Measure single tube resolution with  $\gamma$  irradiation
- H8 Autumn Objectives:
  - Repeat H8 Summer Measurements
  - Try new settings for MDT
  - Further integration with RPC
  - Integration with TGCs

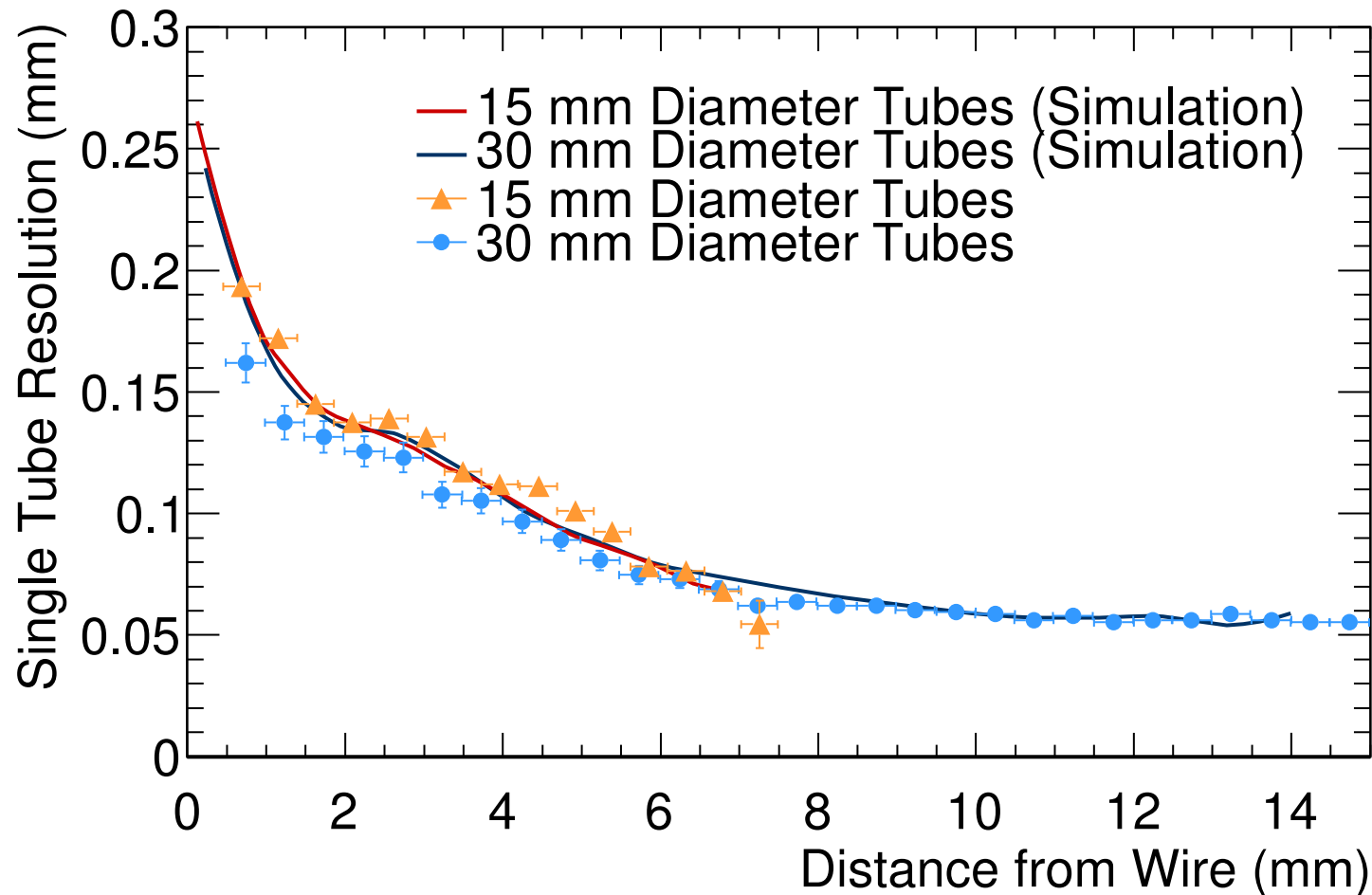


- Collected several 10M events
- First experience with the full scale chamber

## Results:

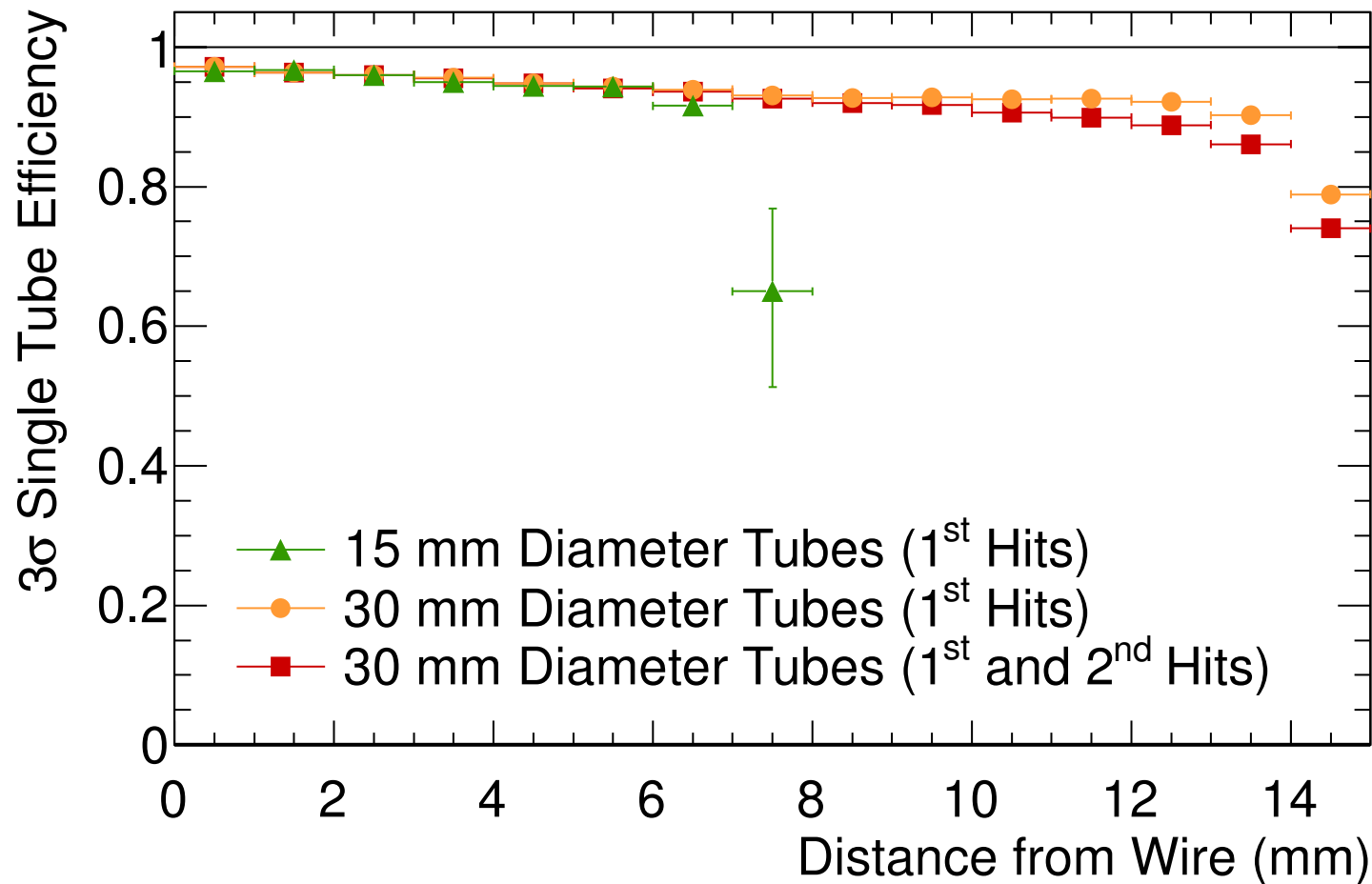
- Chamber was performing better than expected
- Calibration is giving good results
- Single tube resolution and efficiency studies nearly done
- Integration of RPC successful (see talk in group meeting beginning of October)

# Resolution



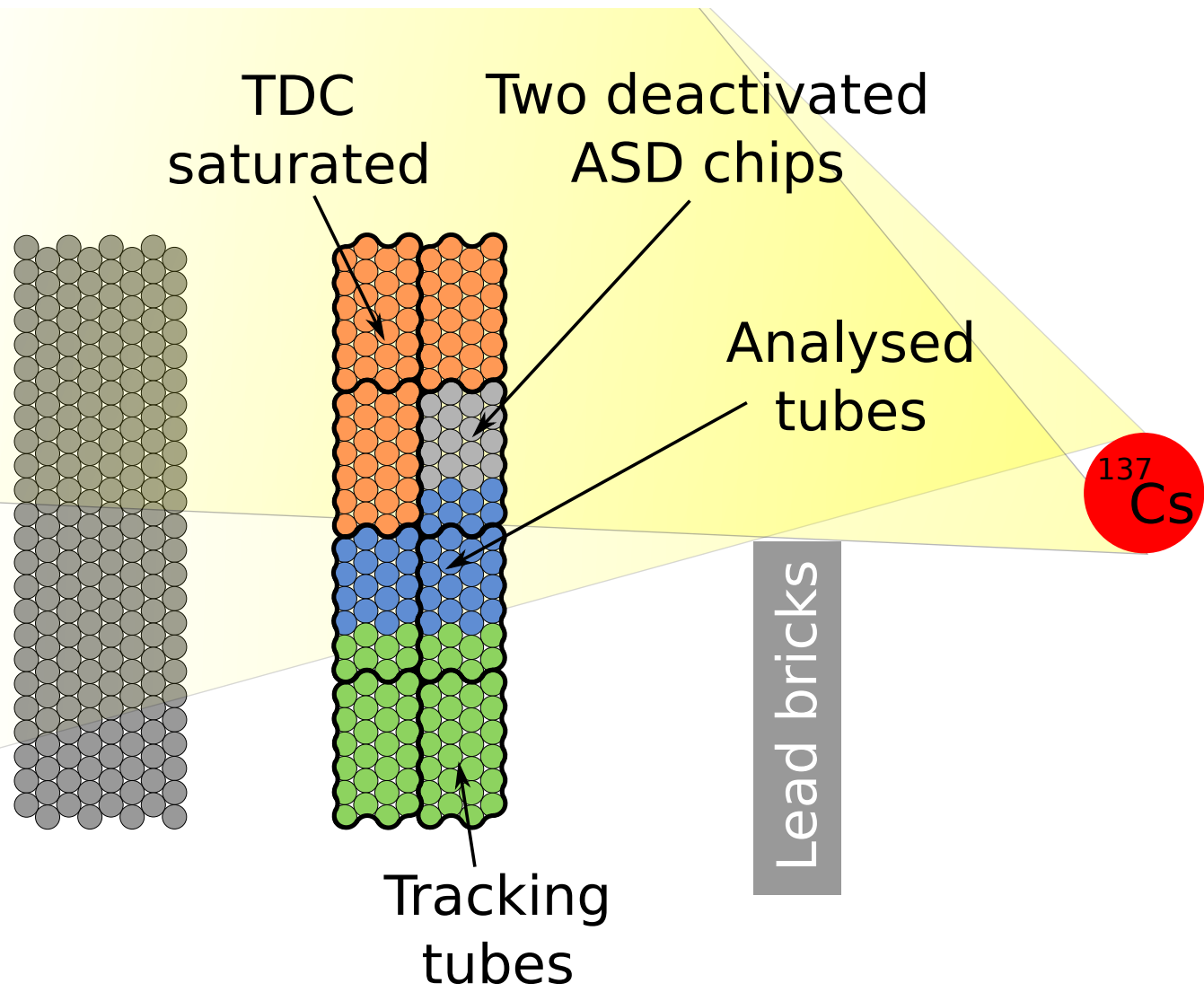
- Good agreement with simulation
- Difference to 30 mm tubes not yet understood
- Influence of temperature on calibration has to be studied

# Efficiency



- Very good agreement with expectation
- Some deviation very close to the wire has to be understood

# Tests in the GIF



Problems with TDC rate capability  $\Rightarrow$  most of the data is not usable!

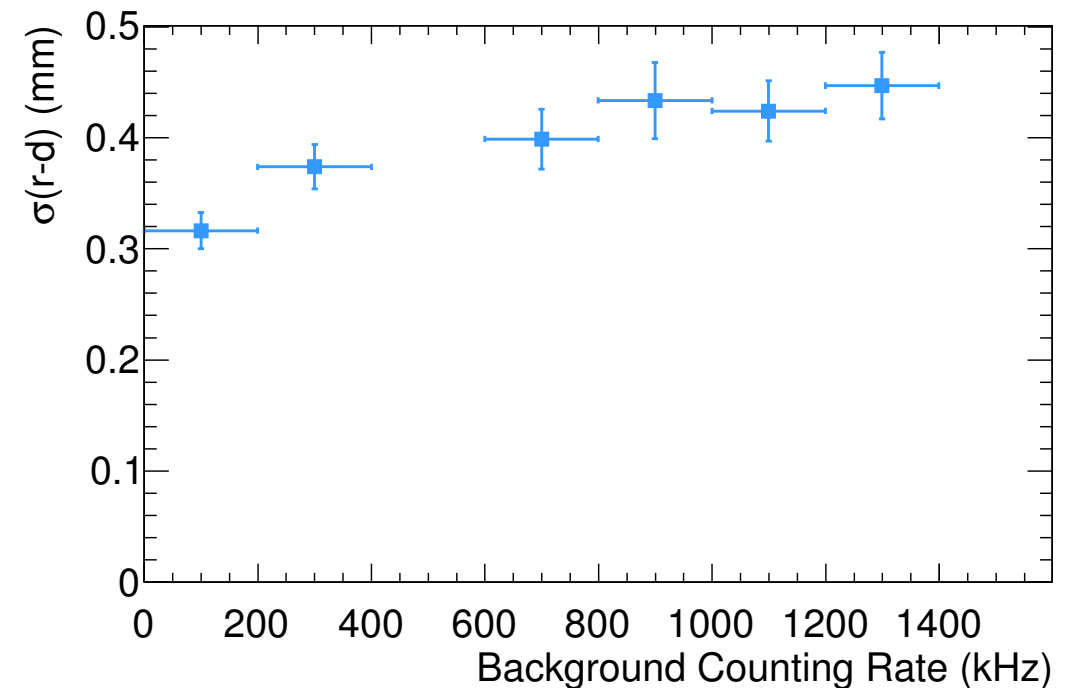
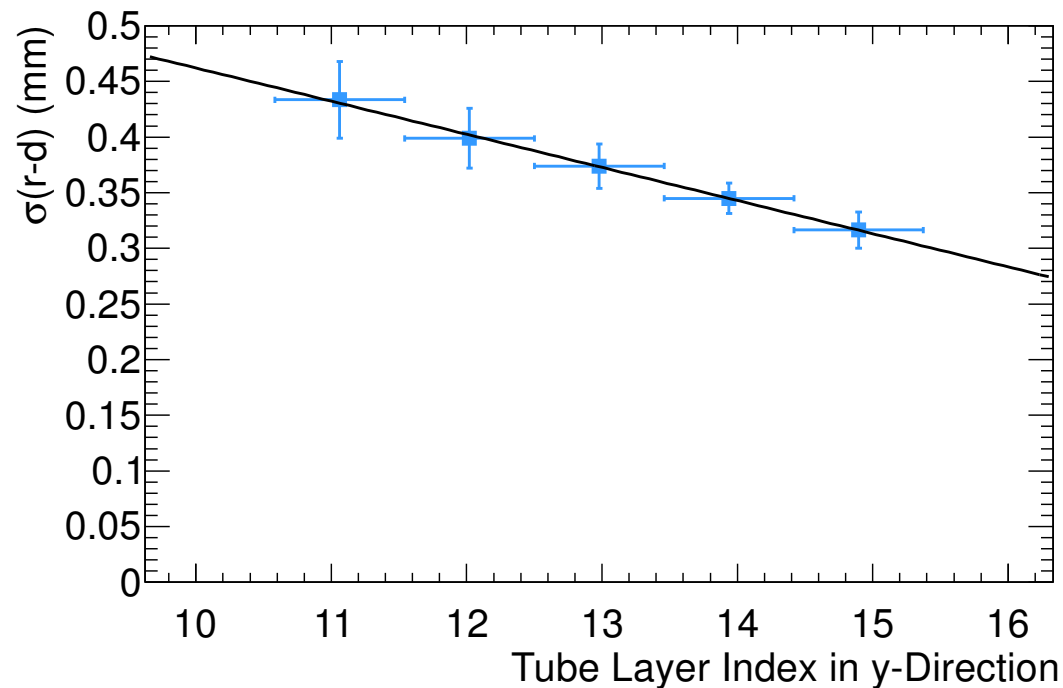
**Solution:** deactivation of 2/3 of the mezzanine card

Only one run with good data, but low statistics (<100k events)

Most tubes with a high rate are not in the readout

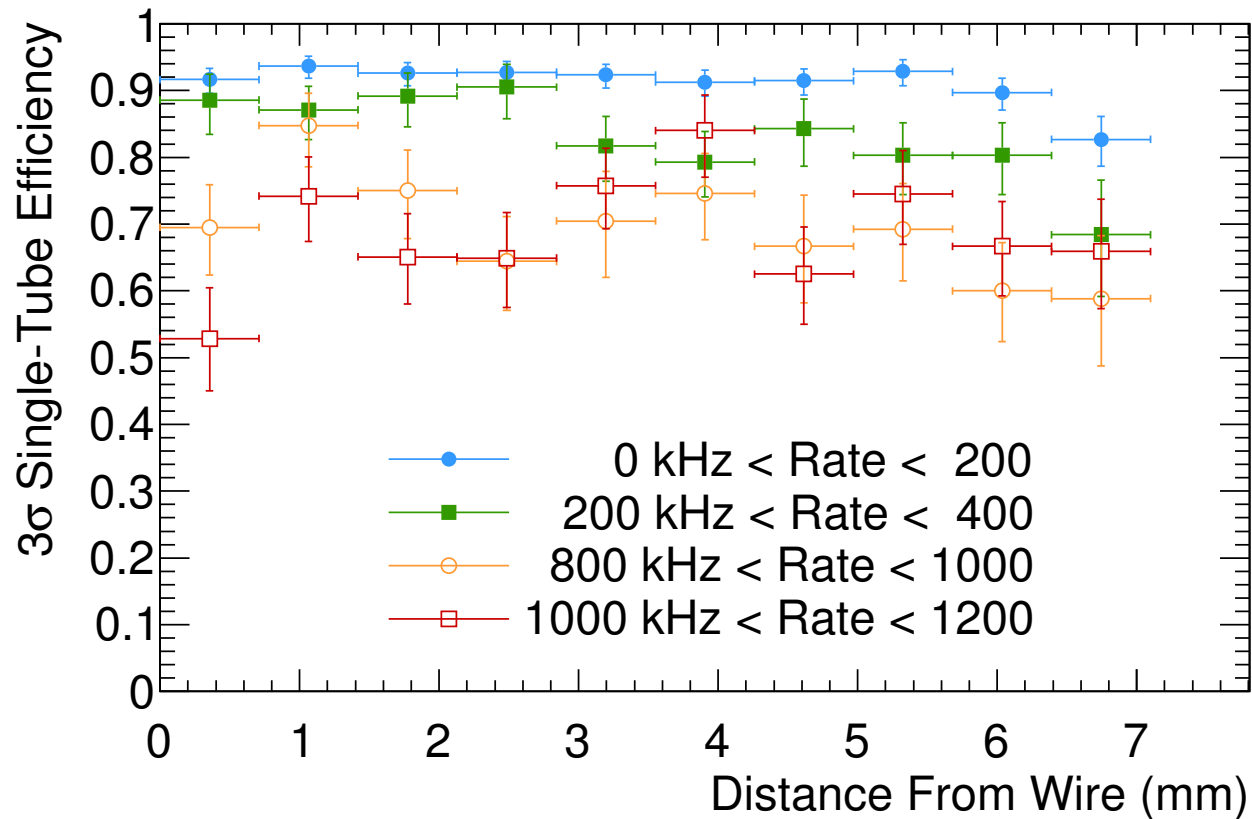
## Resolution

Not enough data to measure the resolution in the irradiated tubes  $\Rightarrow$  only possible to look at the residual distributions



## Efficiency

- $3\sigma$  efficiency depends on the resolution  $\Rightarrow$  have to use residual distributions for the estimation
- Error on the track angle has a big influence since we only have a reference on one side of the analyzed tubes

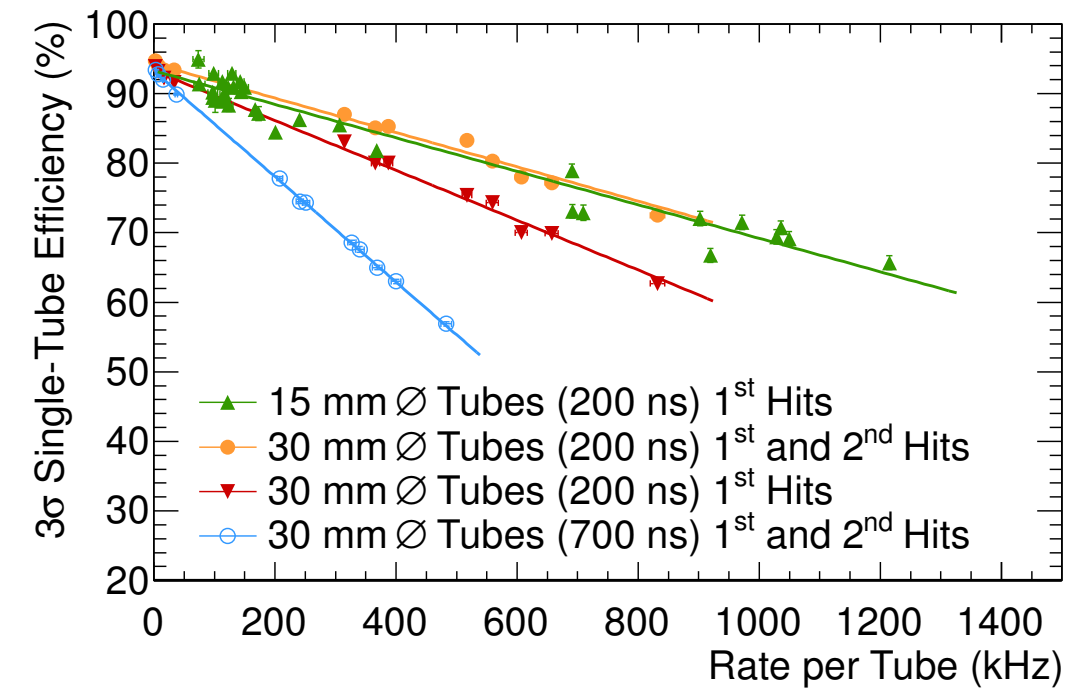
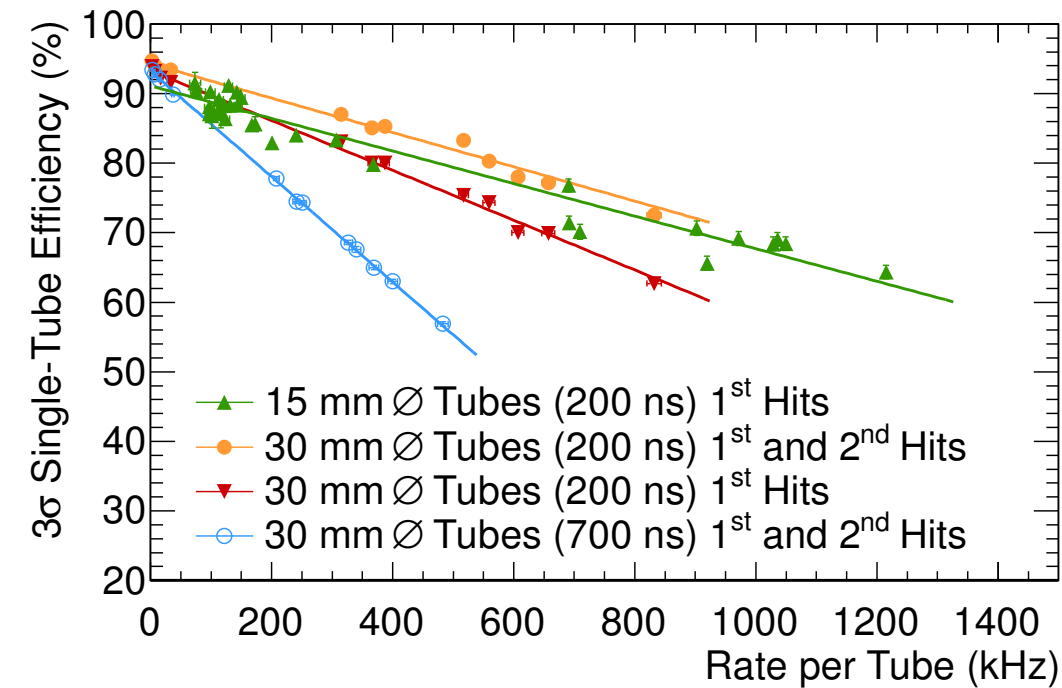




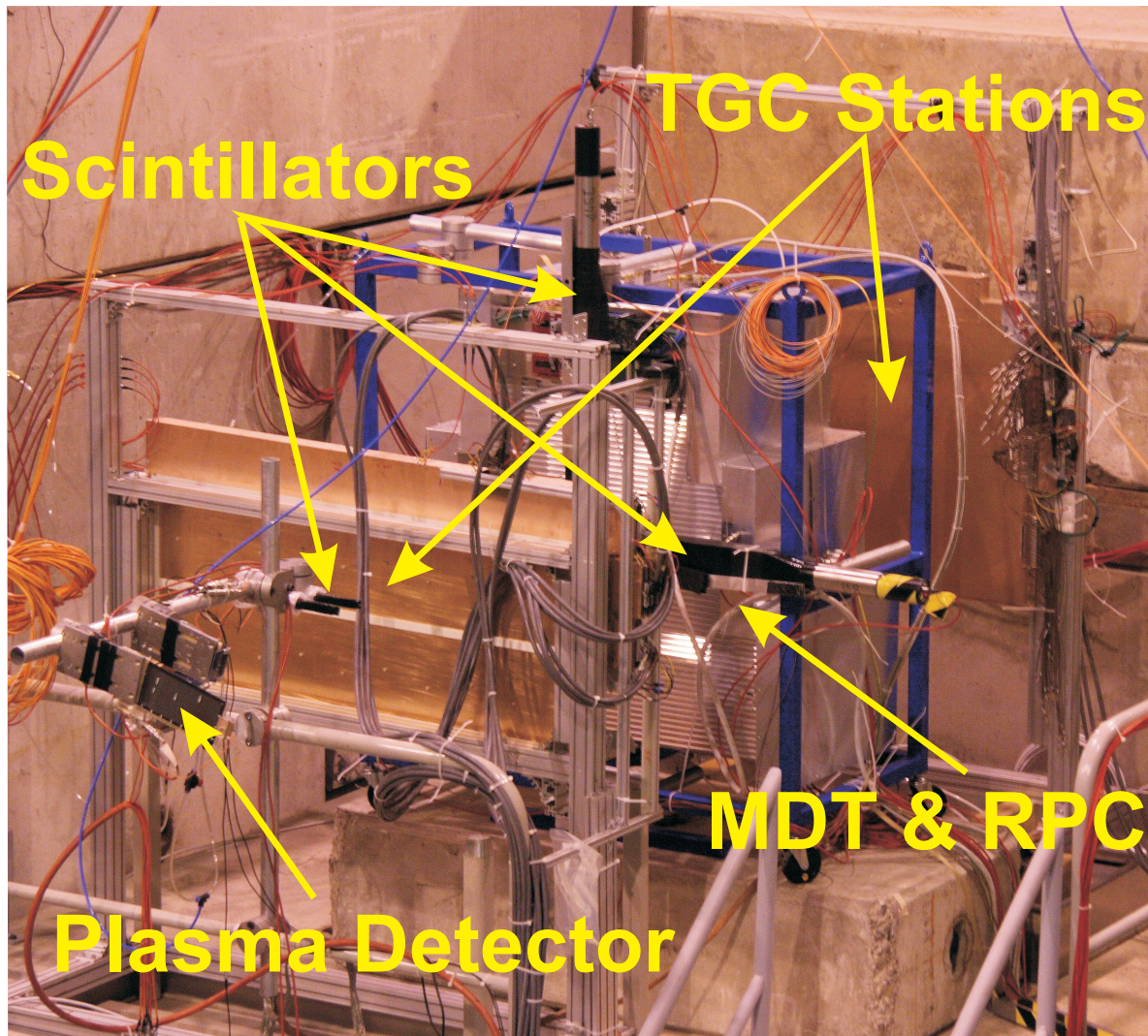
## Efficiency

Single tube efficiency (distance <7.1 mm)

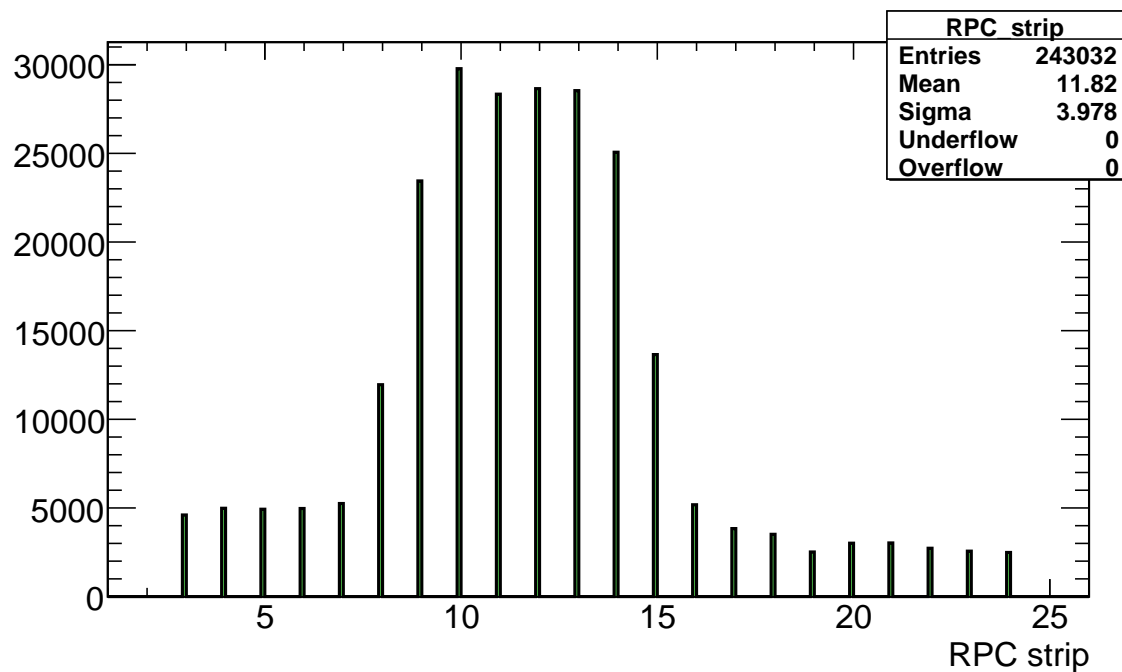
Single tube efficiency (distance <6.7 mm)



- Higher inefficiency close to the tube wall (due to track extrapolation error?)
- Good agreement with expectation (result from 30 mm tubes)



- Take runs with same settings as in summer and compare the results (e.g. calibration)
- Try to answer some questions that arose during the analysis for H8 Summer data (e.g. differences in  $t_{\max}$ )



- RPC are connected to the CSM as before, but with new adapters included in the mezzanine cards  $\Rightarrow$  noise level dropped significantly!
- TGC are read out via VME Modules ( $2 \times 128$  channel multihit TDC and  $2 \times 32$  channel ADC) controlled by our DAQ
- Tested different trigger settings: TGC pads or Scintillators

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- Very successful testbeam, prototype working very nice
- Calibration is working fine, but we still have to do some final checks
- Resolution and efficiency analysis nearly finished, already very good results

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## H8 Autumn 2010

- Trigger and readout with other detectors was very successful
- Have new data to answer some open questions from H8 Summer 2010
- Analysis is waiting for the framework to understand the new detectors (Beamprofile from RPC already visible)