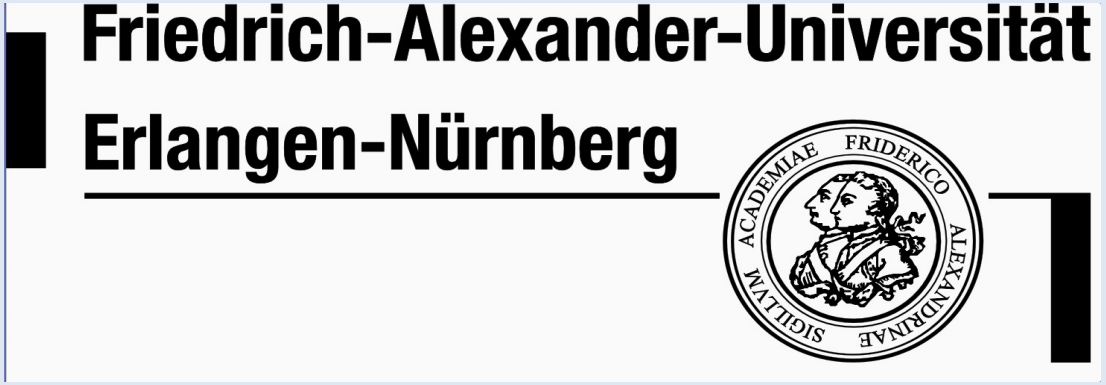
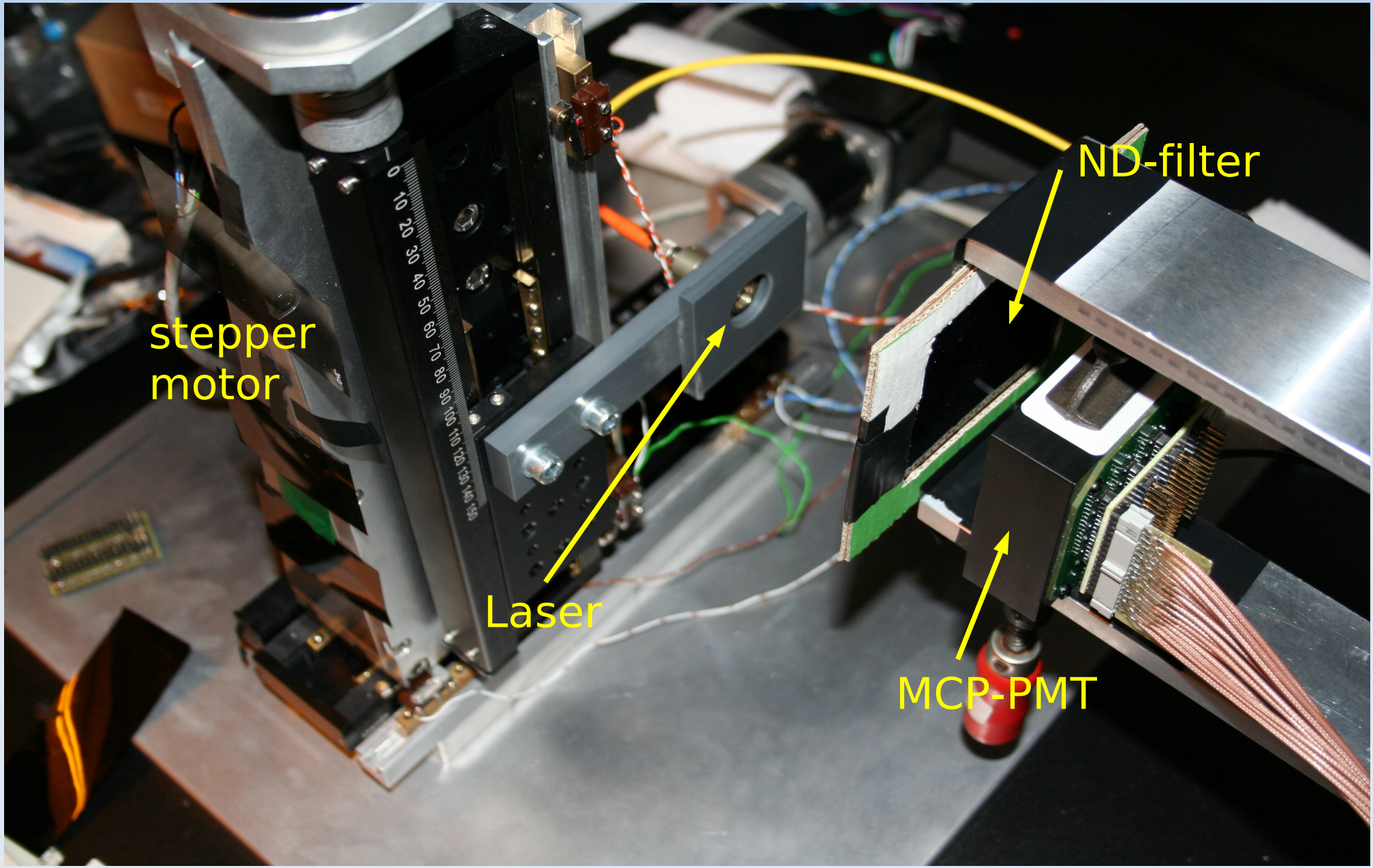
PANDA-Progress report Erlangen



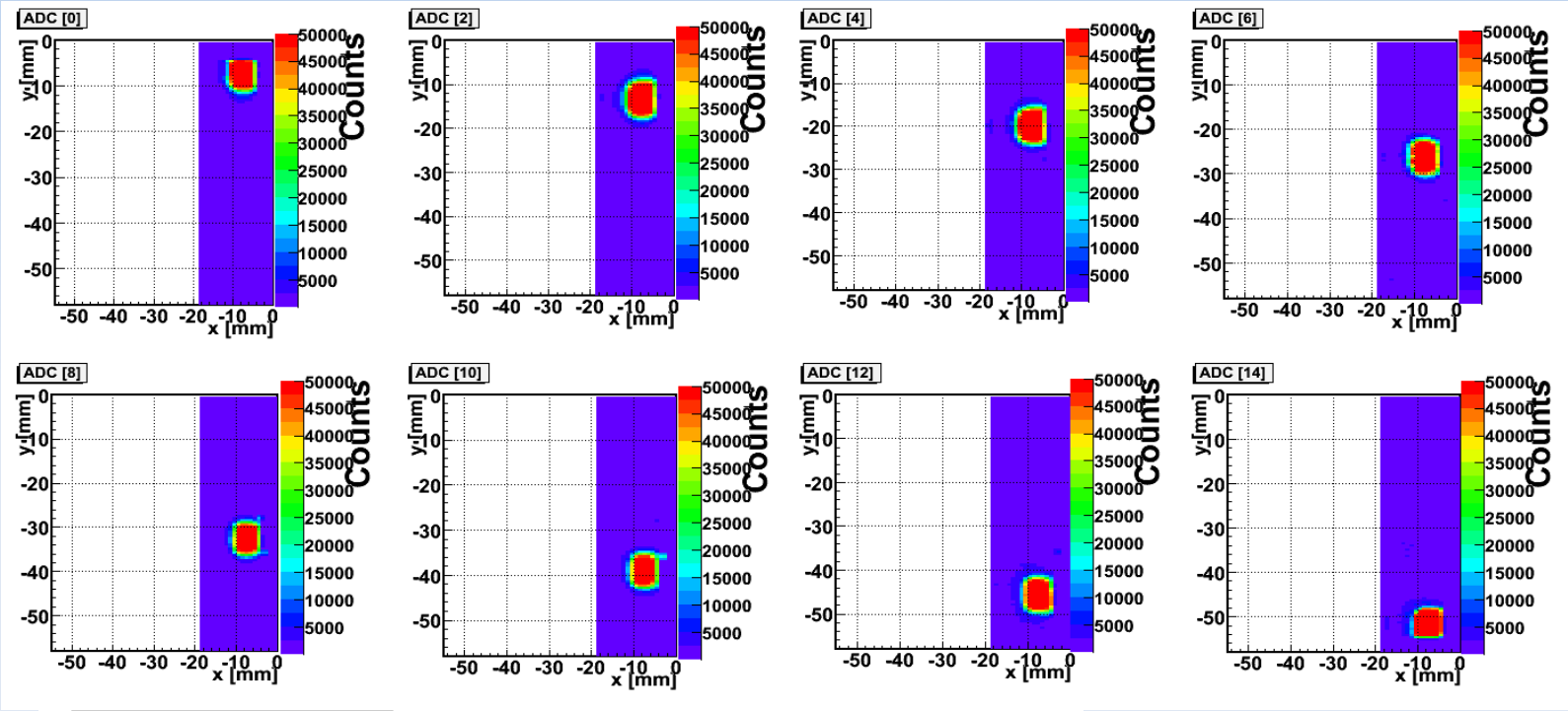
Alexander Britting, Wolfgang Eyrich, Albert Lehmann, Fred Uhlig

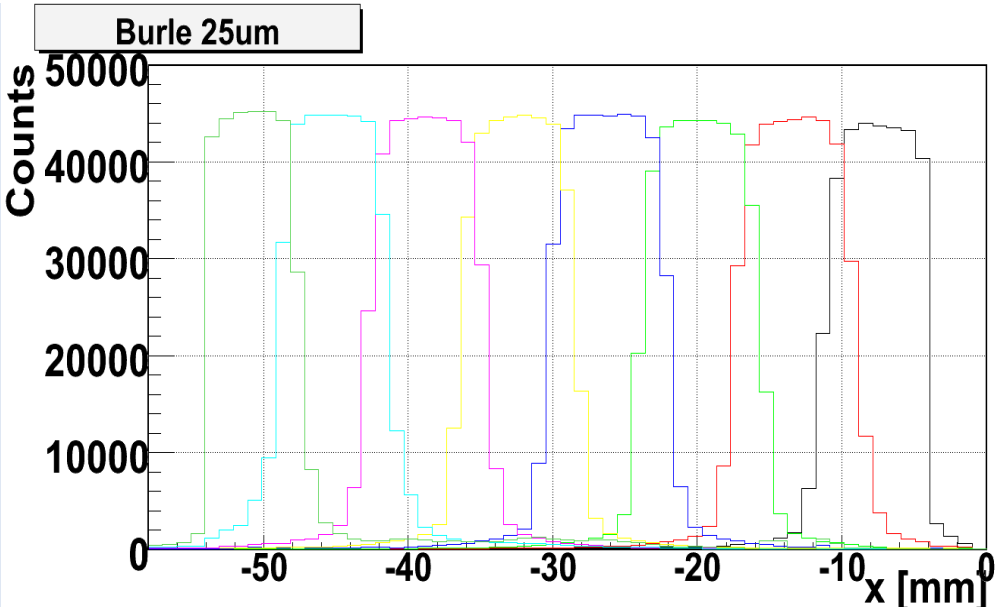
sponsored by BmBF und GSI

Setup



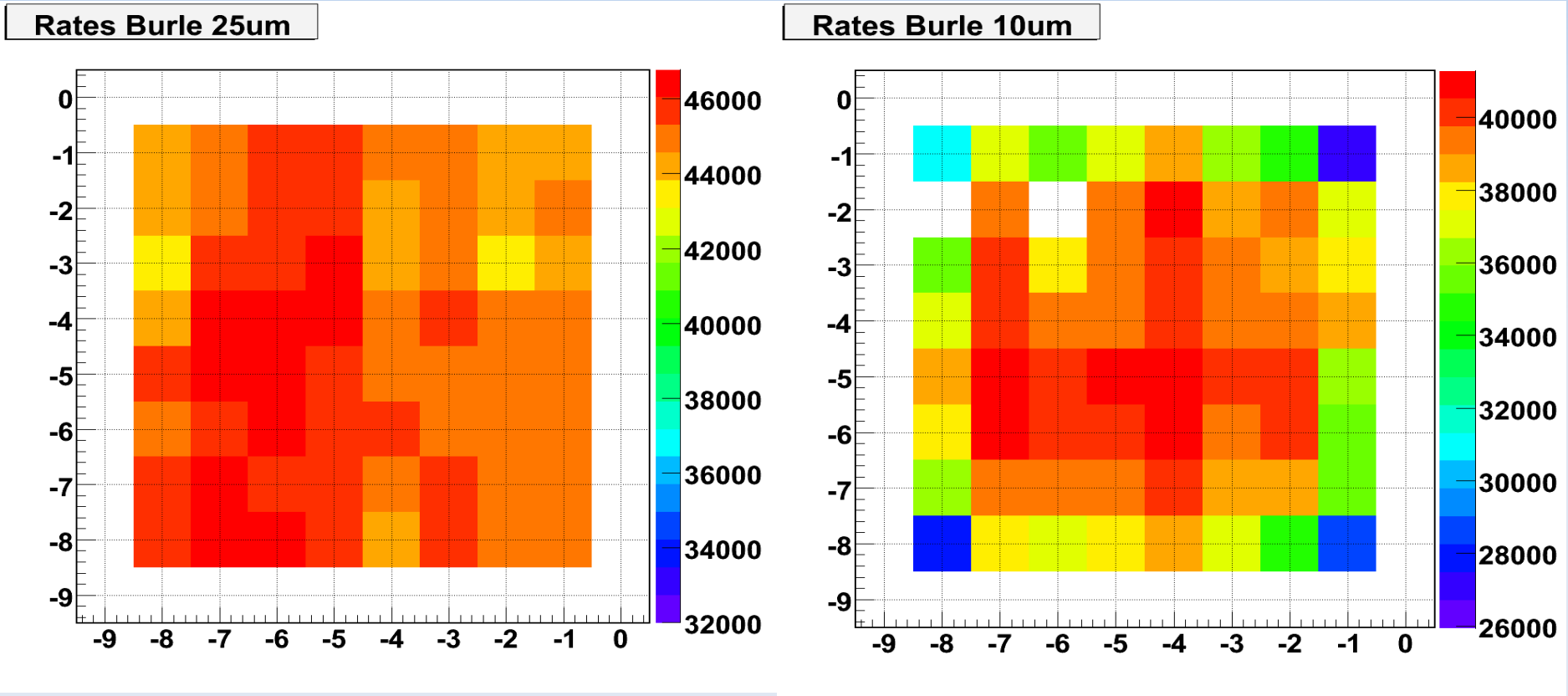
Rates measurement





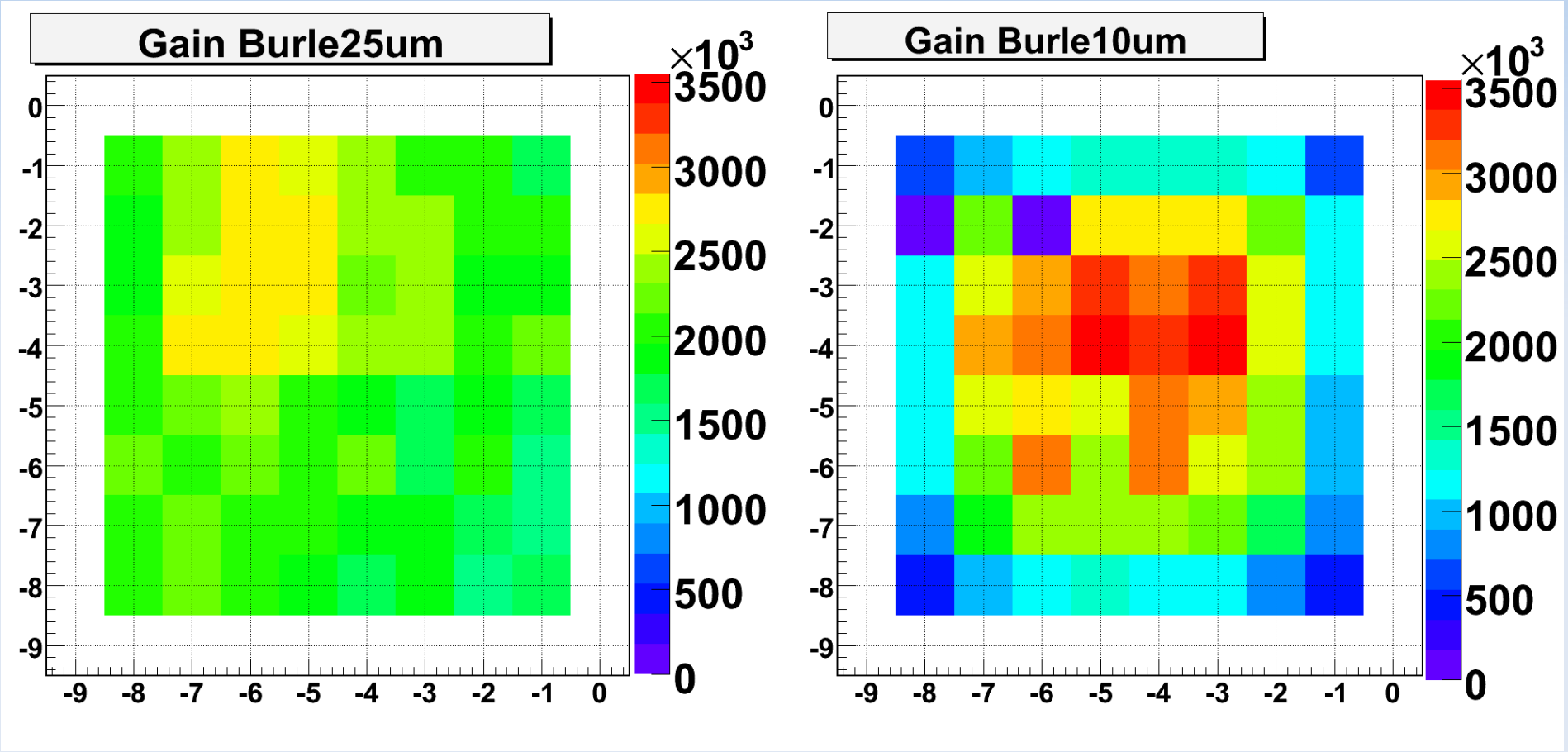
vertical measure-ment along the center of the pixels

Rates measurement (2)



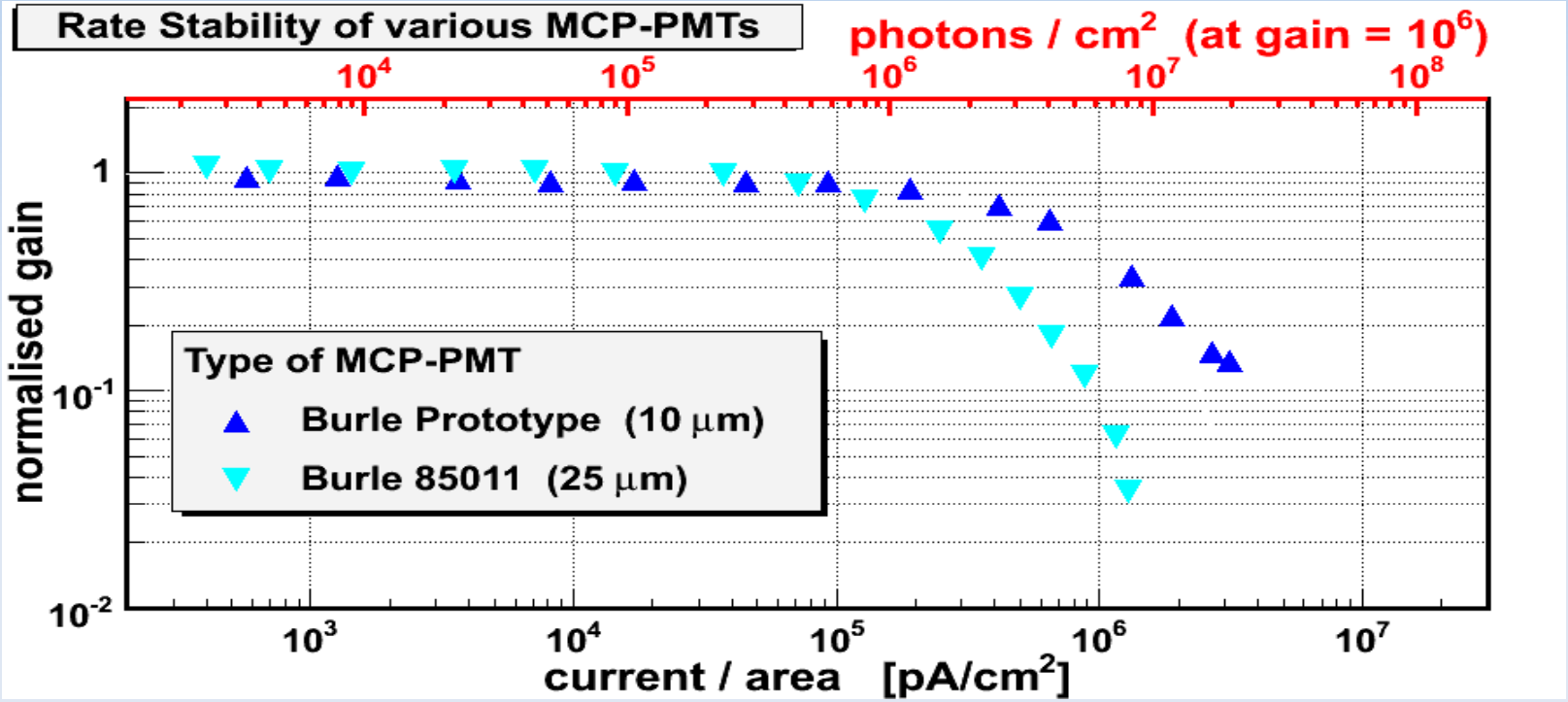
- rates maximum per pixel are shown
- rates of Burle 25µm are quite homogeneous, in contrast of Burle 10µm

Gain



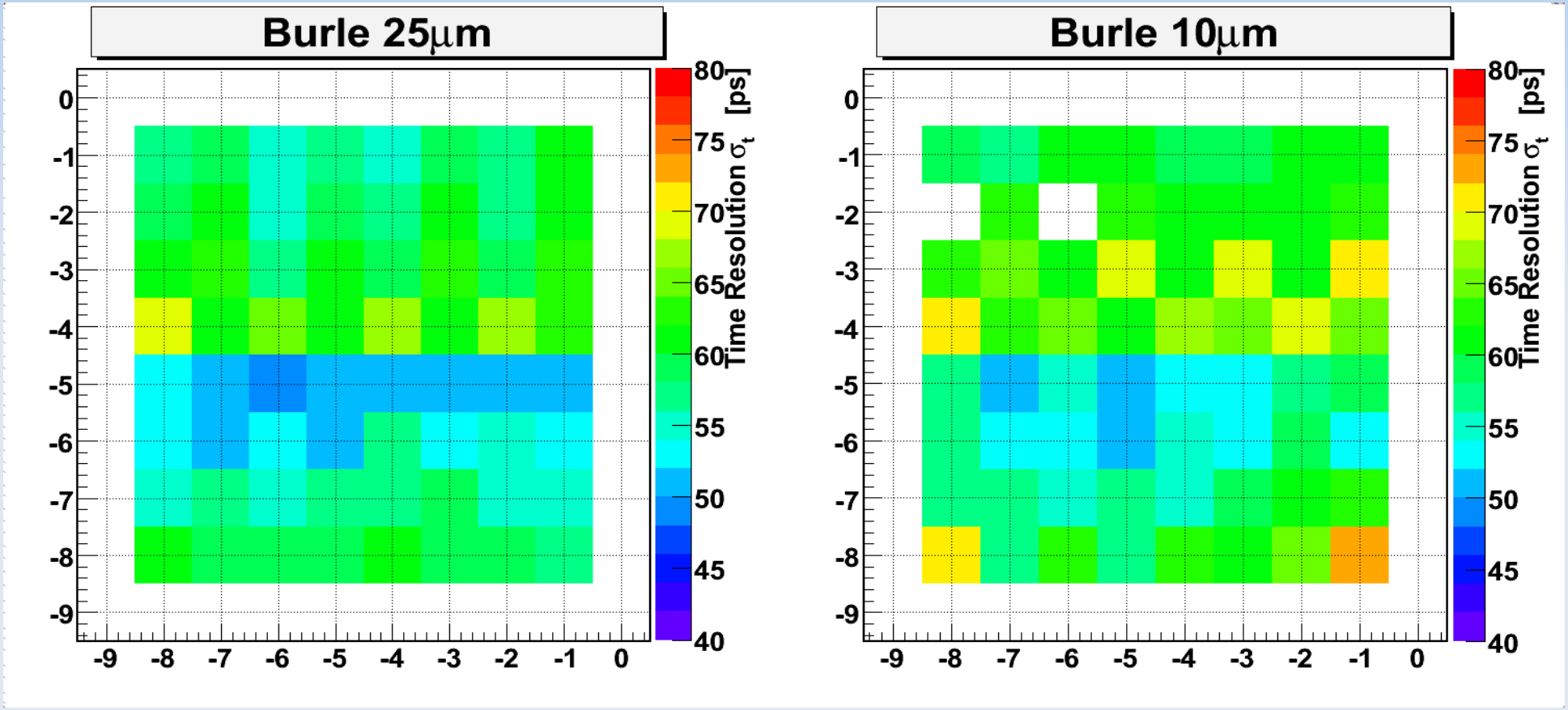
- Uniformity of the Gain for Burle25µm sufficient
- Gain of Burle10µm differs up to a factor of 7!

Rate stability



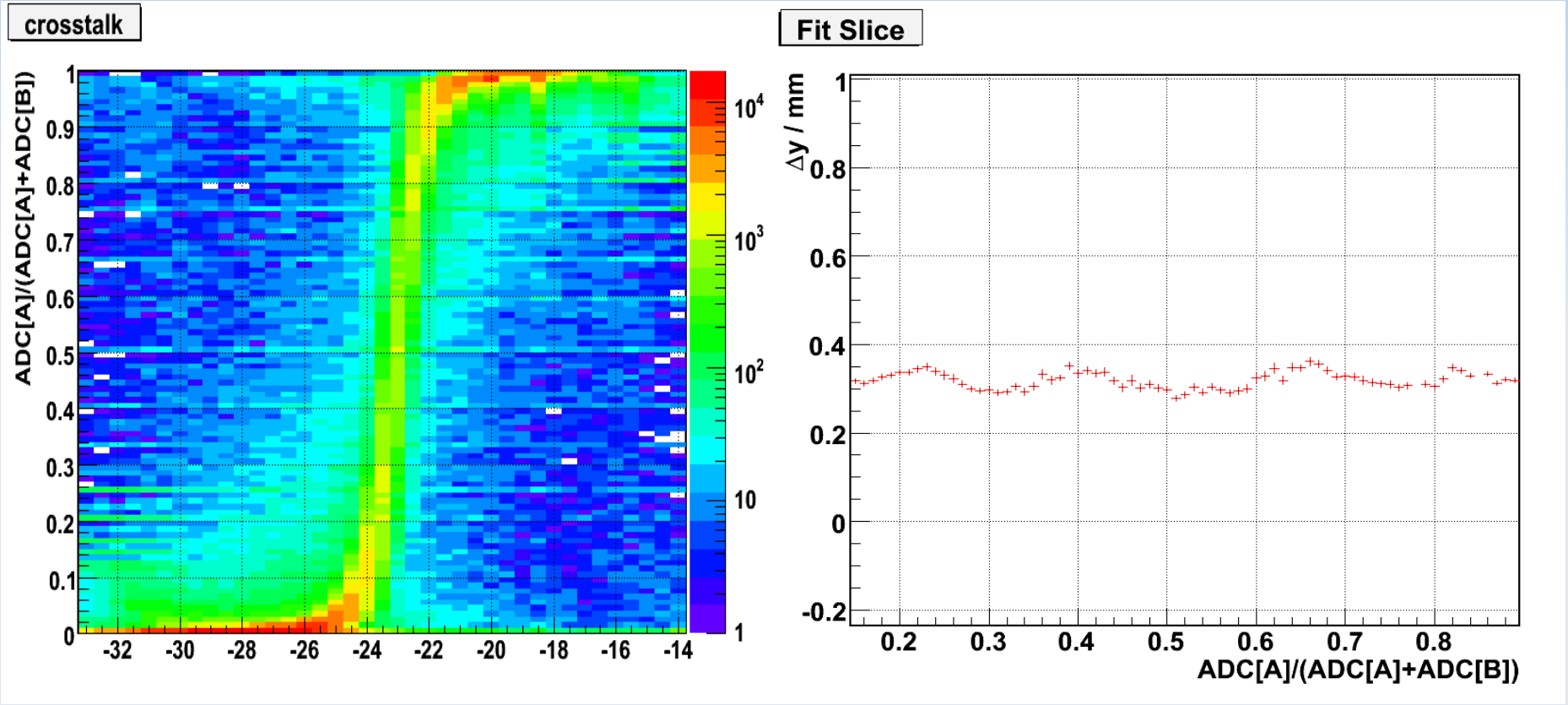
rate stability should be sufficient, if the detectors are placed in the focal plane of the Barrel-DIRC

time resolution



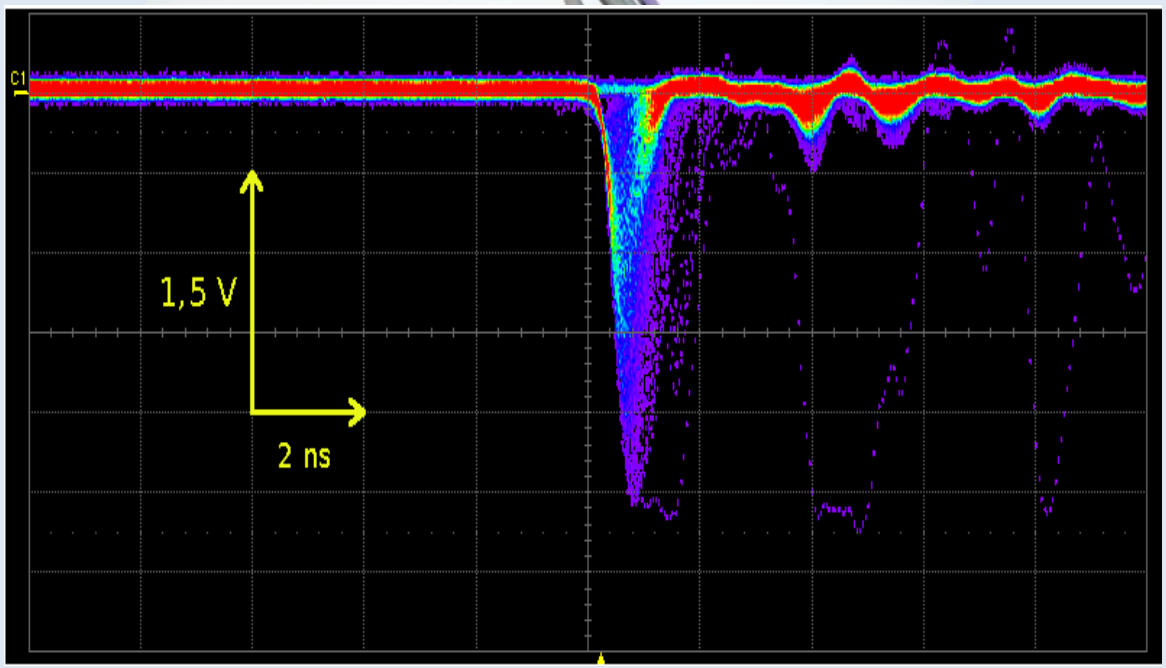
time resolution fairly constant for both detectors (~60ps)

Crosstalk



- ADC[A]/(ADC[A]+ADC[B])
- Laserspotsize < 0.4mm

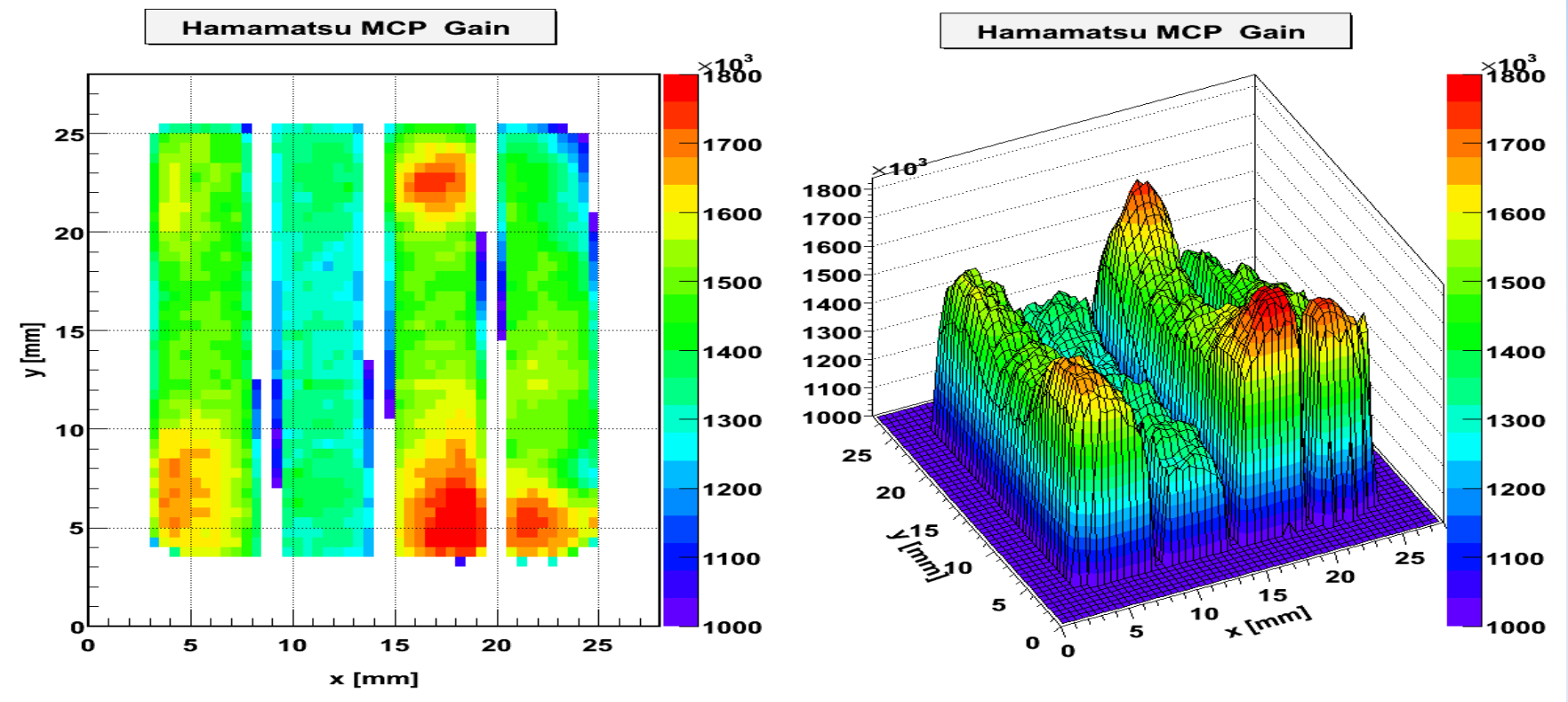
Hamamatsu SL10 - JT0041/JT0063)



very small signals (~750 ps FWHM)

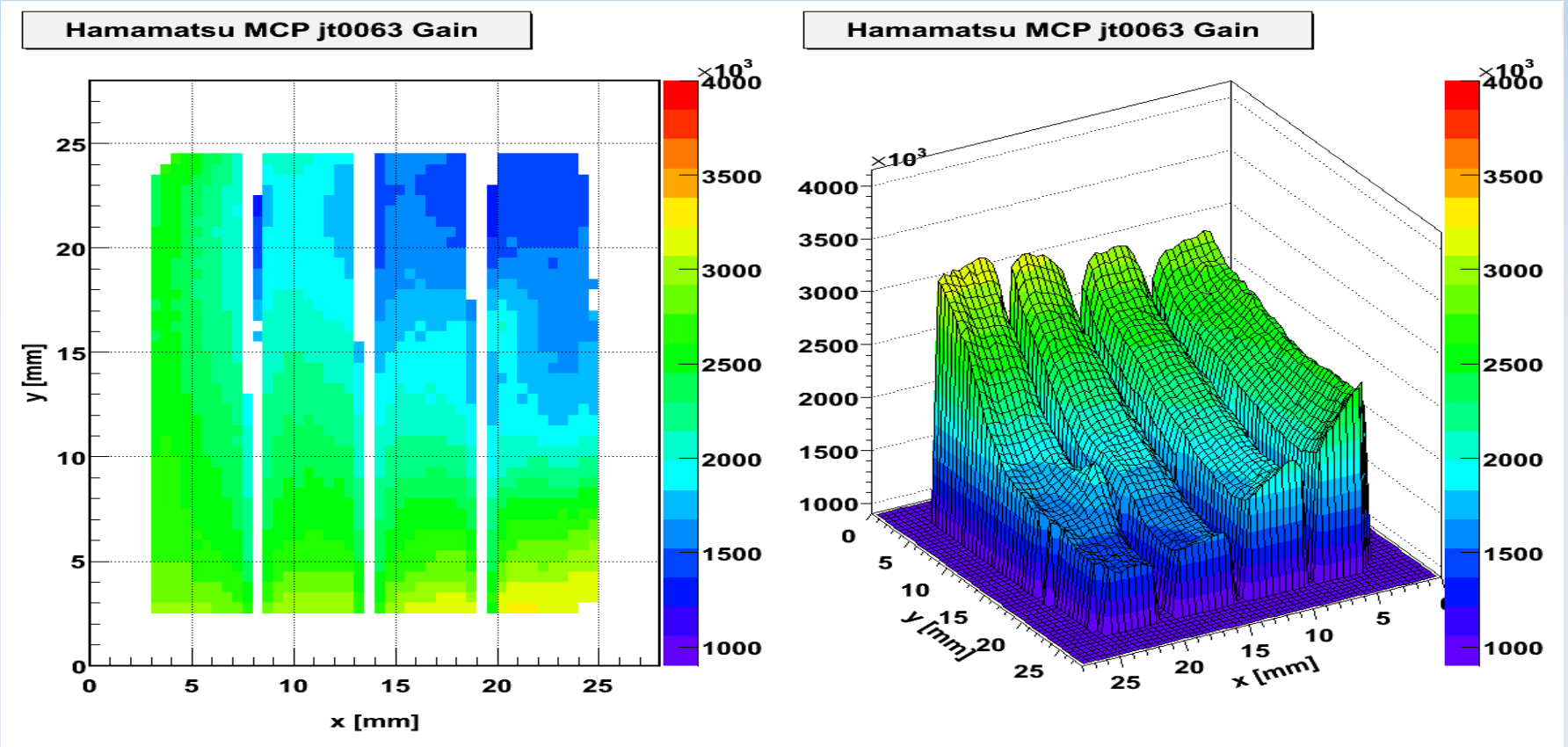
rise time 300 ps problem: very fragile

Gain JT0041



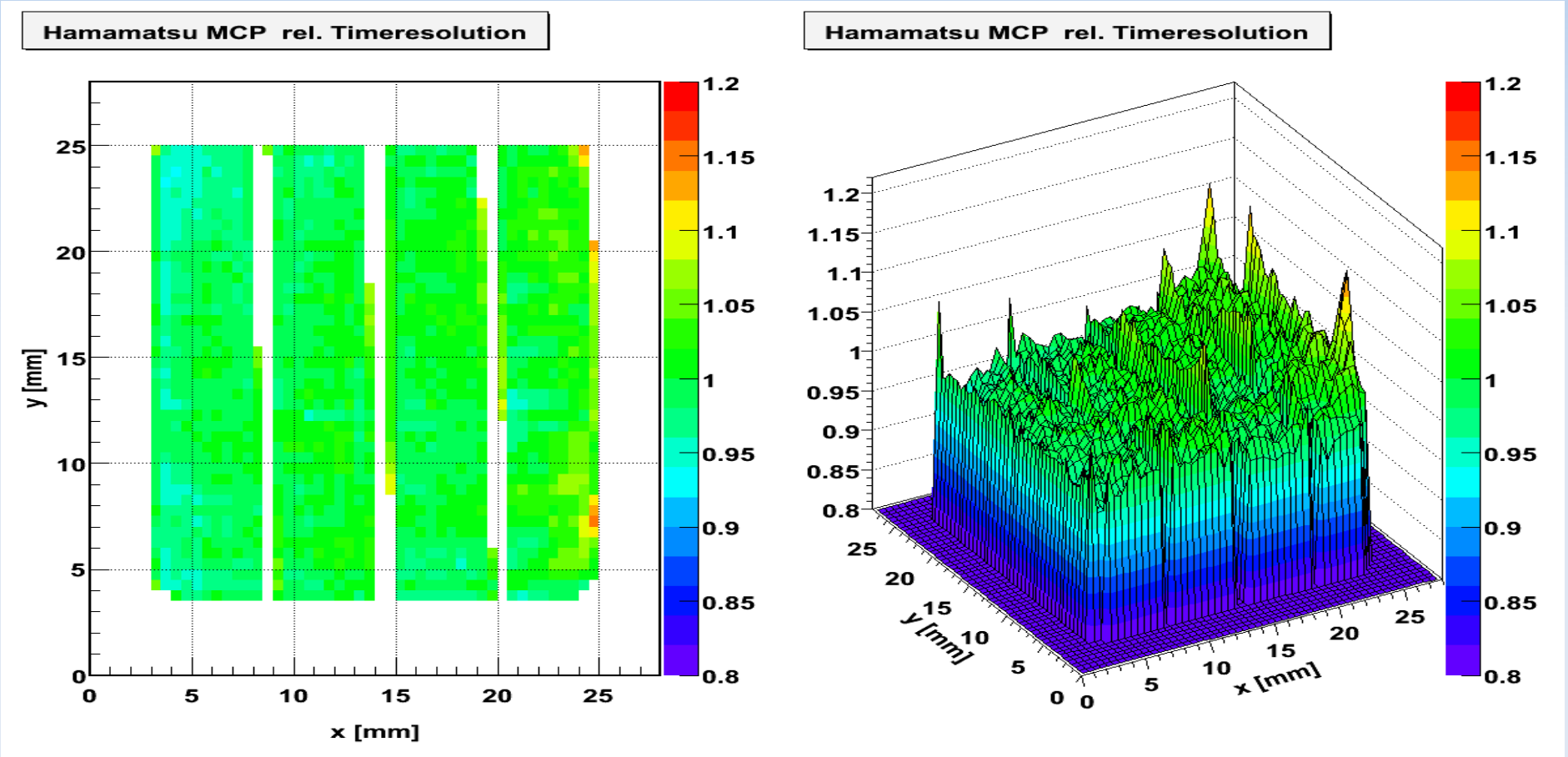
- good uniformity: max difference 20% in Pixel 3
- Gain of Pixel 2 is about 17% less

Gain JT0063



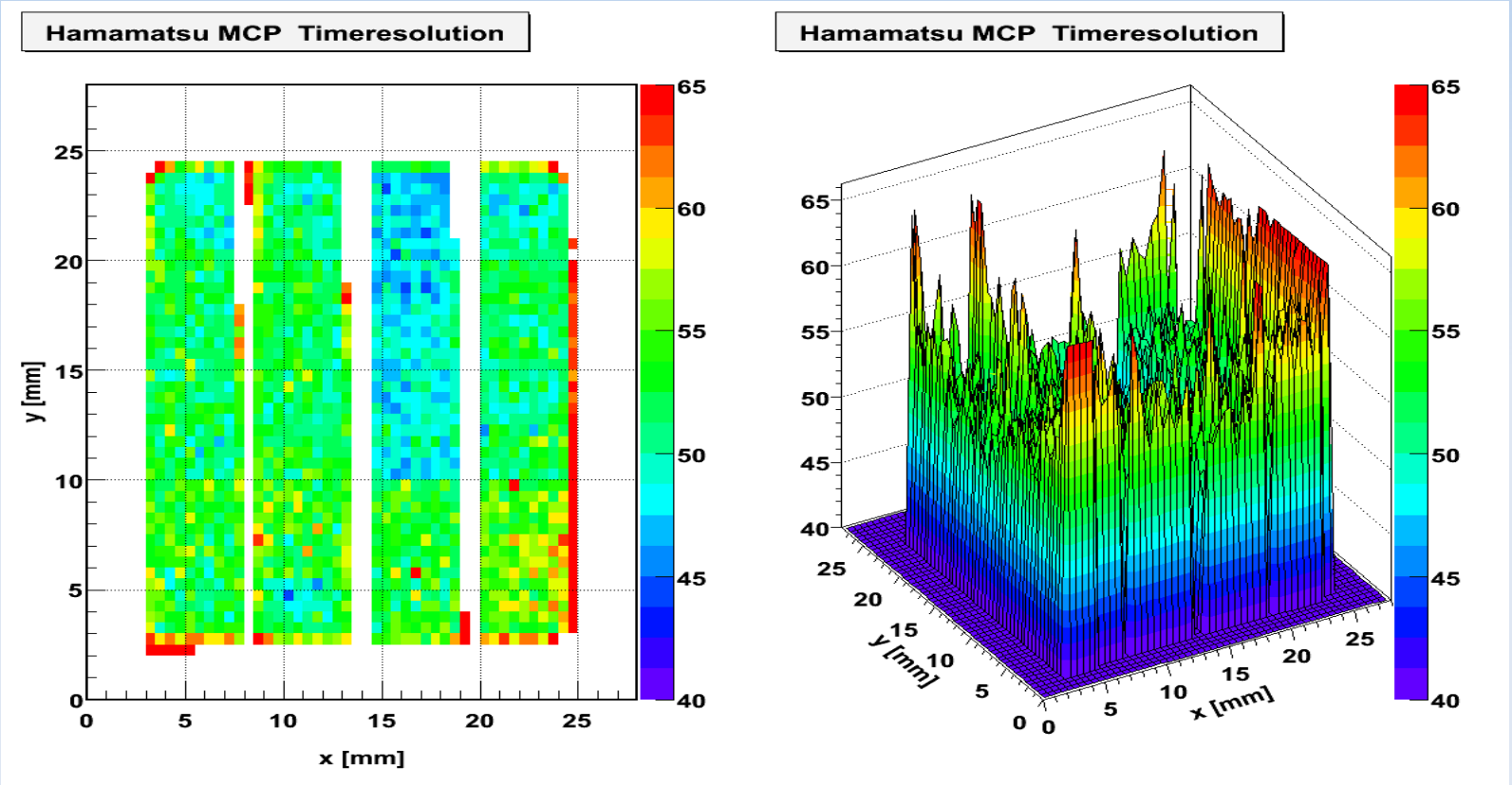
- gain differs about factor 2
- origin of 'Gain-hole' is unknown

time resolution JT0041



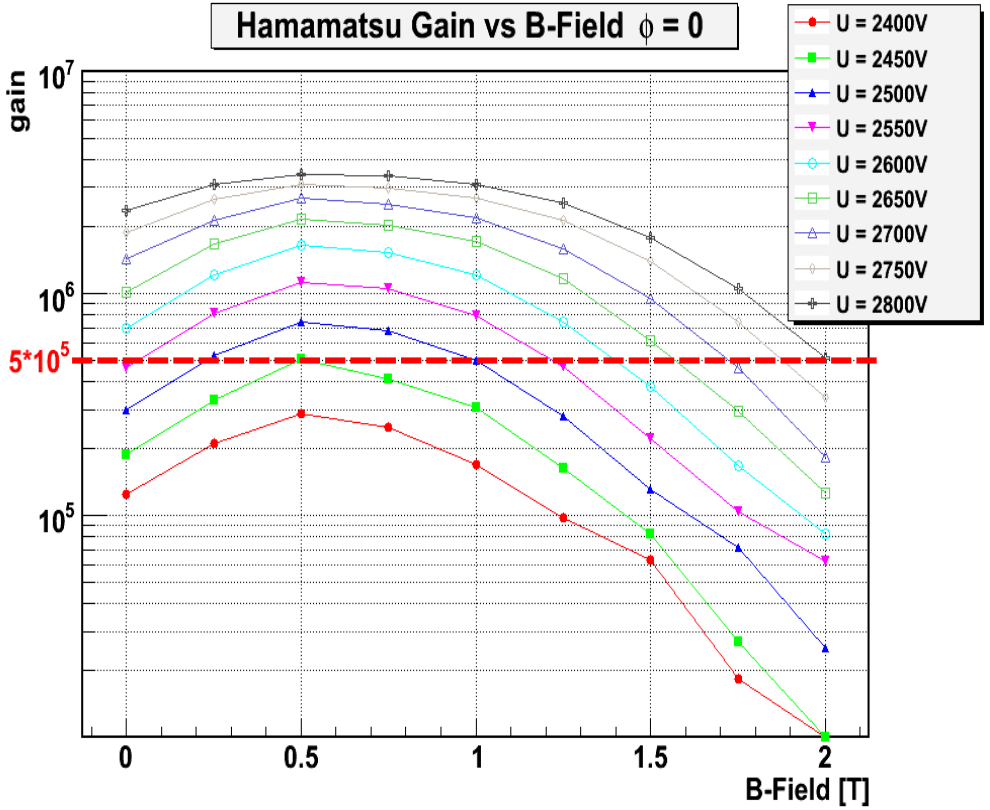
- Difference of the time resolution < 10%
- 'spikes' at the edges of the pixels

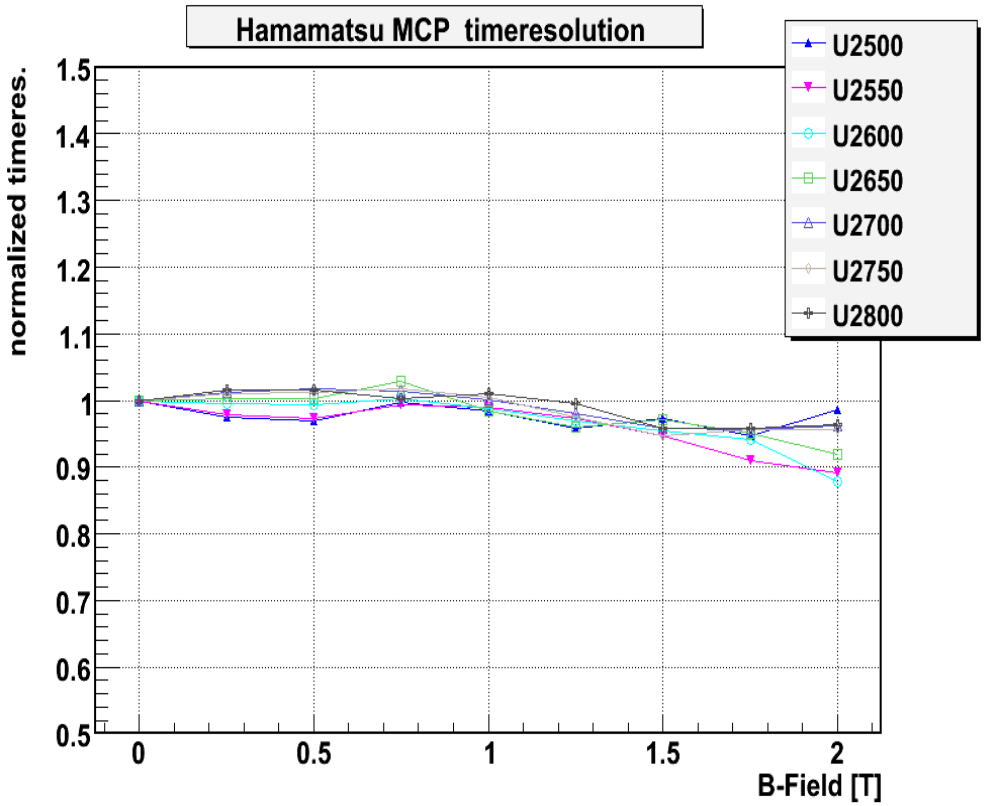
time resolution JT0063



- time resolution ~50ps
- high values are results of low rates at the edges

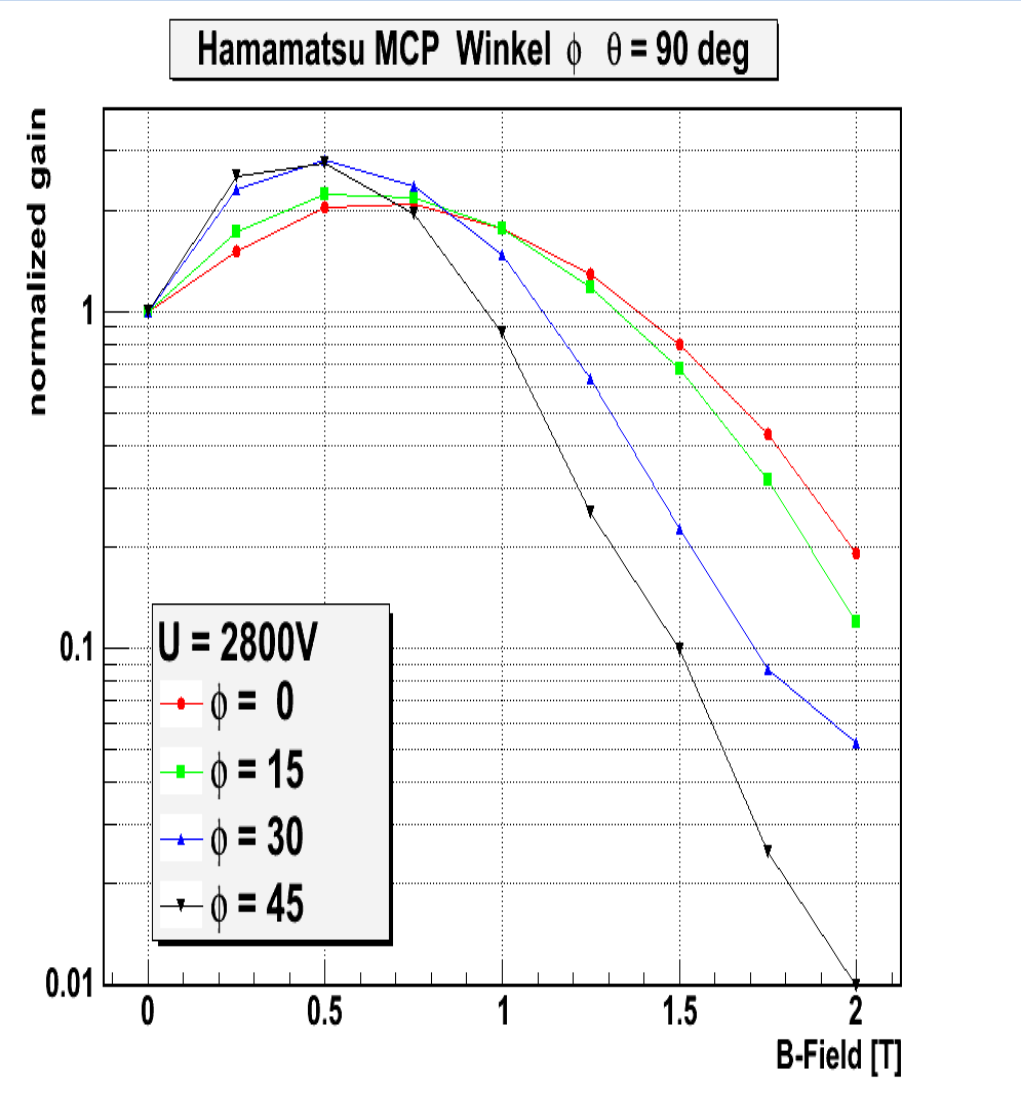
Measurements in B-Field: JT0041 (Gain, time res.)

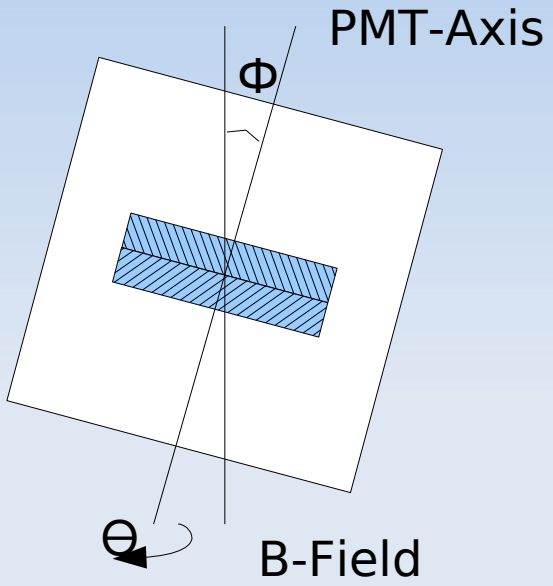




- B < 0.5 T small rise of the gain → Electrons have a higher probability of impacts
- gain drops at higher fields, about 60 % (1,5T) respec. 15% (2T)
- time resolution almost unchanged

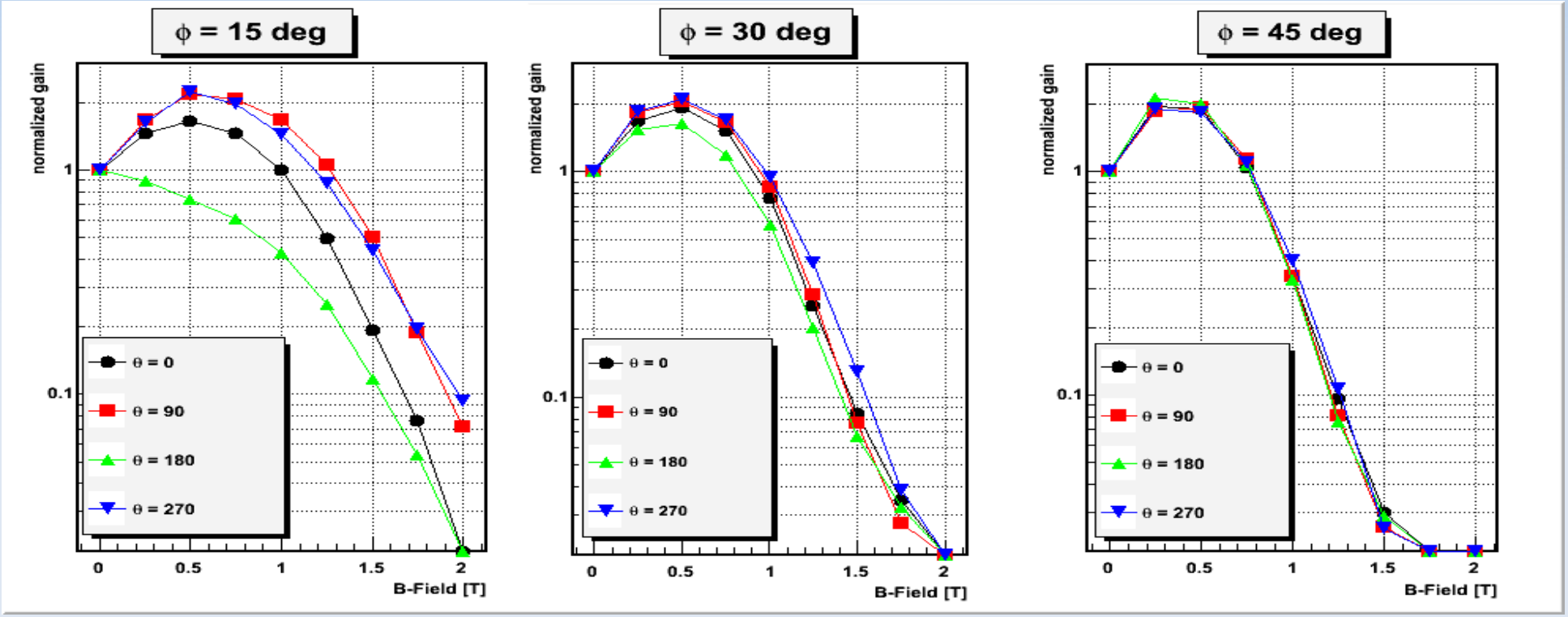
Measurements in B-Field (tilt-angle Φ)





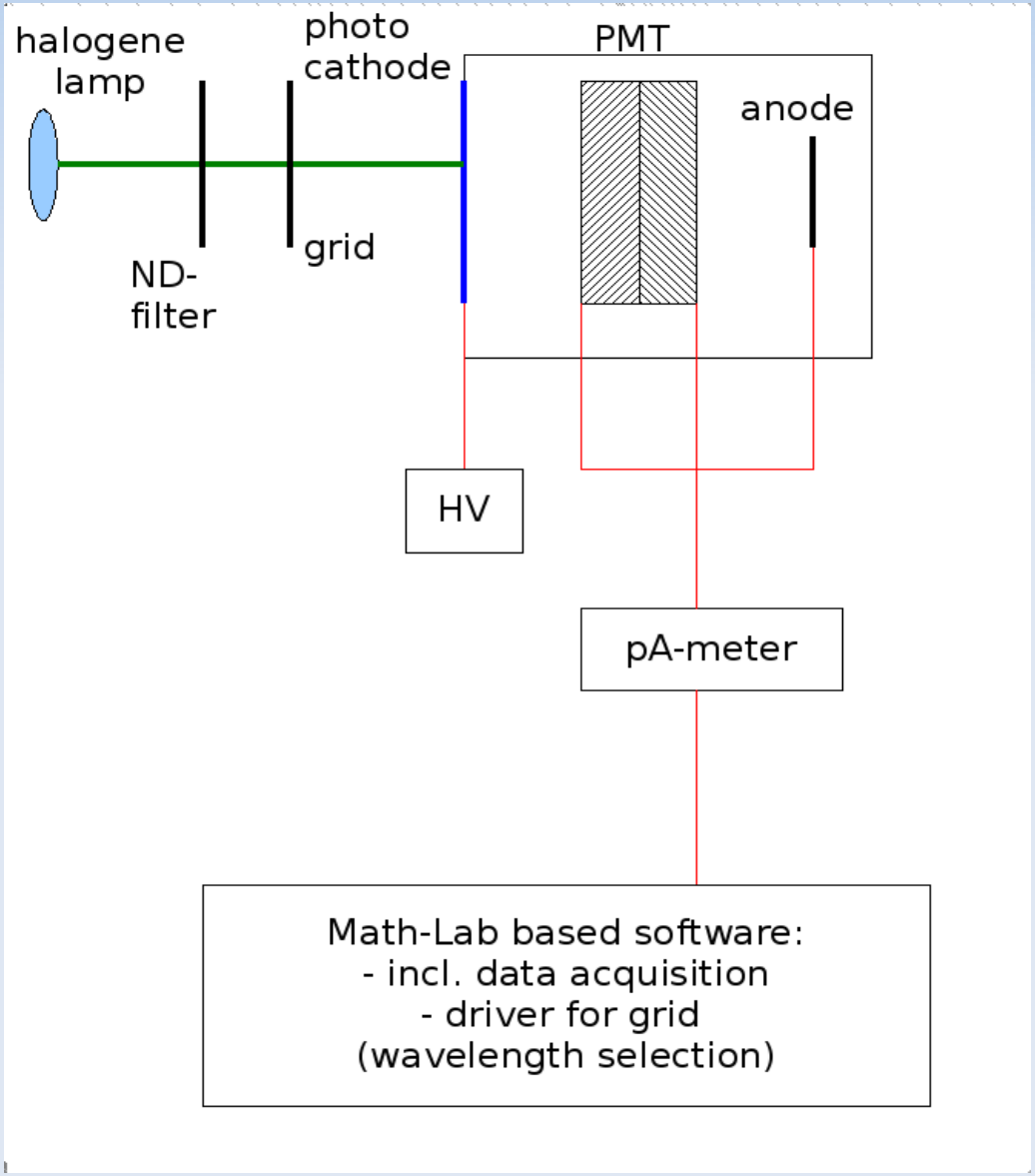
- **Φ = 15°**
  - Gain nearly the same as Φ = 0°
- **Φ > 15°**
  - faster rise for small fields than for Φ = 0° and 15° , but rapid decrease for B>1T

Gain vs B-Field (tilt Φ, rotation θ)



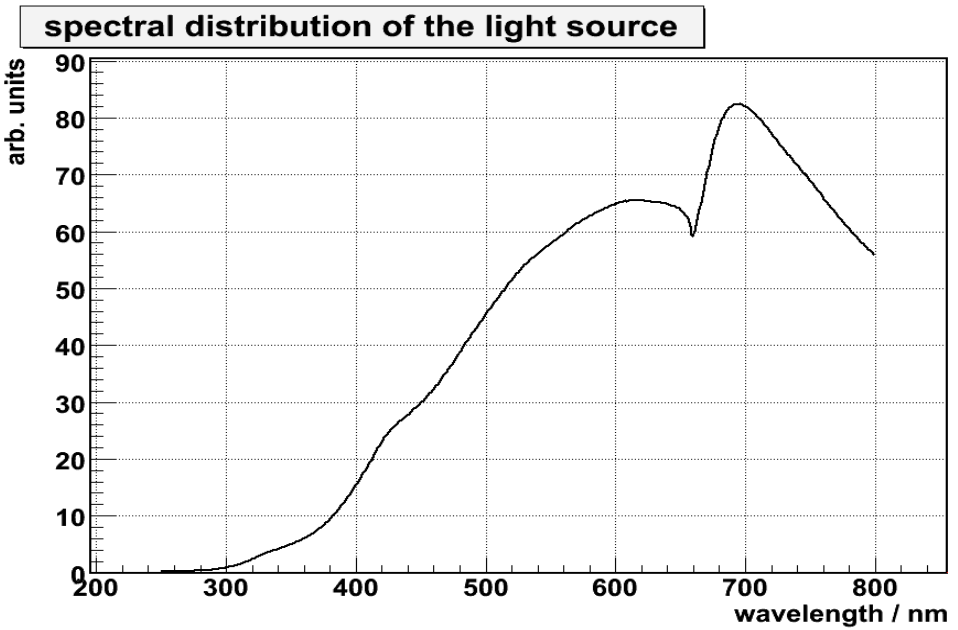
- Φ = 15°
  - at θ = 0° and 180°: Gain significantly smaller, because the capillary tubes in one plate are parallel to B-field axis
  - at θ = 90° and 270°: Gain behavior identical
- Φ > 15° → similar Gain for all θ-angles

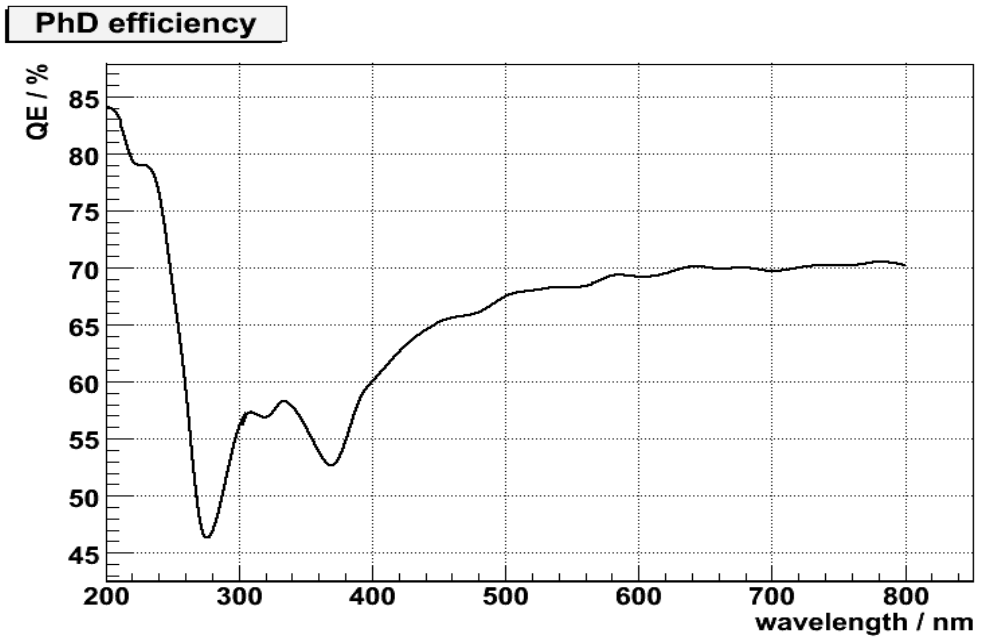
Quantum efficiency measurement



- wavelength selection by grid
- anode and PMT are shorted and current measured

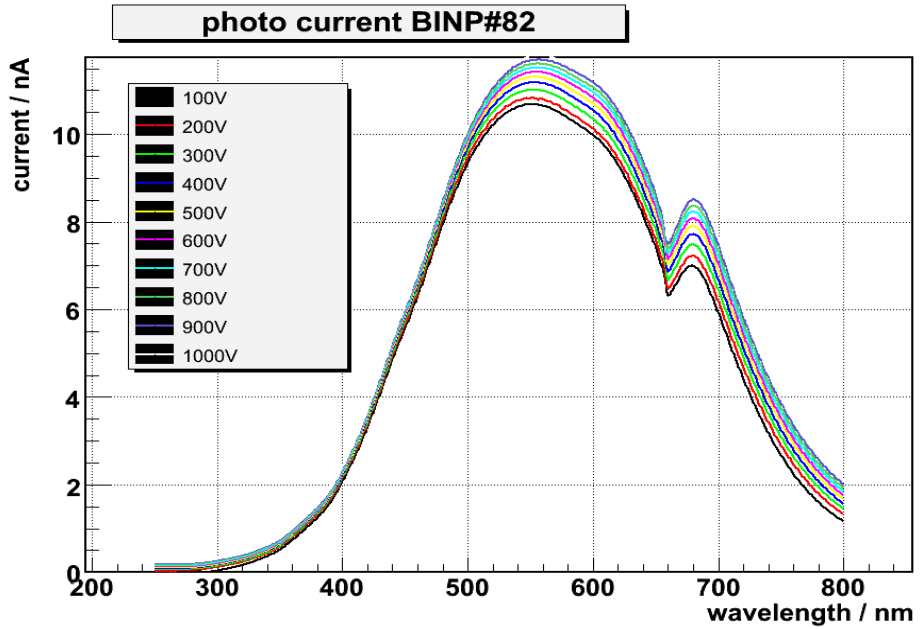
halogene lamp

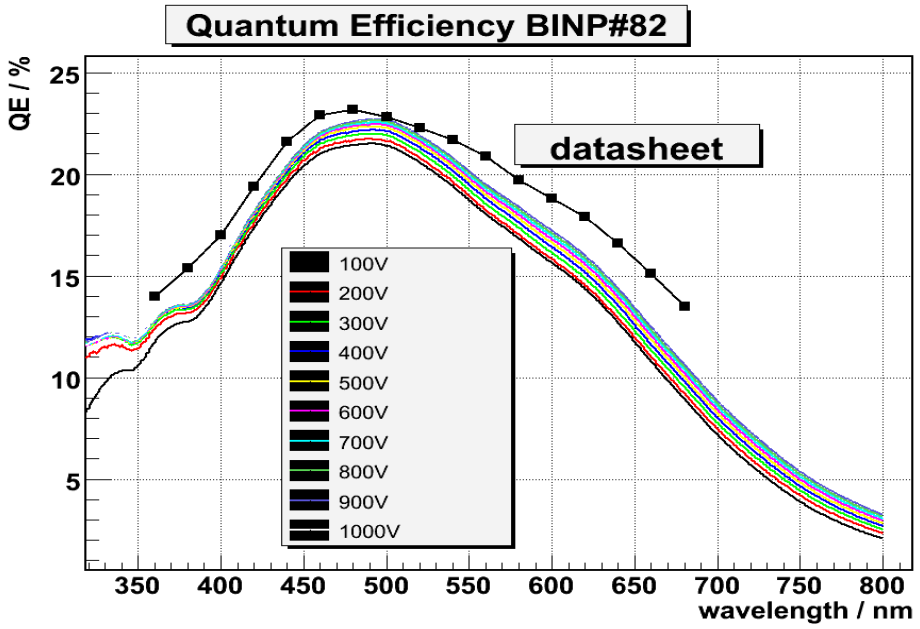




- apparently measurement limited for $\lambda > 300$nm (ND-filters)
- stable light source (halogene lamp, 100W)
- $\Delta\lambda = 1$nm
- calibrated PhD: Hamamatsu S6337-01

Quantum Efficiency





- increased collection efficiency results in an increasing measured quantum efficiency
- measured QE smaller than data-sheet, possible degradation effects or higher voltage needed

Outlook

- Further testing of PMTs needed
- SL10 seems to be a promising candidate, but very fragile
- life time measurements under development and first steps with QE-measurements are promising