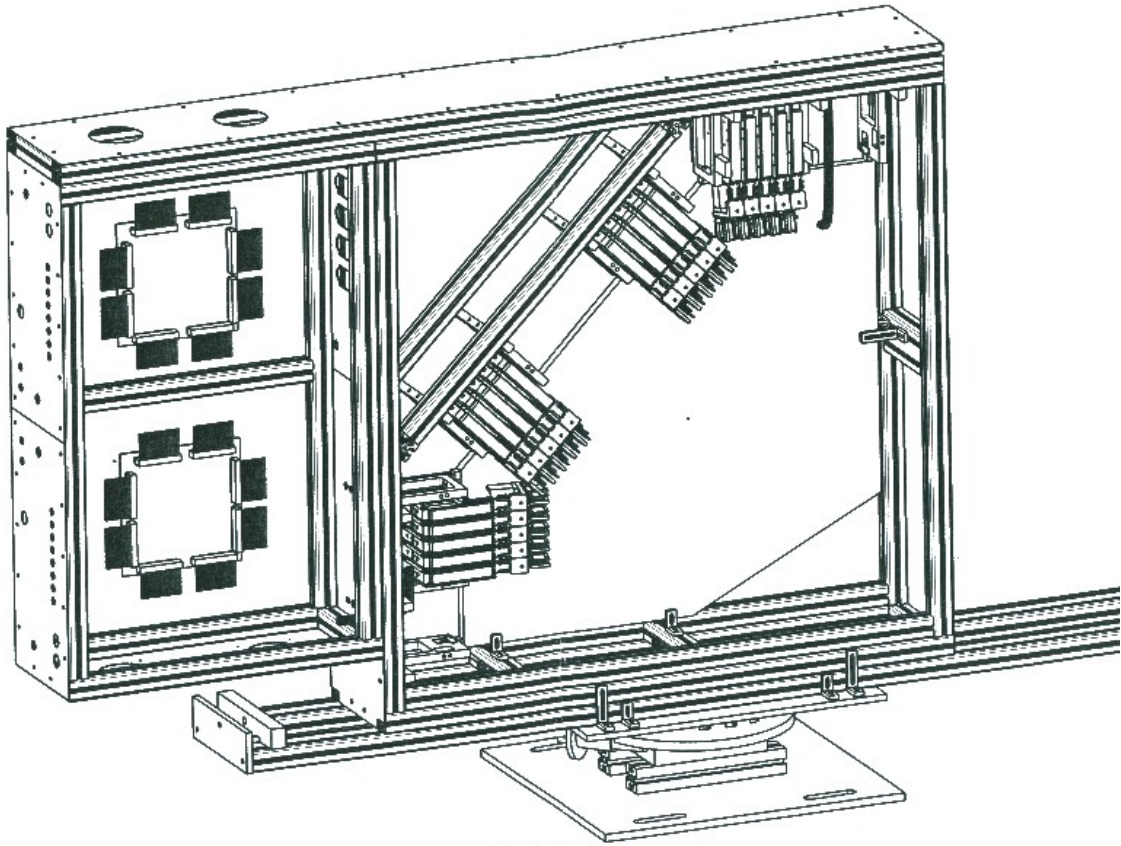
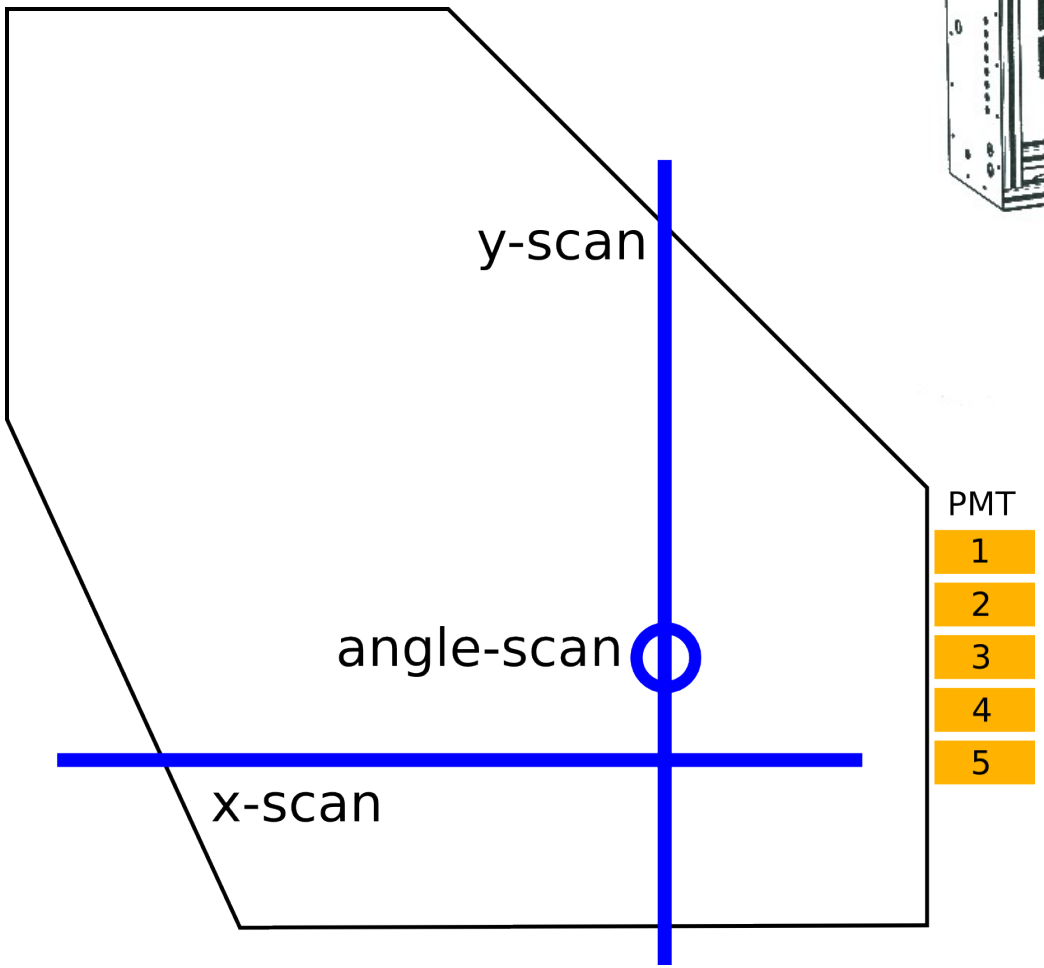
Summary of Giessen Testbeam Results

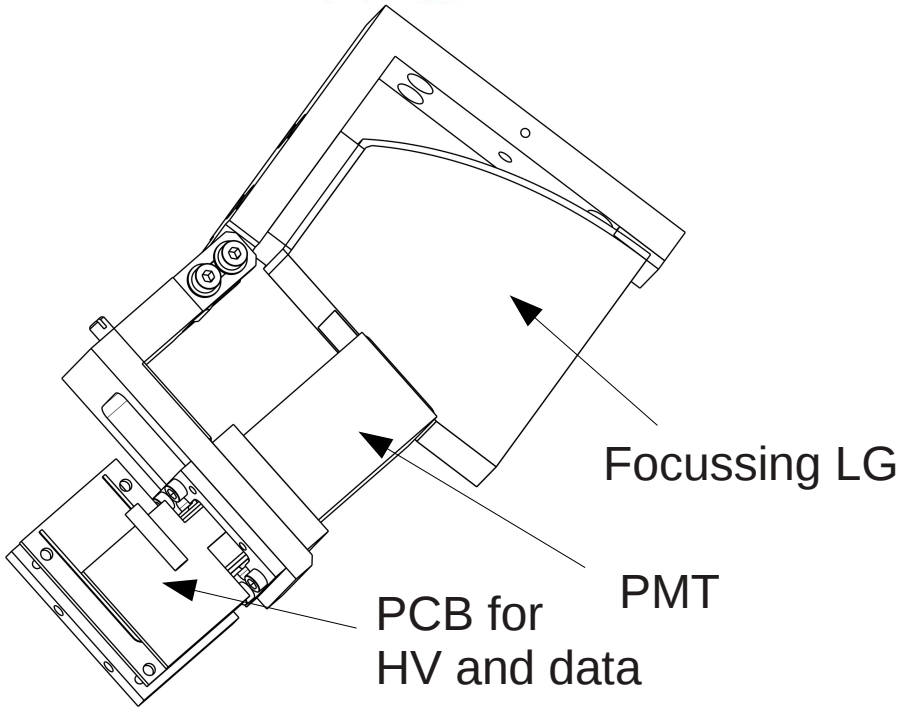
Peter Koch on behalf of AG Düren

Panda Coll. Meeting XL
Mar 5 - Mar 9, 2012

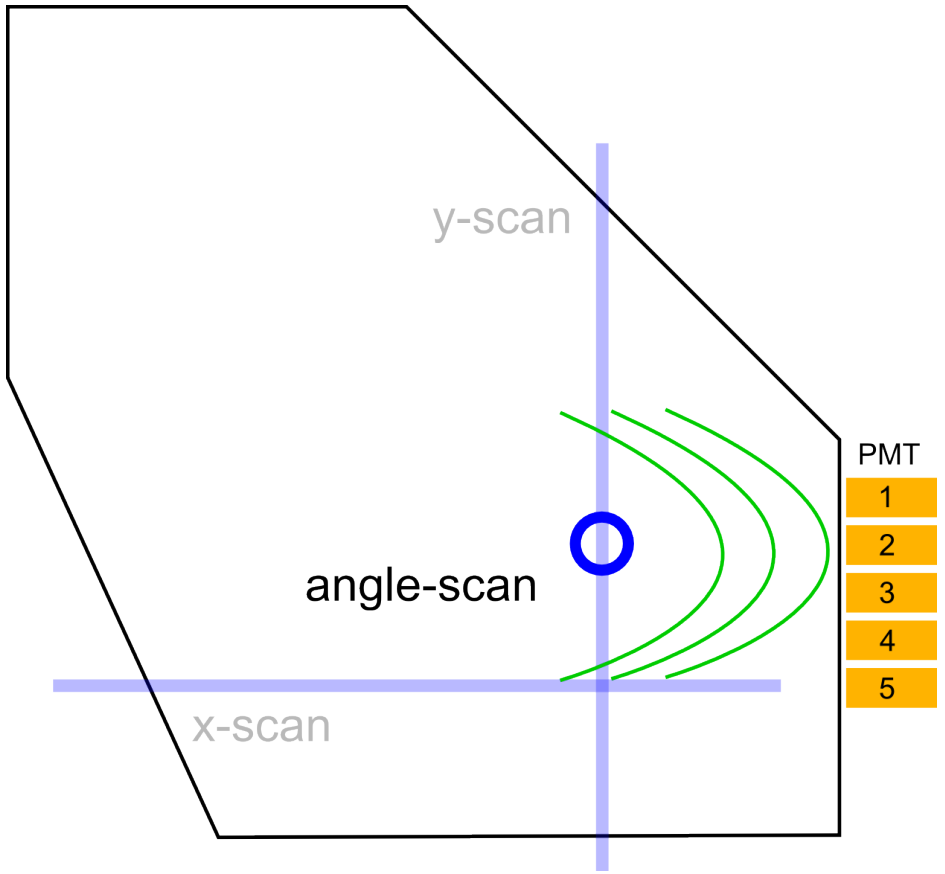
Our setup in December 2011





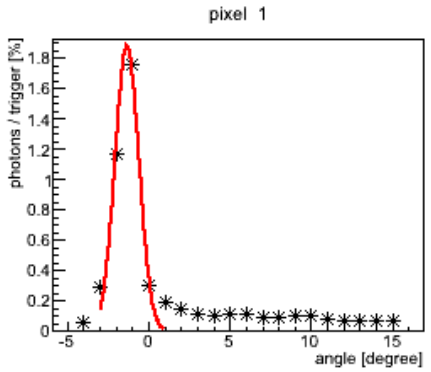


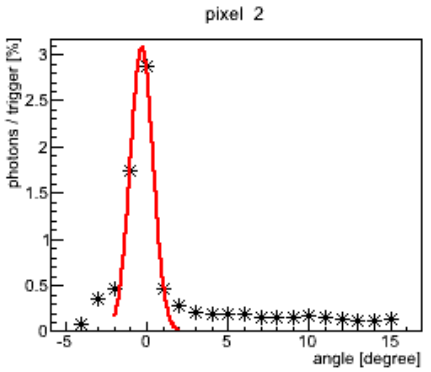
Angle Scan in front of PMT 2

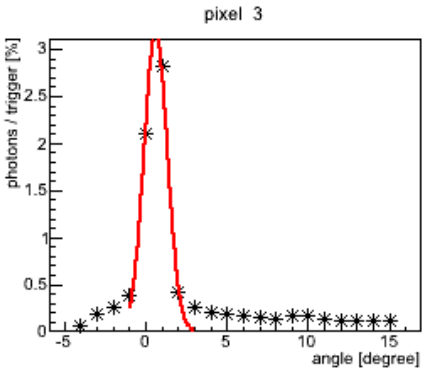


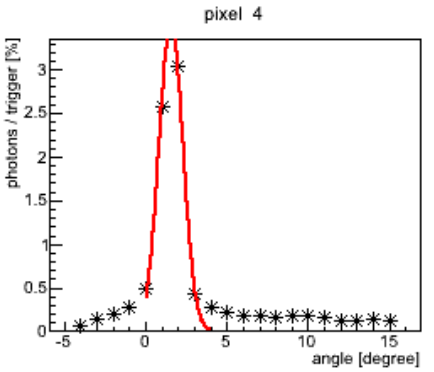
for each pixel and each angle:

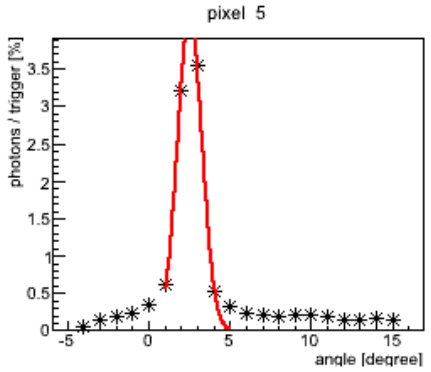
- plot time spectrum „trigger – signal“
- fit the peak
- calculate number of entries
- plot that number as function of angle

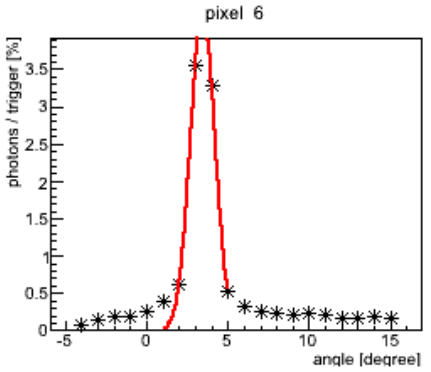


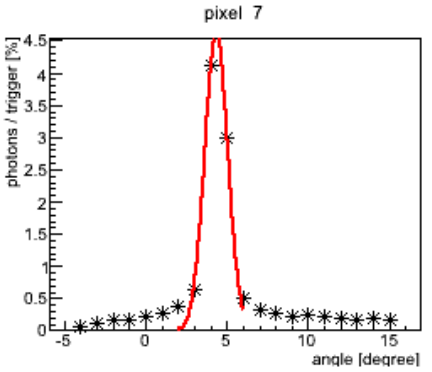


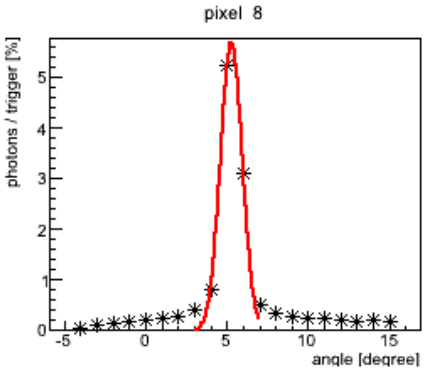


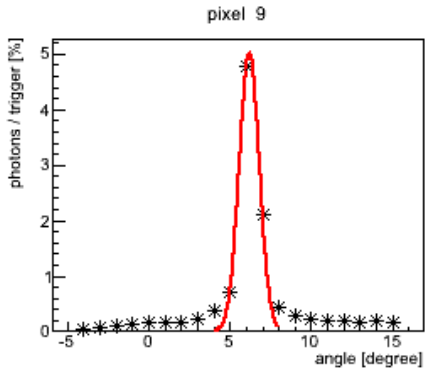


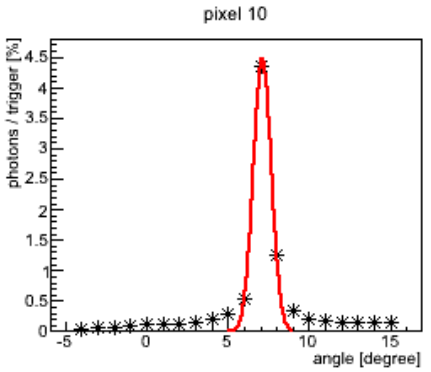


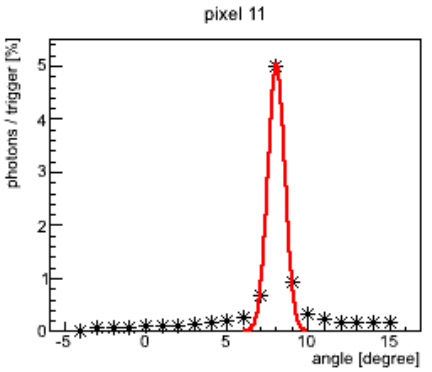


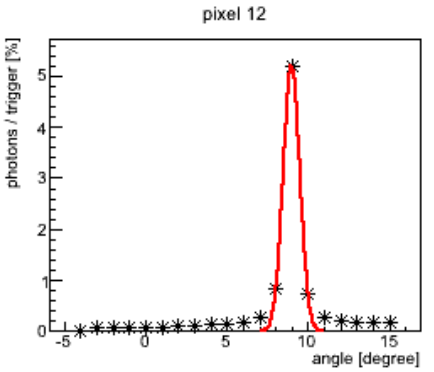


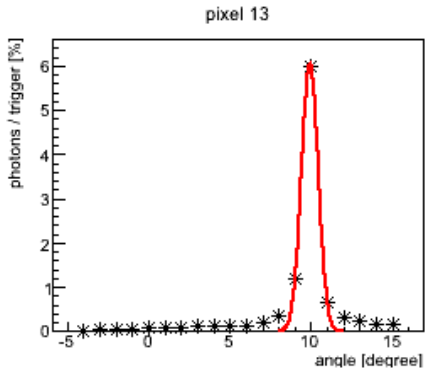


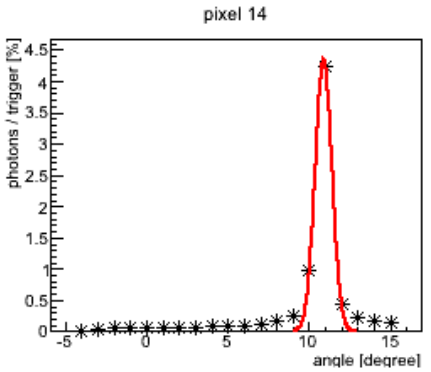






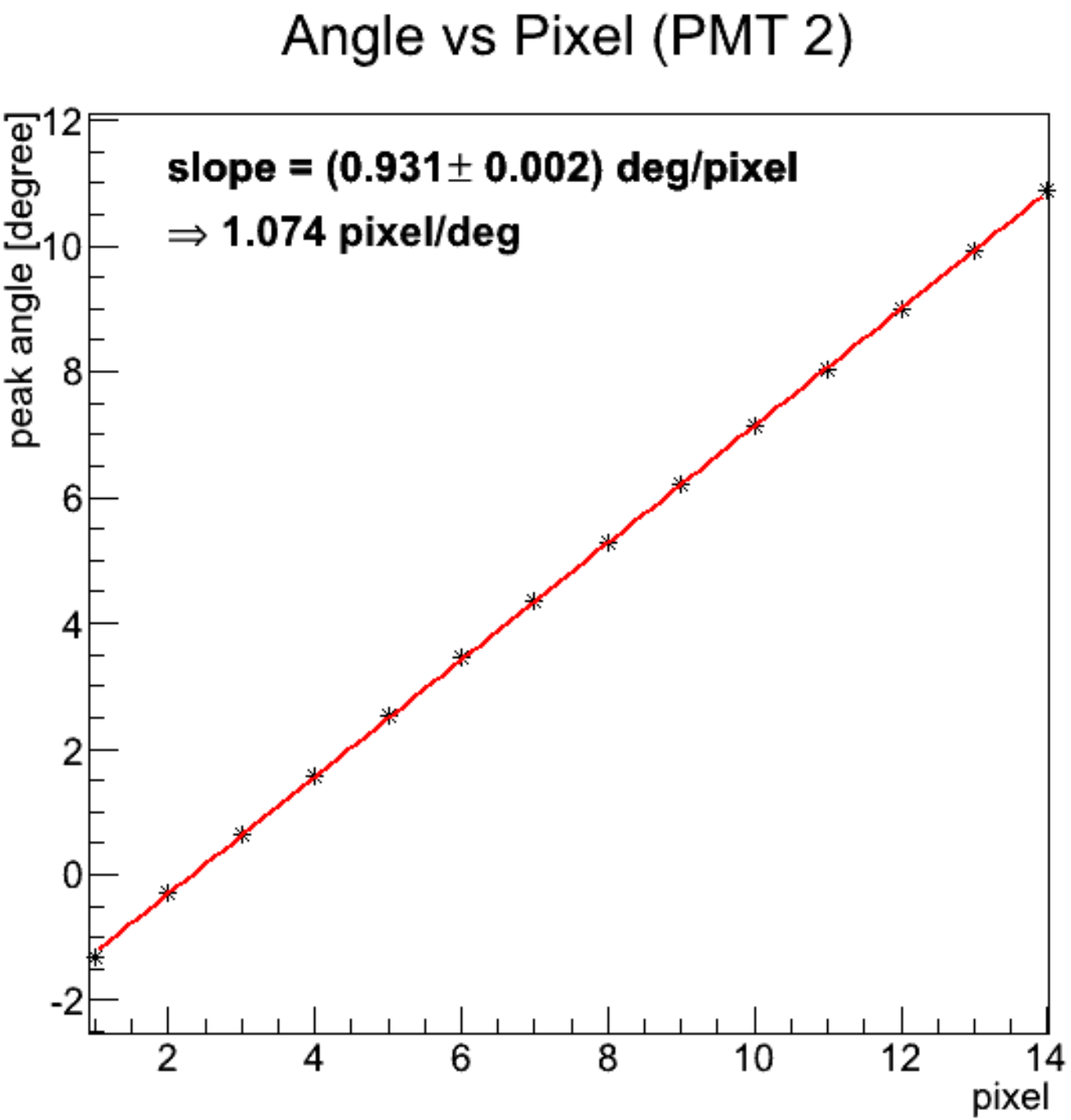






14 pixels of PMT2 (15 and 16 were bad)

x: angle [degree] -5 .. +15
y: photons / trigger [%]



LightGuide design:

angle range:

$$\Delta\alpha = 25.7°$$

focal plane

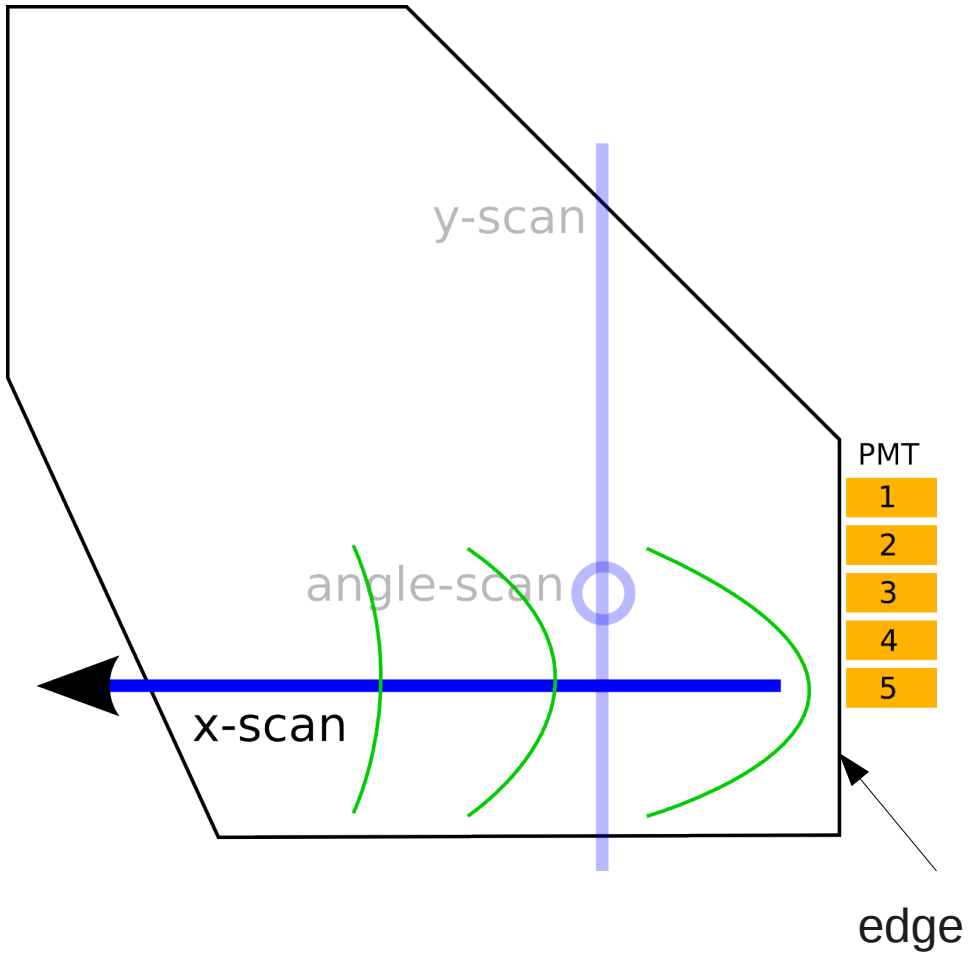
$$\Delta L = 29.4\,mm$$

pixel width

$$= 1\,mm$$

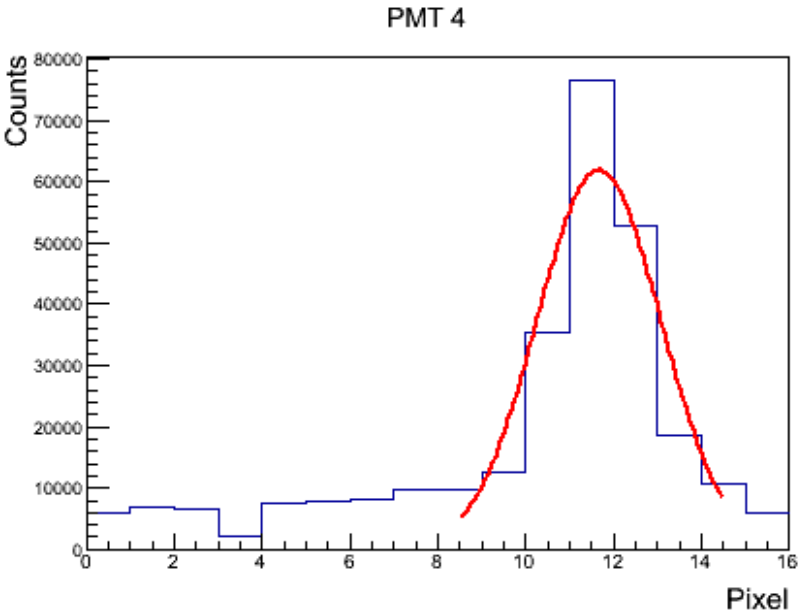
$$\frac{\Delta L}{\Delta\alpha} = 1.14\,\frac{pxl}{deg}$$

x-Scan in front of PMT 1 and 5

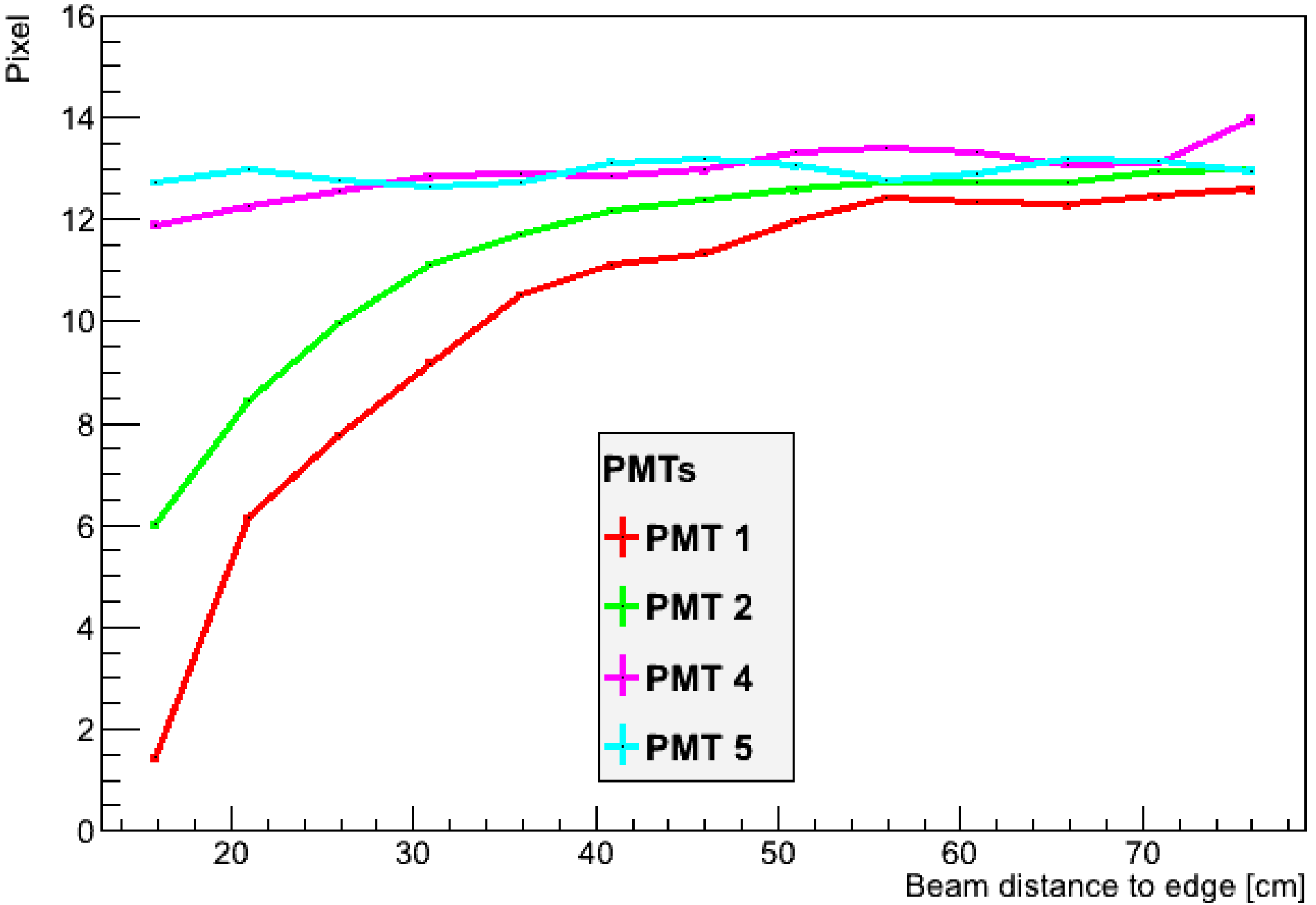


for each PMT and each position:

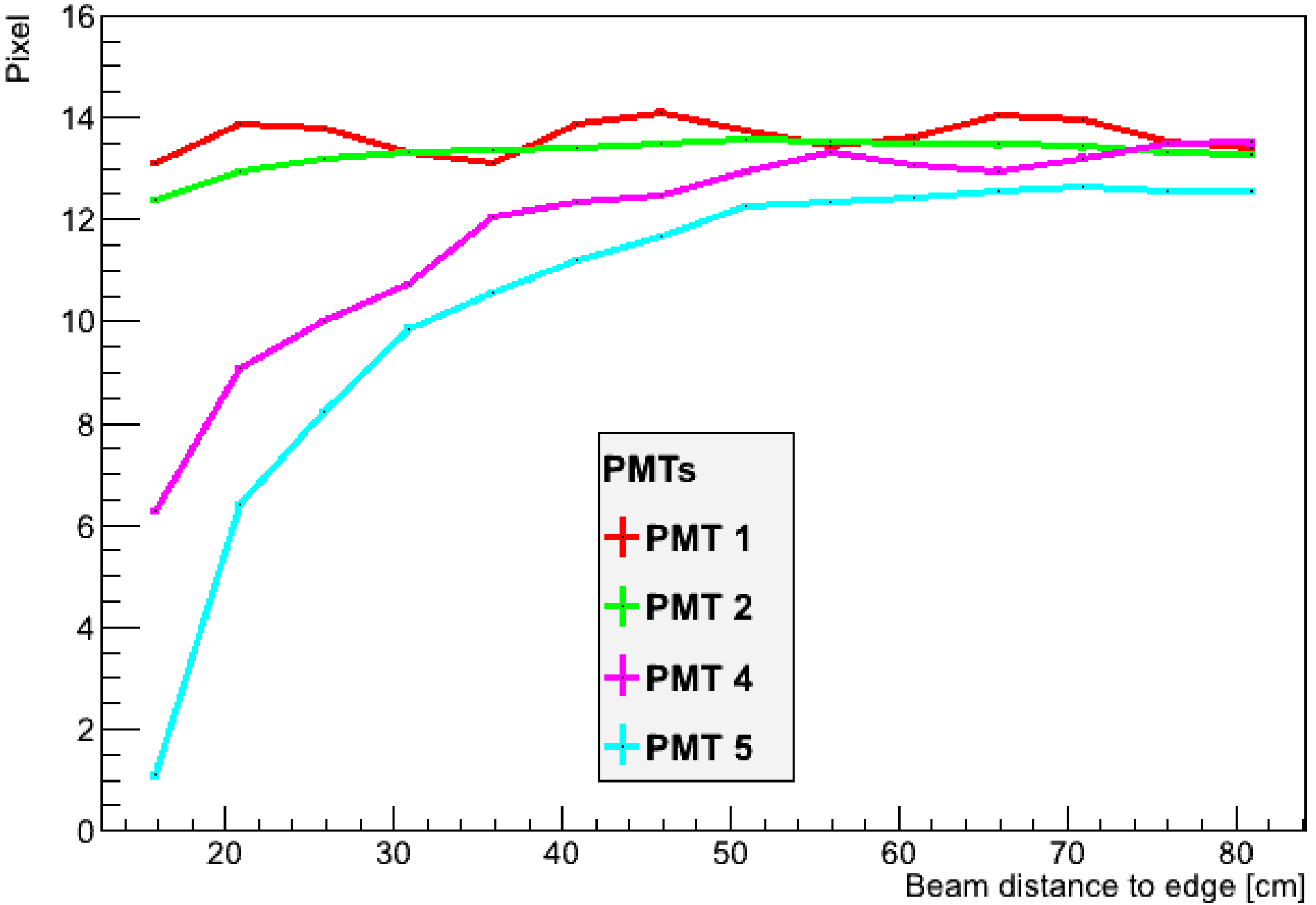
- plot number of entries in each pixel
- fit histogram to find mean pixel



x-Scan in front of PMT 5



x-Scan in front of PMT 1



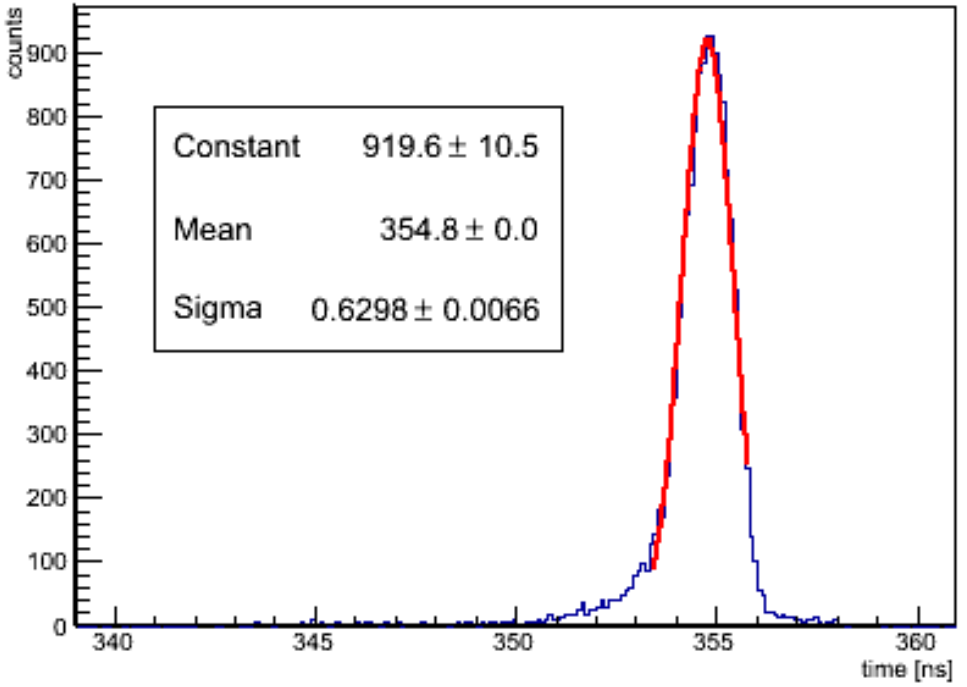
ToP for PMT 1 in x-Scan

scan in front of PMT 1:

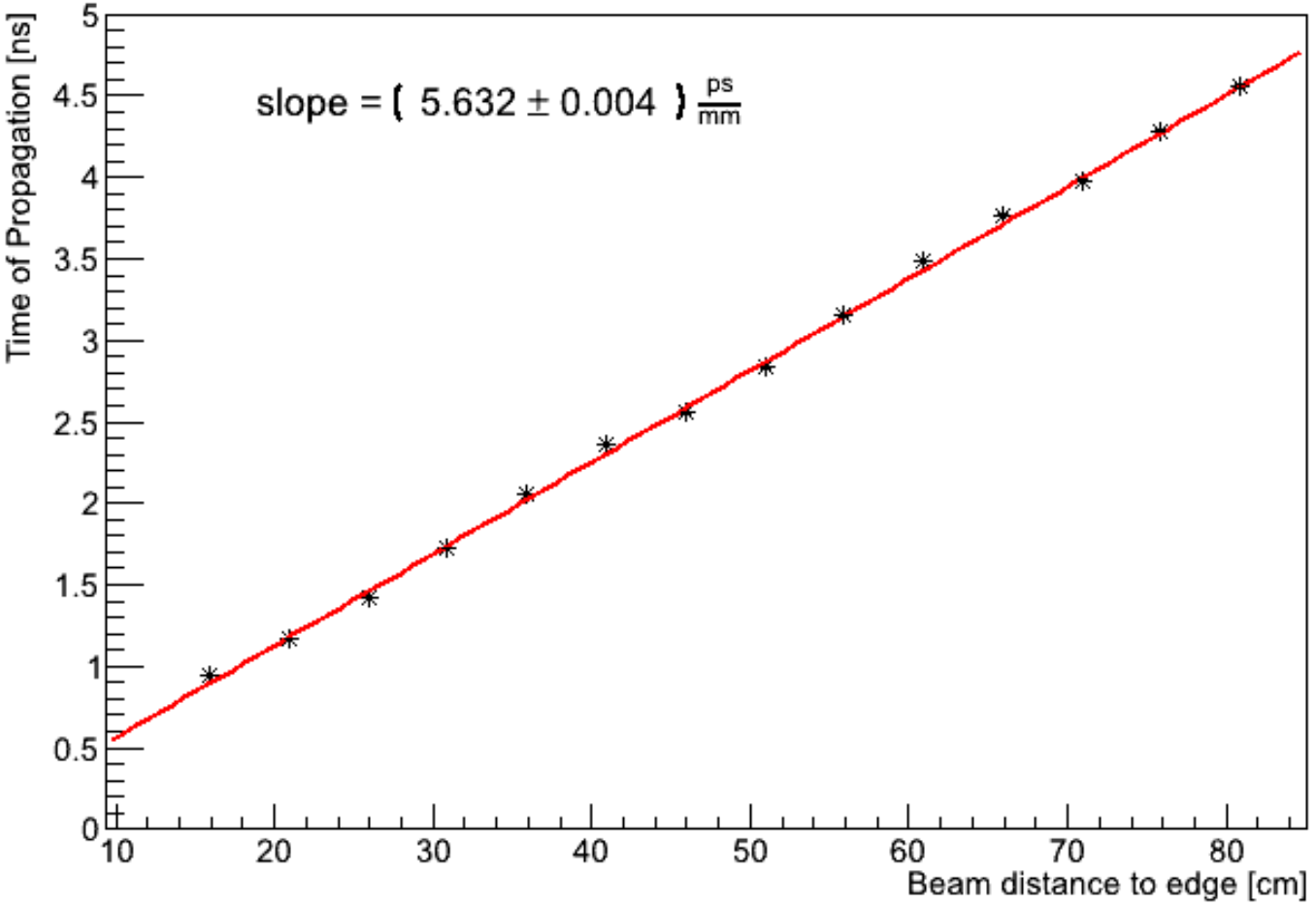
- for PMT 1 same pixel hit in each run

for each position:

- plot time spectrum „trigger – signal“
- fit the peak to get hit time
- plot time vs position



ToP for PMT 1 in x-Scan



photon speed in medium

$$c_m = \frac{c}{n} \approx 20.2 \frac{cm}{ns}$$

projection on radiator surface

$$c_p = \cos(31°) \cdot c_m$$

$$\approx 17.5 \frac{cm}{ns}$$

$$\frac{1}{c_p} \approx 5.716 \frac{ps}{mm}$$

Summary and Outlook

- LightGuides focus as designed
- position scan results in expected behaviour for PMTs close to the scan-axis

- open issues / need to understand
  - get number of Photons
  - curves for PMTs away from scan-axis
  - focal quality of LGs
  - . . .
  - reconstruct events