Update on the TI-LGAD test beam analysis @JSI

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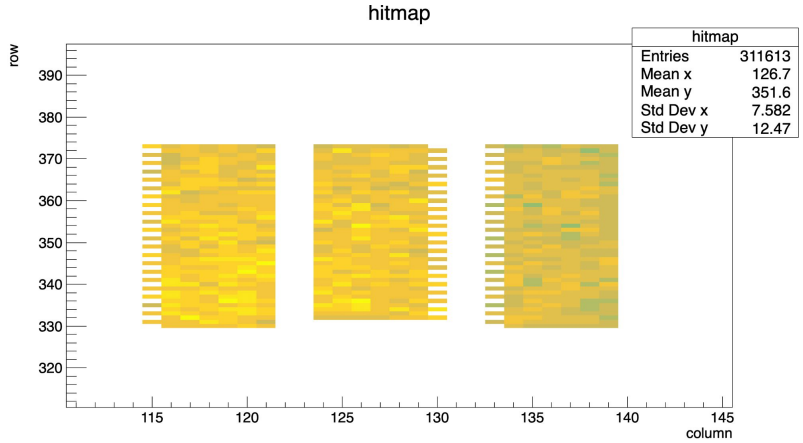
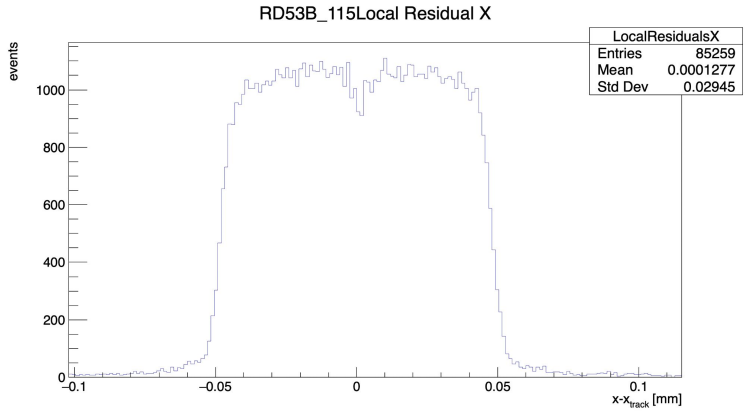
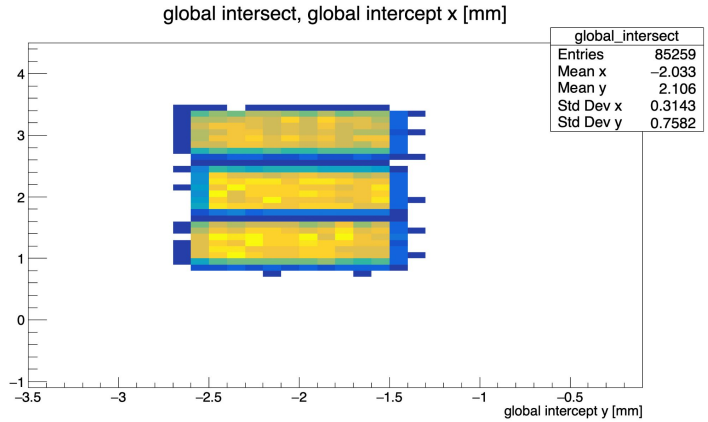
AIDAInnova Reconstruction Meeting, 30.01.2026

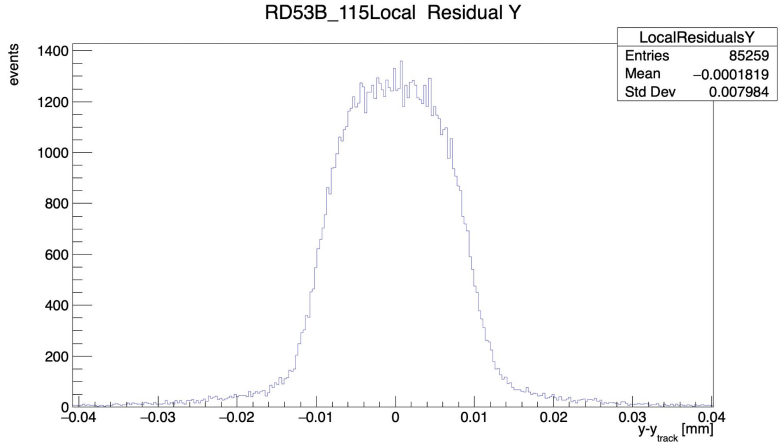
Jožef Stefan Institute
Ljubljana, Slovenia

Tracking for run 607, hitmap of the CMS ReadOut chip
ROI defined as a coincidence of HitOR + scintillators

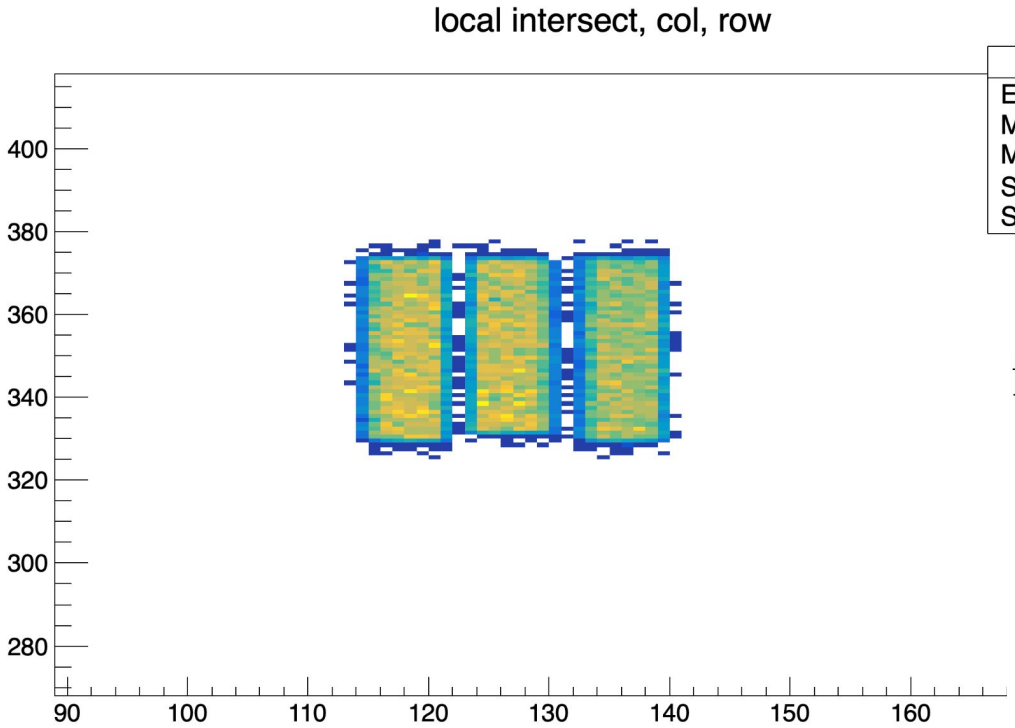




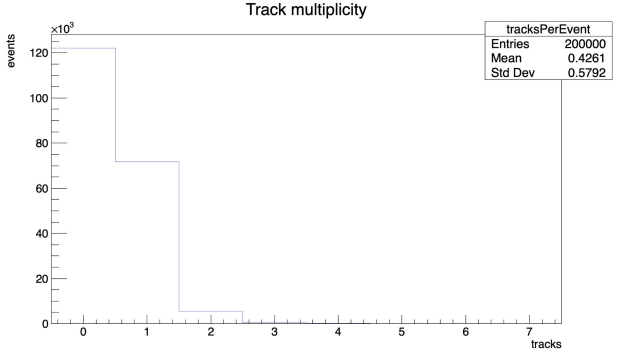


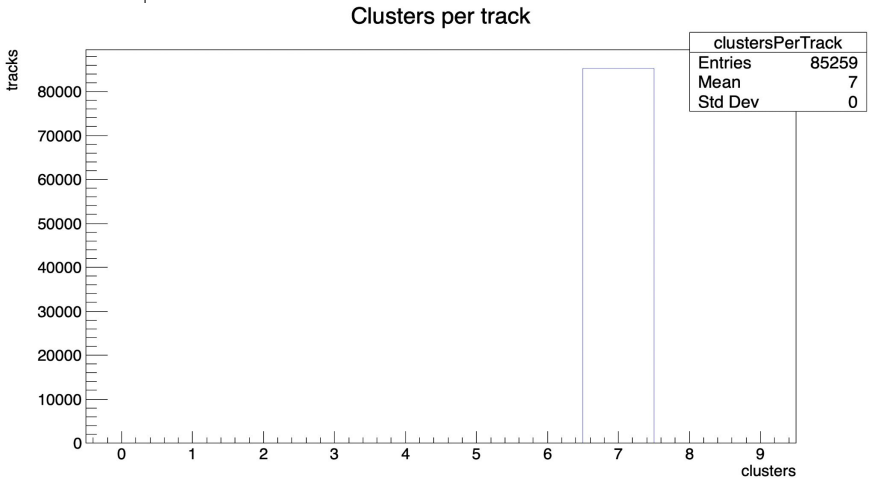


Tracking for run 607, reconstruction

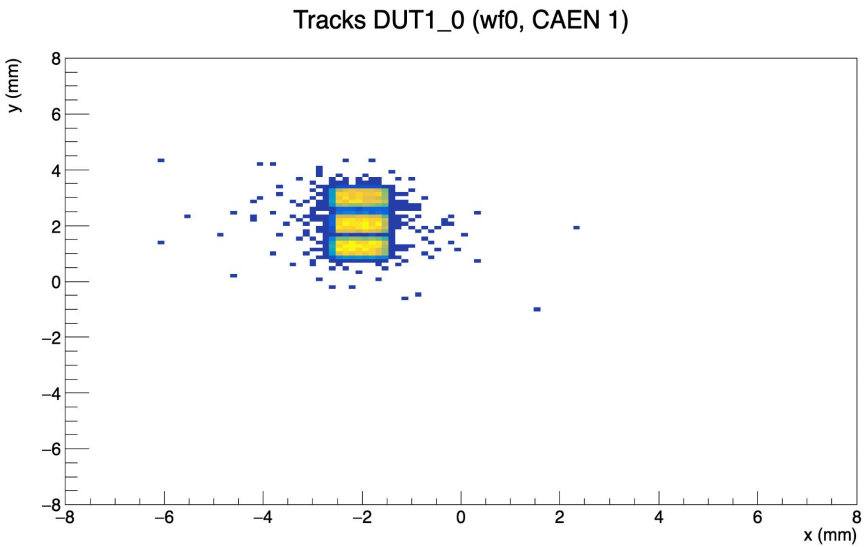


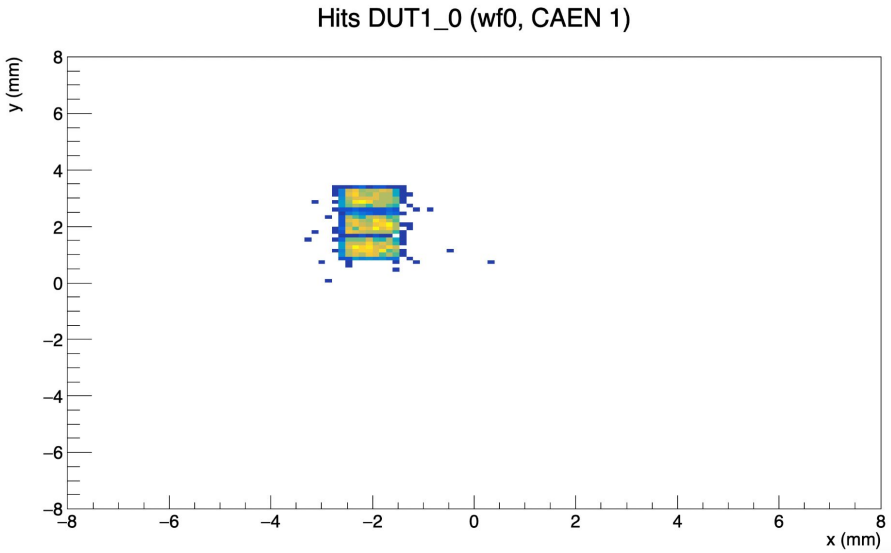
local_intersect	
Entries	85259
Mean x	126.8
Mean y	351.6
Std Dev x	7.588
Std Dev y	12.53



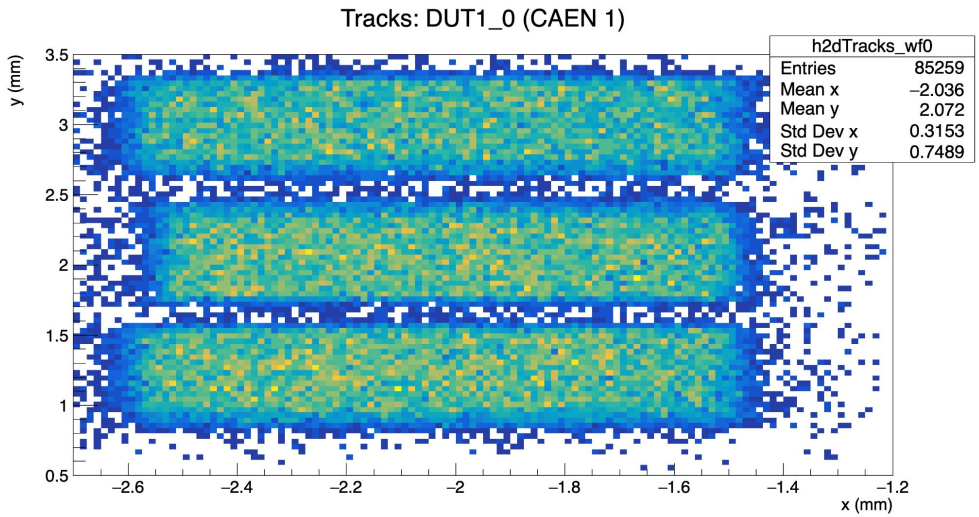


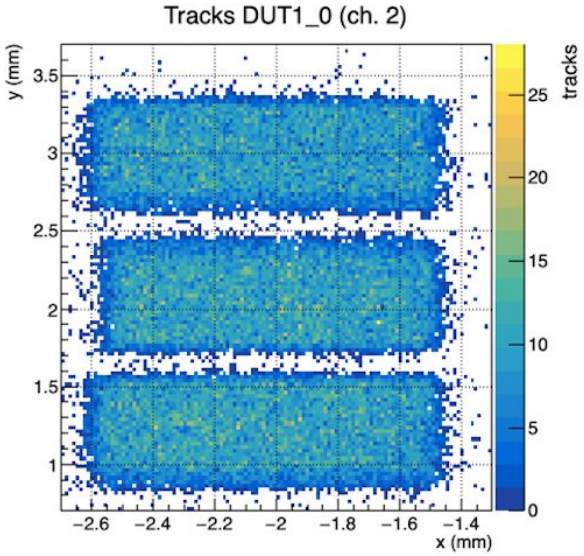
Tracking for run 607, CROC, track intercepts





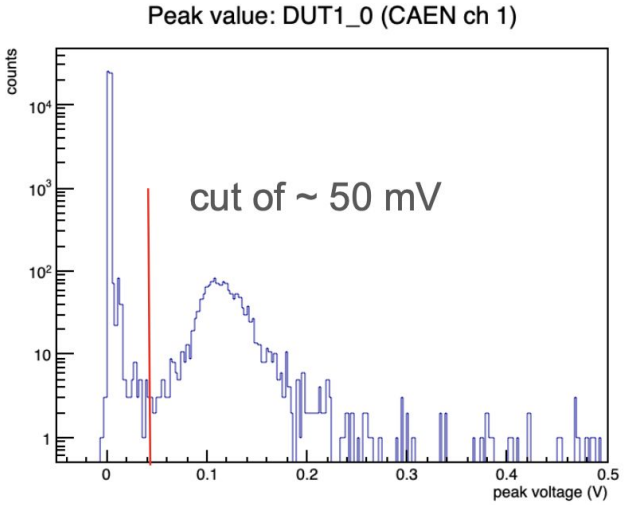
Tracking for run 607, tracks for the NON-irrad Mimosa planes + CROC included in tracking

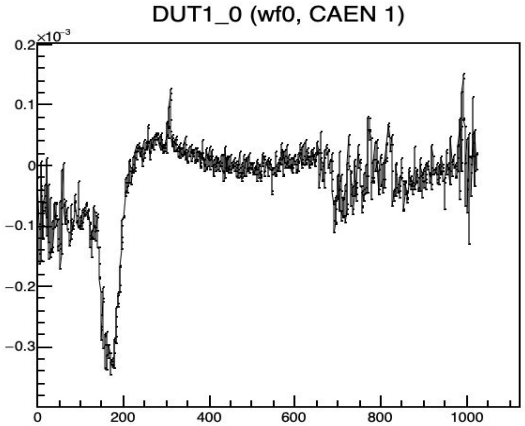


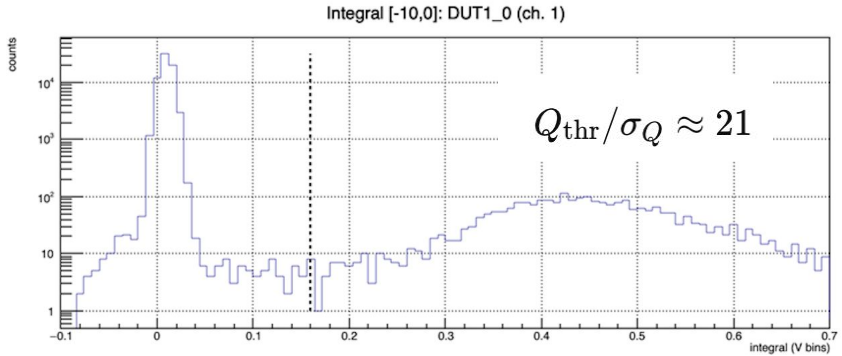


Signal analysis in April ’25 TB

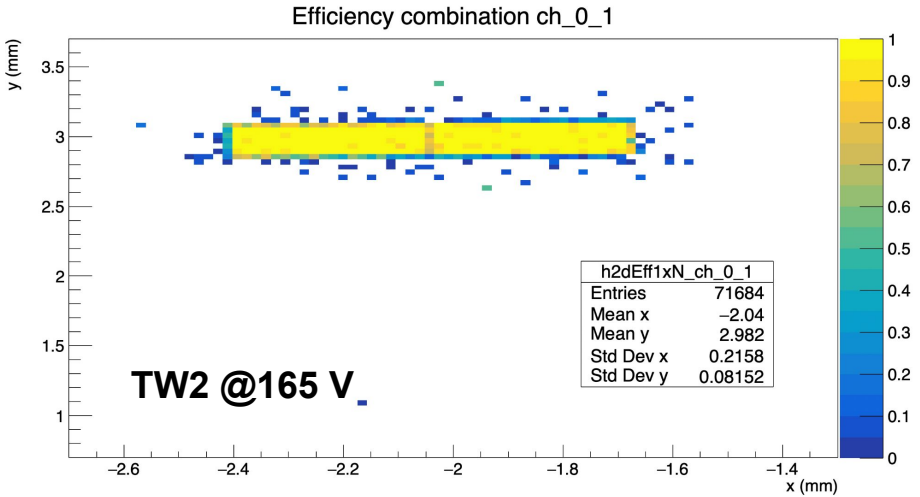
- Events are required to have **exactly one reconstructed telescope track**
- The trigger time is defined using the **rising edge of the trigger signal**
- For each DUT waveform, the signal peak is searched **in a window relative to the trigger edge**
- Signal charge is computed as the **integral in a narrow window around the peak** (integration time of 4 ns)
- In addition to the charge cut, DUT pulses are required to have a **peak amplitude** above ~50 mV for non-irradiated TI-LGAD

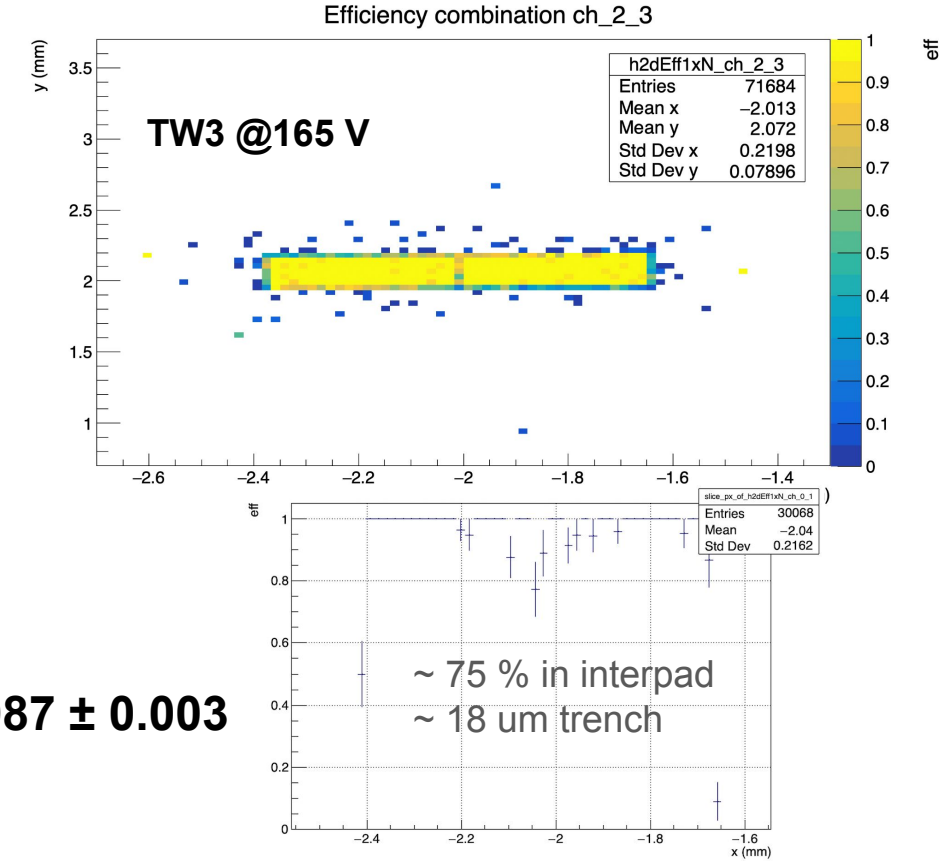






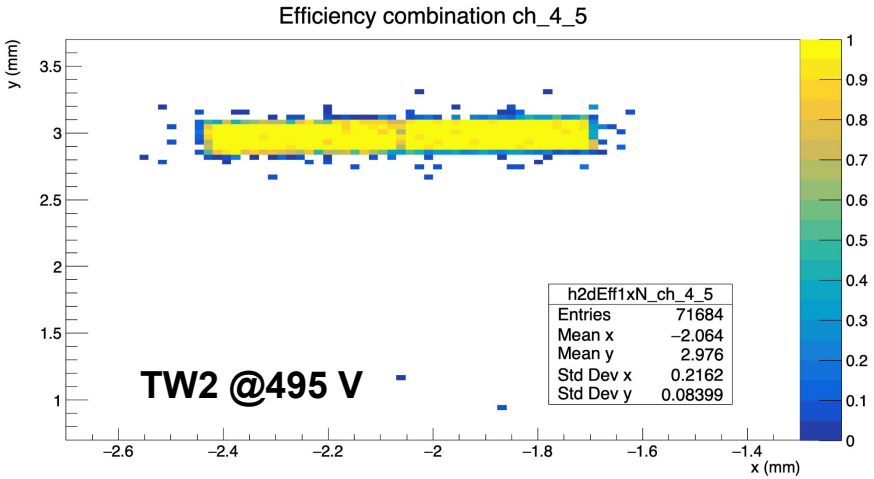
Analysis done for run 607 @ -23.83 ℃, Efficiency result for TI-LGAD @ 0E15 n_{eq}/cm^2



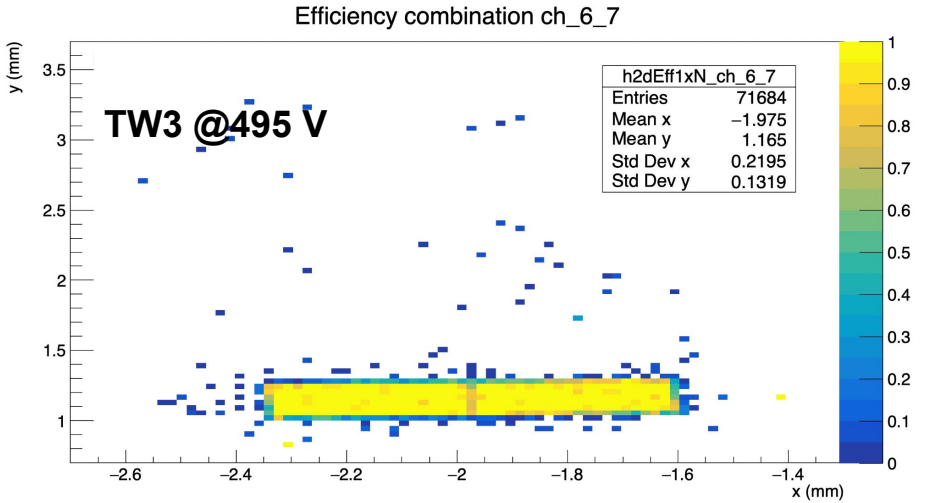


Efficiency per pad without edges is ~ 0.987 ± 0.003

Efficiency results for TI-LGAD @ 1.5E15 n_{eq}/cm^2

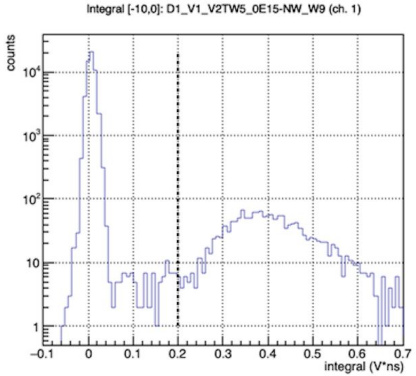


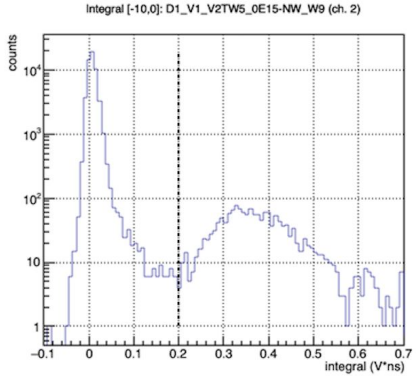
thr/RMS=6.35

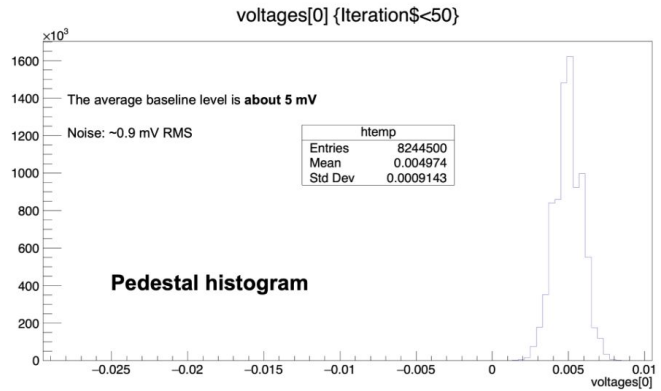


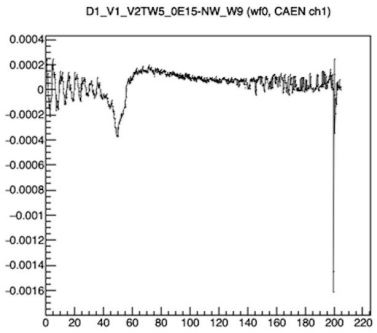
thr/RMS=6.35

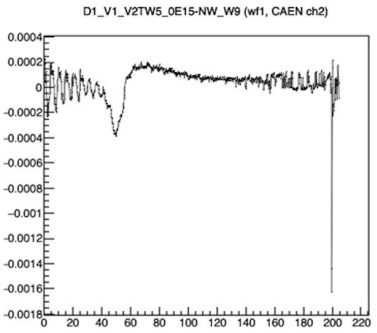
October TB ’25 efficiency results for V1 TI-LGAD

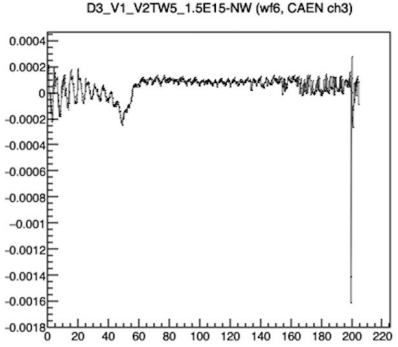


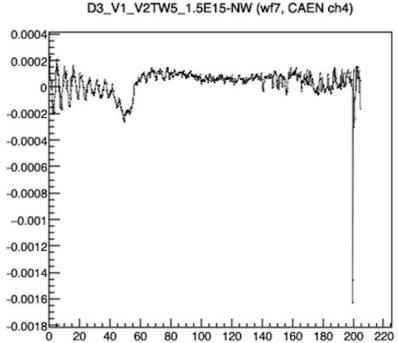




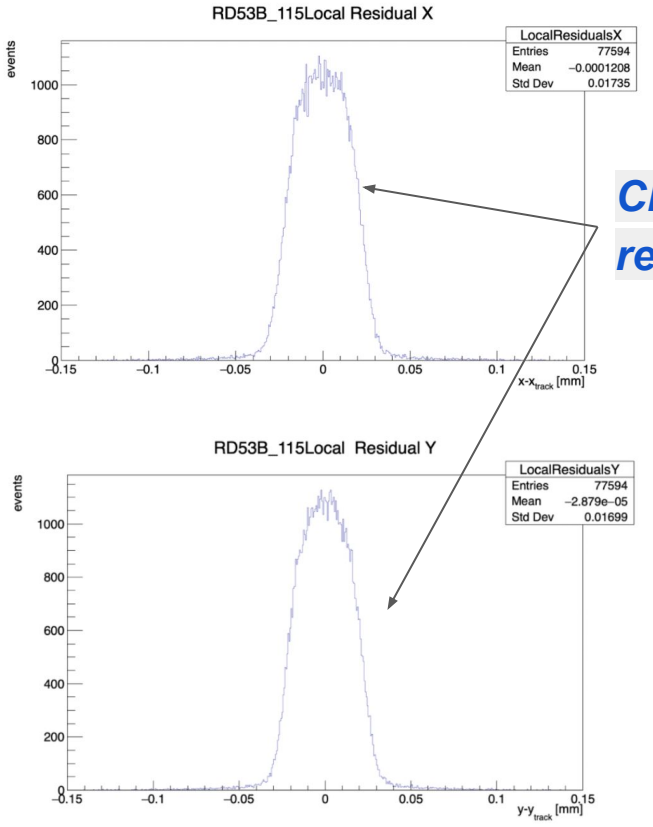




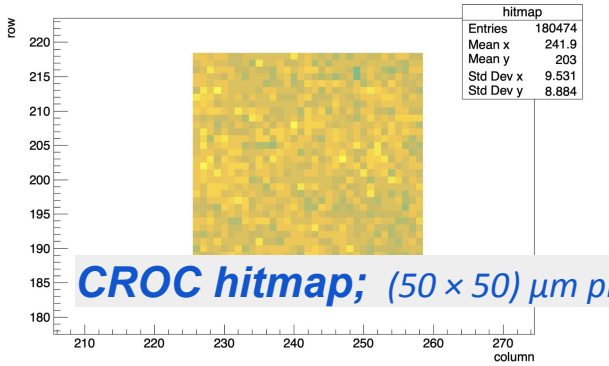




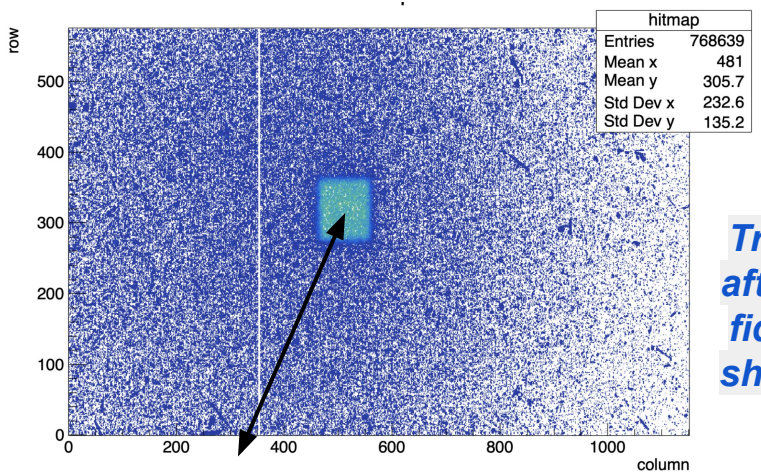
CMS Readout Chip: σ_x=17.3 µm, σ_y=17.0 µm



CROC residuals



CROC hitmap; *(50 × 50) µm pixel size*

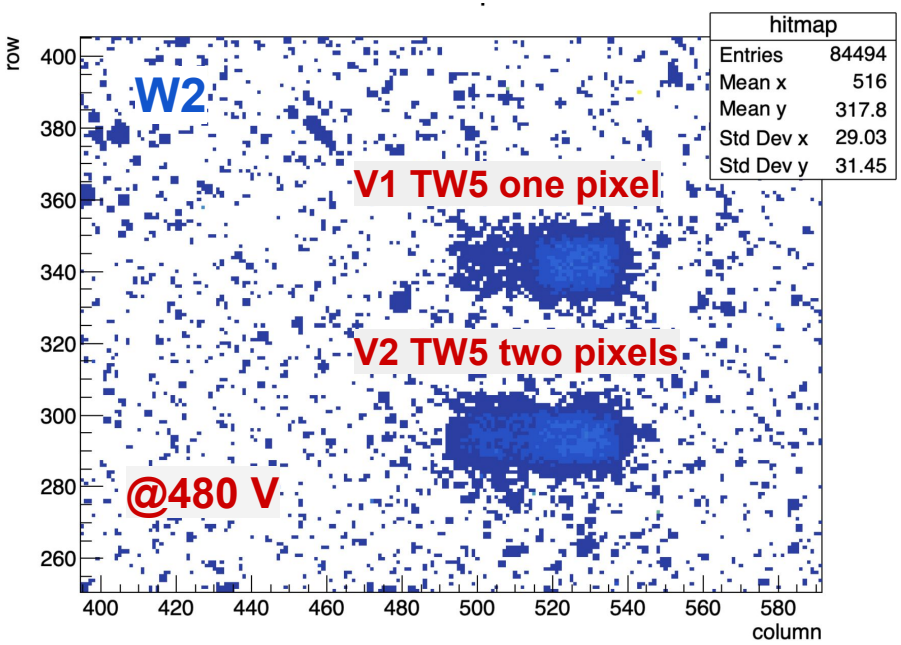


Triggering on CROC, after having defined a fiducial area with the shadowing procedure

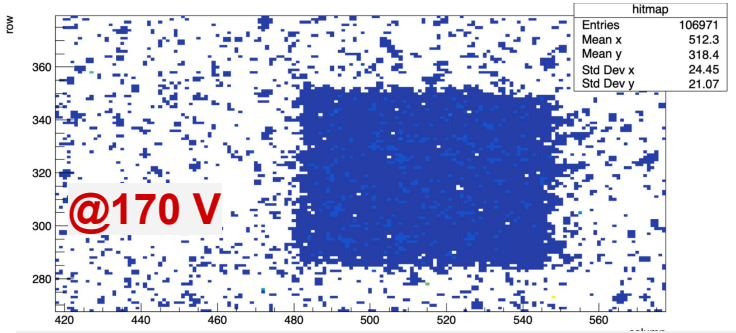
Triggering on CROC

Integration of CMS ReadOut Chip: DUT Alignment @ -23 ℃

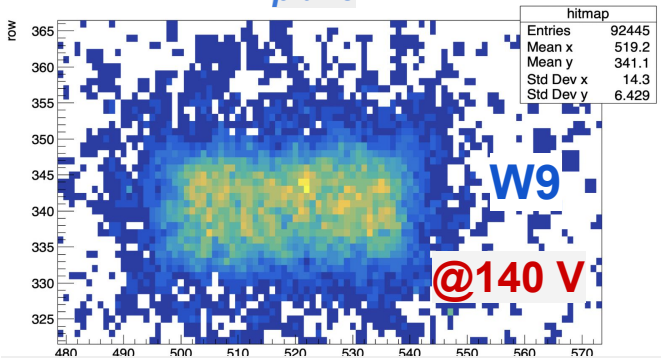
- Triggering on the DUT to get its shadow on the CROC and MIMOSA planes



Shadow of irradiated TI-LGAD 1.5E15 n_{eq}/cm^2 on CROC plane

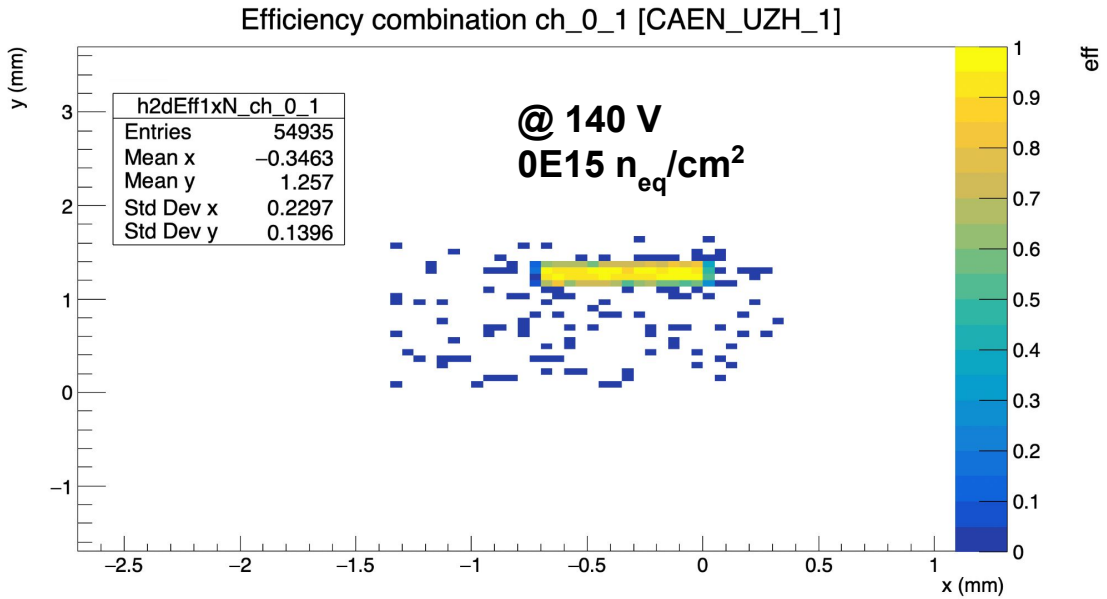


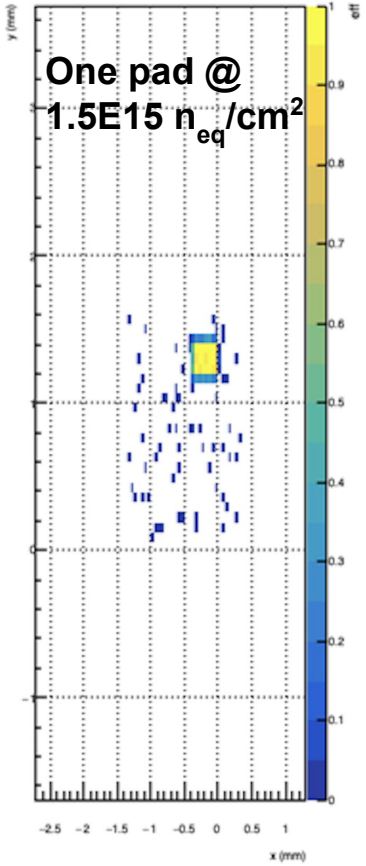
Shadow of TREF 1.2 × 1.2 mm² LGAD on MIMOSA plane

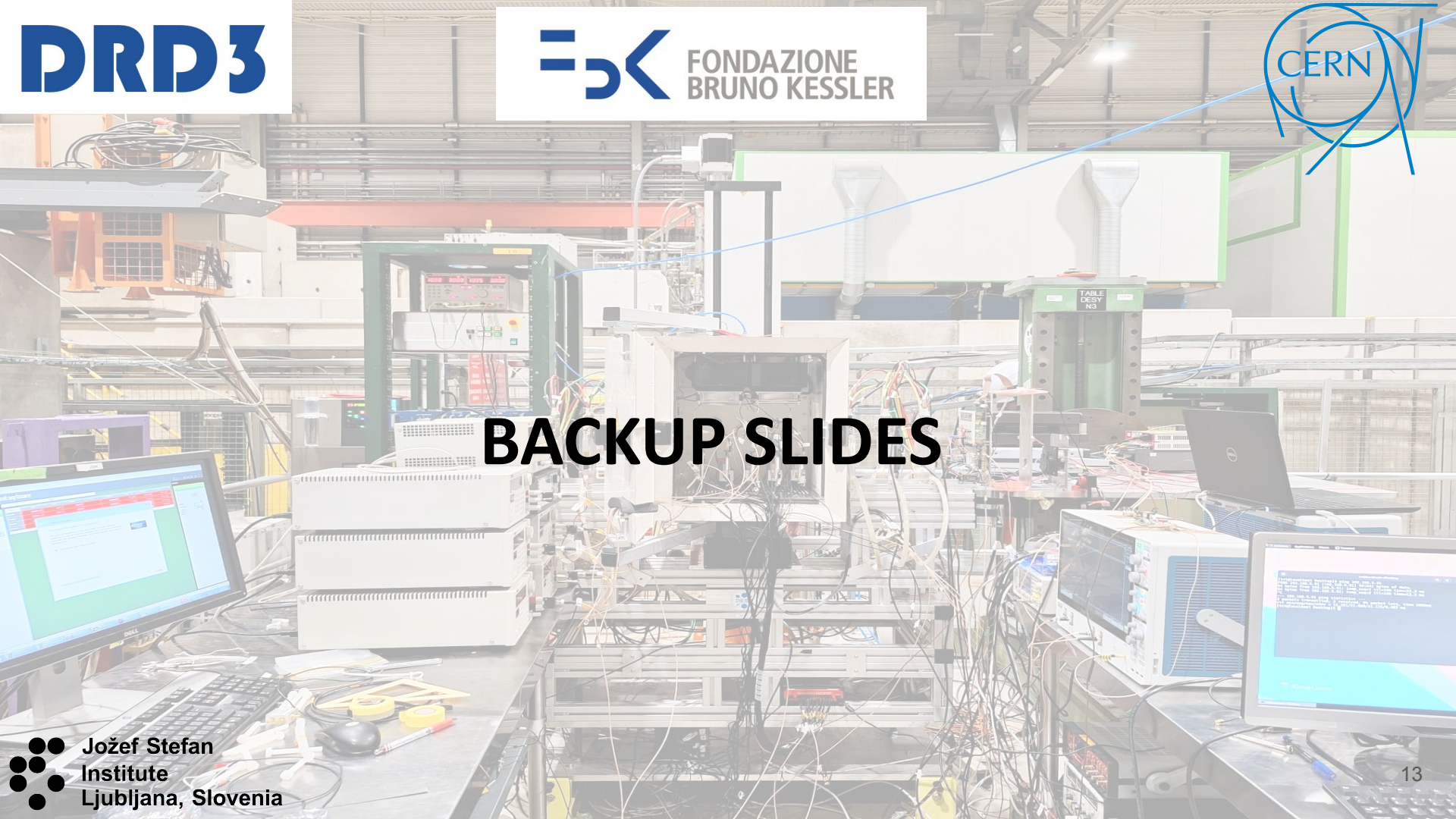


Shadow of non-irradiated TI-LGAD V1 TW5 on CROC plane

October TB ’25 efficiency results for V1 TI-LGAD



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Efficiency of the HPK time reference