Response of PWO to photons with energies from 10 to 62 MeV using Vacuum Photo-Tetrodes (VPTTs)

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Outline

- Experiment
- Analysis
- Results

Experiment-I

- 3x3 matrix of Forward End-Cap type PWO crystals equipped with VPTTs (Hamamatsu R11375 with Al stripes)

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- The DAQ was in the control-room.

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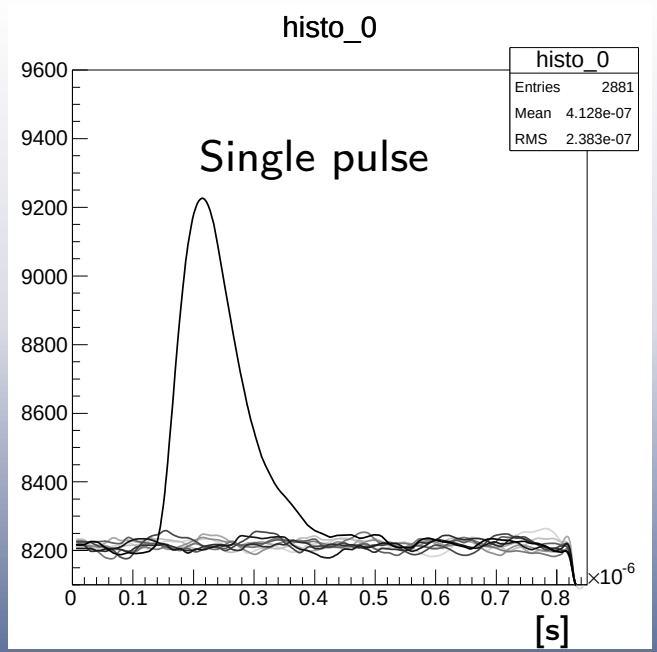

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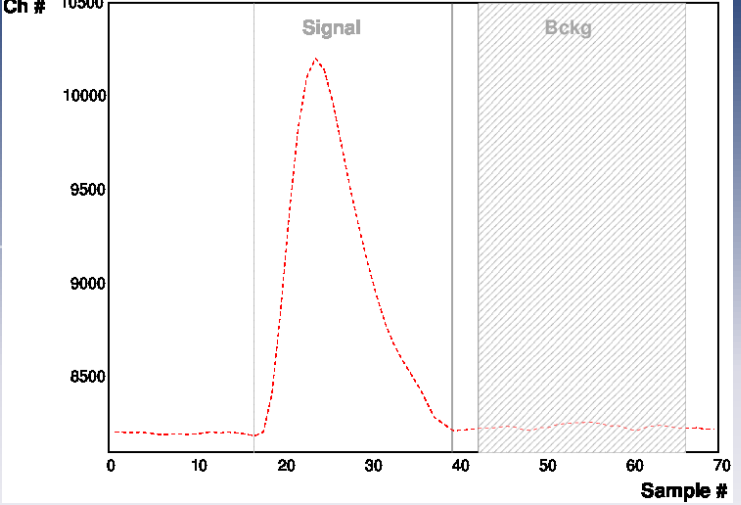

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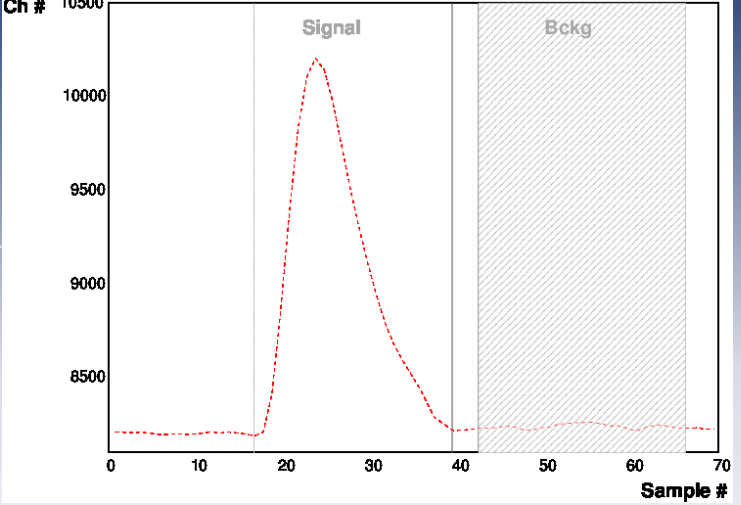

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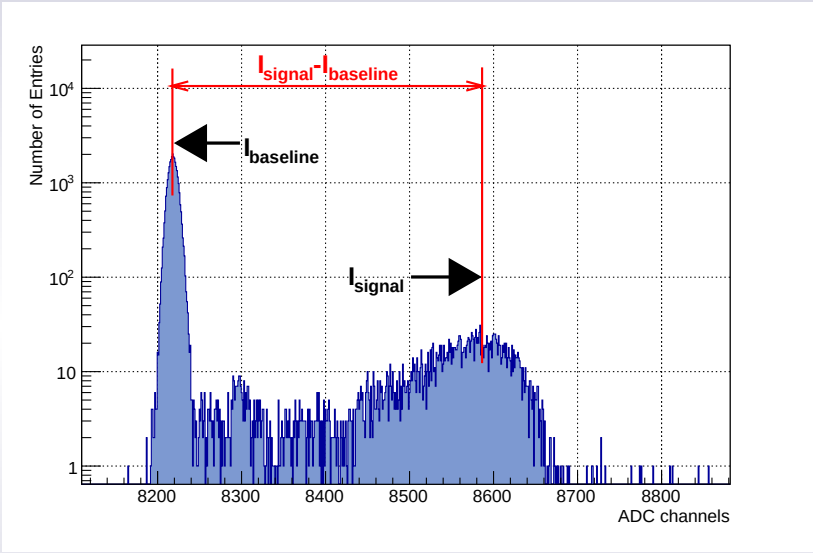
- the relative calibrationis made by the $b(I_{\text{signal}} - I_{\text{baseline}}) + c(I_{\text{signal}} - I_{\text{baseline}})^2$ where I_{signal} is the integral of the given region with signal present and I_{baseline} is the integral without signal



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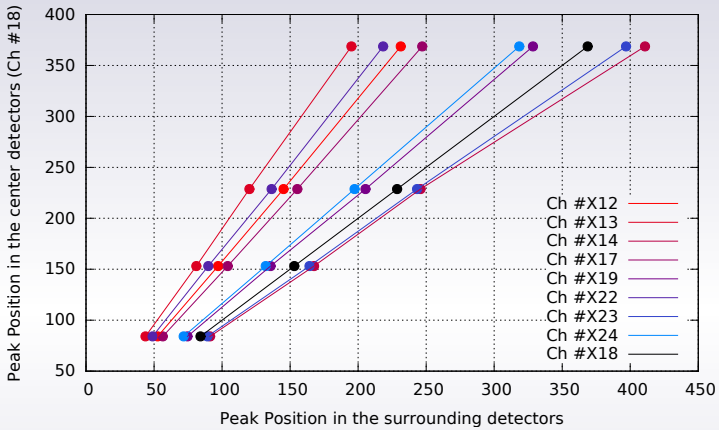

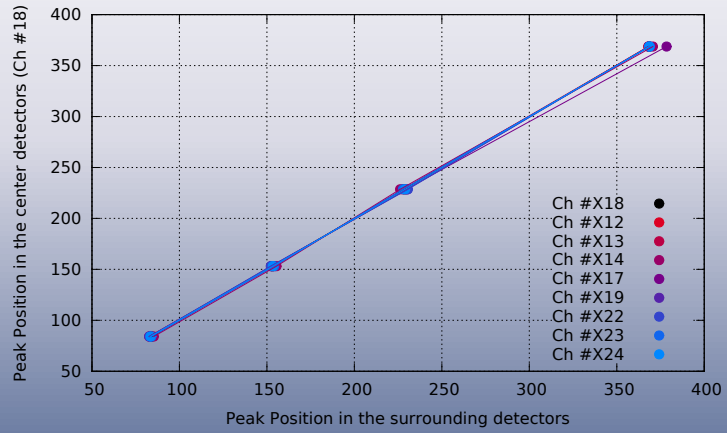

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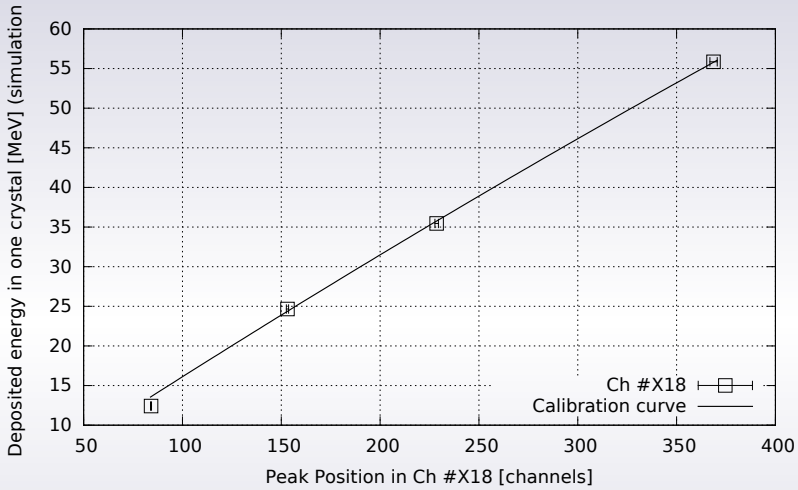
- the relative calibration
- absolute calibration is made using a GEANT simulation as reference
    - fitting via a second-order polynomial without a constant term



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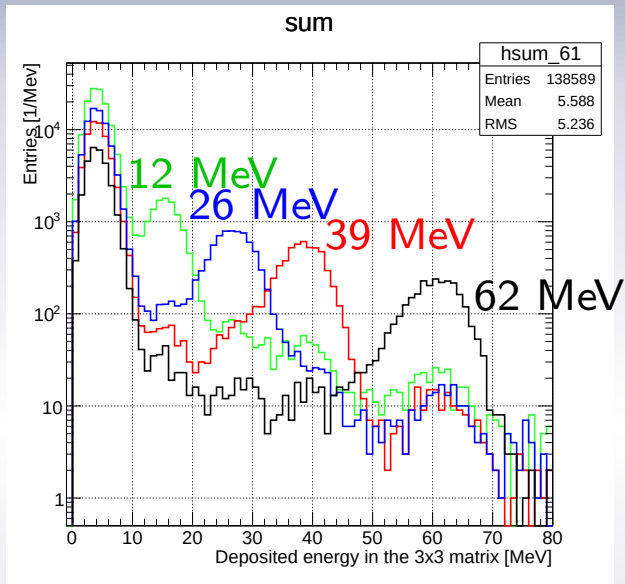

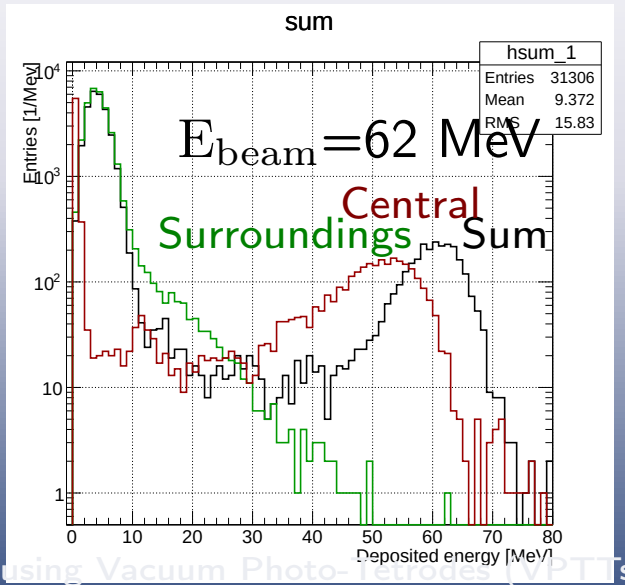

Results

- Optimal Threshold
  Threshold was applied only on the 'surrounding' crystals

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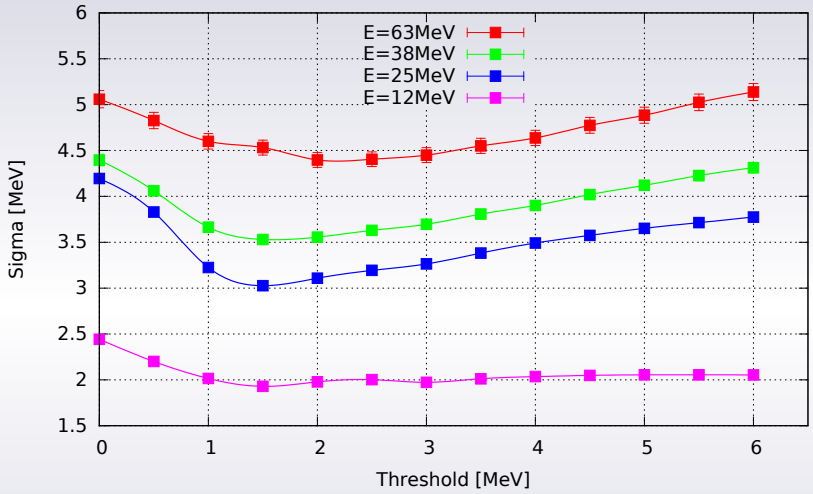
Optimal Threshold is $\approx$ 1.5MeV

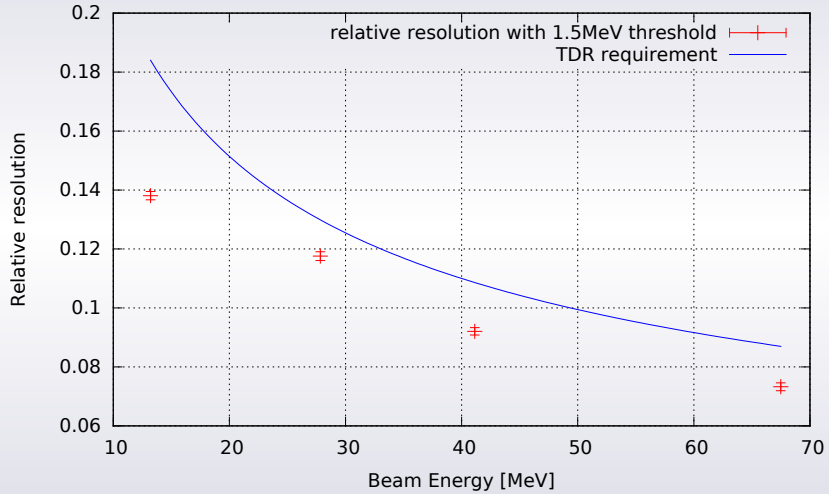


$E_{beam} = 63$ MeV $E_{beam} = 38$ MeV

$E_{beam} = 26$ MeV $E_{beam} = 12$ MeV

Results

- Optimal Threshold
- Relative resolution



fADC [PANDA prototype] -
2 MeV threshold,
$\approx$ 40 ns shaping

Tagger resolution
is not removed

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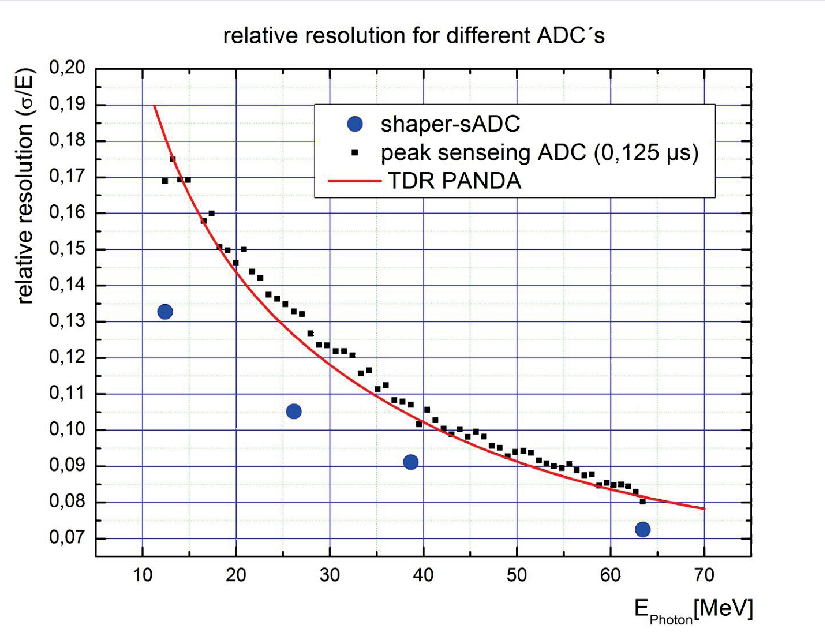

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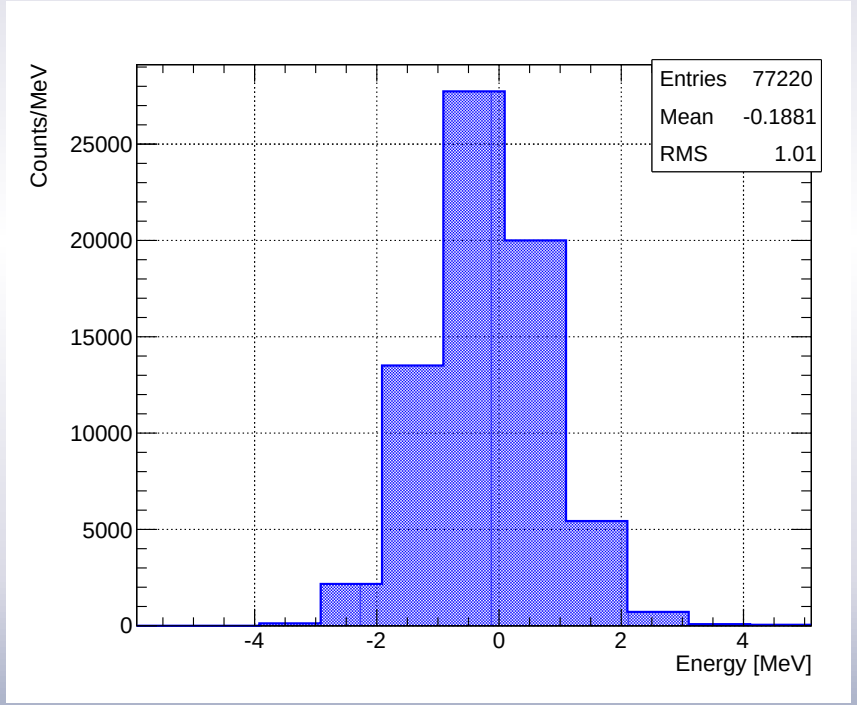
Results

- Optimal Threshold
- Relative resolution
- Noise of the individual detectors was determined via fitting the 'noise-peak'



Summary/Outlook

- First step of PWO response for low energetic photons with VPTT readout using fADC has been performed
- The measured relative resolution fulfills the PANDA requirements
- Noise is determined

Thank You!

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I wish You Merry Christmas and Happy New Year!