ÖAW AUSTRIAN ACADEMY OF SCIENCES

HEPHY INSTITUTE OF HIGH ENERGY PHYSICS

RD50 HV-CMOS Meeting

Testbeam RD50-MPW3 DESY Jul. 23

Bias + E Scans

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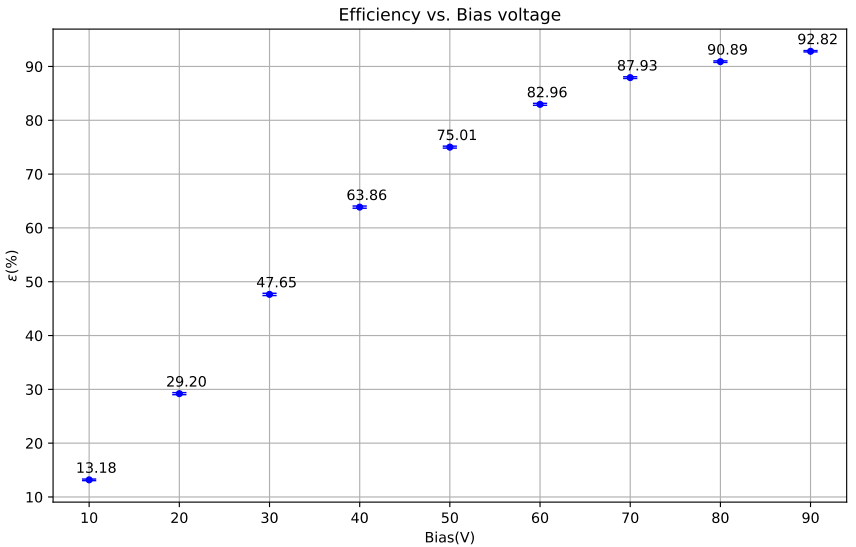
Justification Trigger-Number shift

- We had a chat with Adrian (DESY, *Adenium* telescope)
- Trigger number shift of -1 was artificially added to the *Adenium* producer
  - *Duranta* (MIMOSA26 based) had this trigger offset bug, introduced in *Adenium* for DAQs and Analysis designed for the *Duranta (especially ATLAS Itk)*
- Shifting trigger numbers by +1 in our case therefore totally appropriate

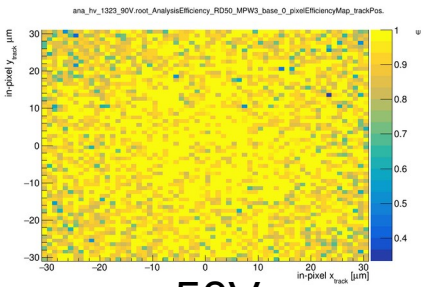
Bias Voltage vs. Total Efficiency



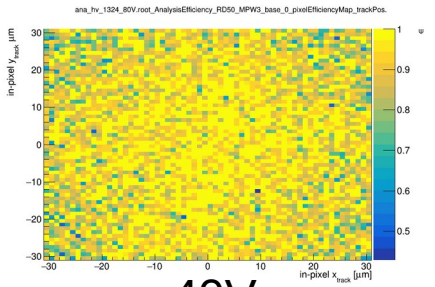
- Analyzed runs with various voltages
  - 10 → 90 V in 10V steps
  - Run *#1323* → *#1331*
- All runs taken with V_{th} = 1.2V
  - We don’t achieve ~98% here
- Each run was aligned in *Corry*
  - DUT position was changed during runs

Bias voltage vs. In-pixel Efficiency

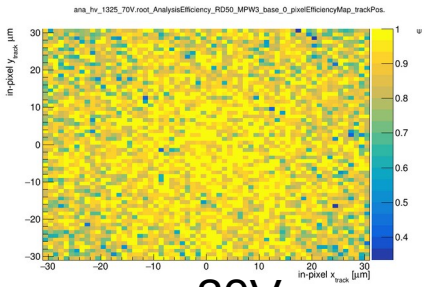
90V



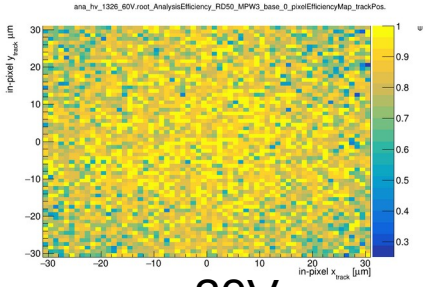
80V



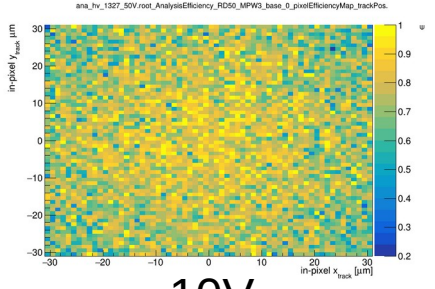
70V



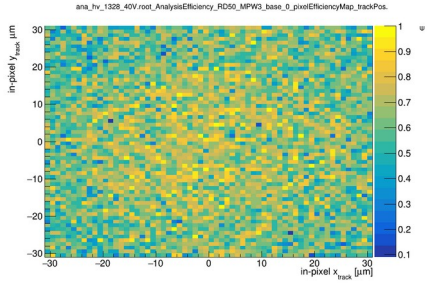
60V



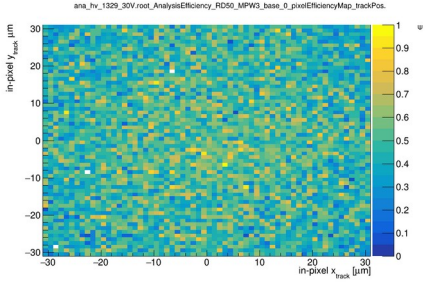
50V



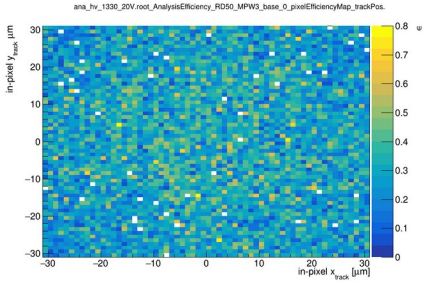
40V



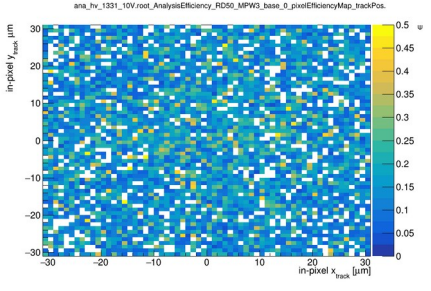
30V



20V



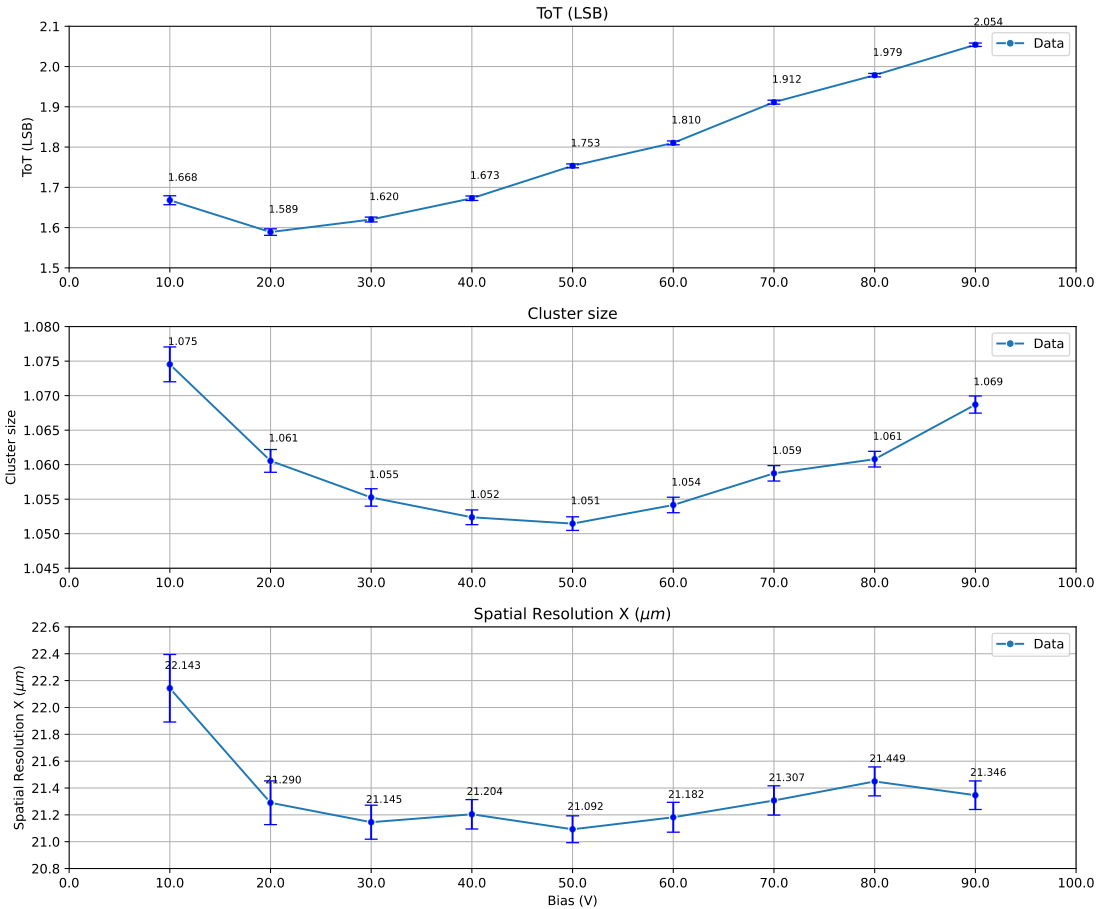
10V



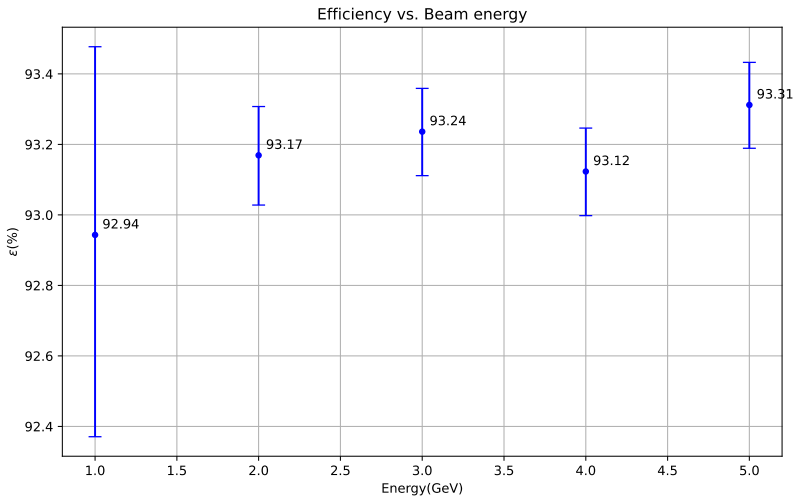
- Efficiency in the edges < Efficiency in the center → Not fully depleted at any here tried bias voltage
- Higher bias voltages would also have been interesting
  - Breakthrough at?

Bias voltage vs. Others

- ToT strictly increasing (ignoring 10V) with bias voltage
- Cluster size shows a minimum at 50V
  - Why?
- Spatial Resolution (excluding 10V and taking error bars into account) „unaffected“ by bias voltage



Beam Energy vs. Efficiency



- Analyzed Beam-Energy scans
  - Energy from 1GeV → 6GeV in 1GeV steps
  - Rate at 6GeV really low, basically no tracking done at TB
- Efficiency shows no significant dependence on particle energy
  - Not very surprising
  - Electrons are MIPs at ~1.6MeV

Beam Energy vs. Others

- ToT shows slight influence of energy
- Cluster size shows no significant effects
- Spatial resolution gets better with energy increase
  - Effect of GBL track fitting (momentum parameter)?
  - Alignment was not done with correct momentum
    - I will redo that