

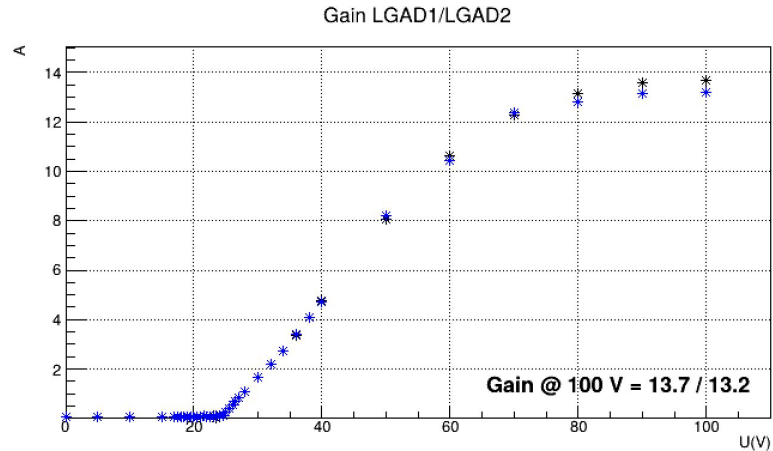
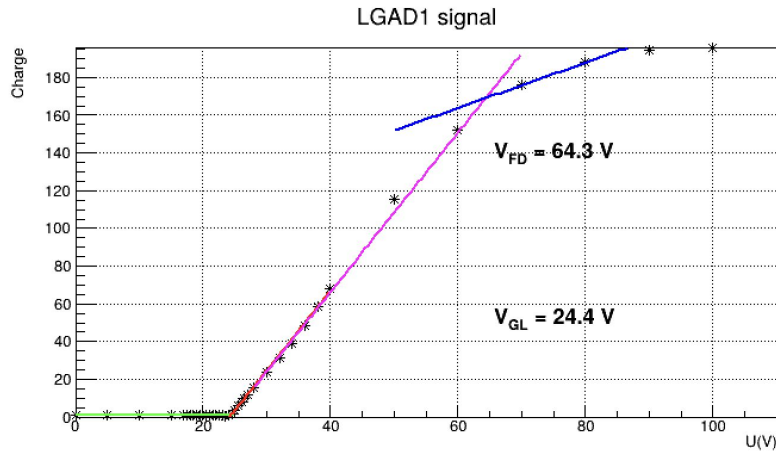


Updates on the latest sensor activities at JSI

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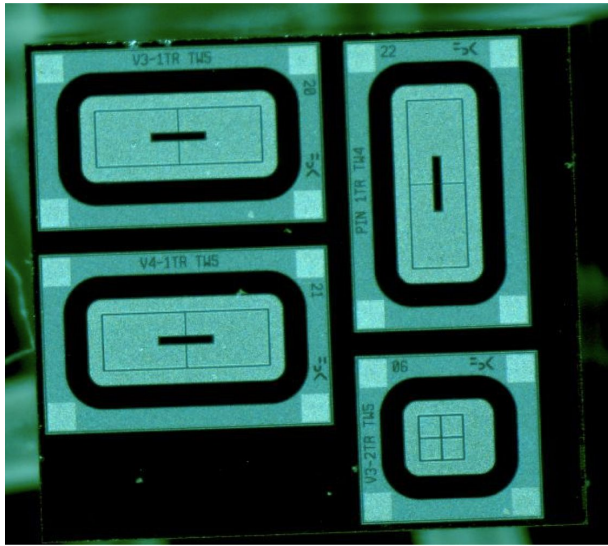
HGTD Meeting 08/08/25, Ljubljana, Slovenia



HGTD Production -> IHEP Pilot batch TCT measurements

- Wafer 2 (position 5 and 10) are measured
- $V_{gl} \sim 24.4 \text{ V}$ for unirradiated samples
- Once PQC is done we proceed with neutron irradiations to EoL fluence





Single trench

Test structure	Fluence (neq/cm ²)
V1TW5	1.50E+15
V1TW5	1.50E+15
V1TW5	2.50E+15
V1TW5	2.50E+15
V2TW 1/2/3	1.50E+15
V2TW 1/2/3	2.50E+15
V2TW 1/2/3	2.50E+15
V2TW 4/6/7	1.50E+15
V2TW 4/6/7	1.50E+15
V2TW 4/6/7	2.50E+15
V2TW 4/6/7	2.50E+15



TI-LGADs irradiated for the upcoming testbeam in October

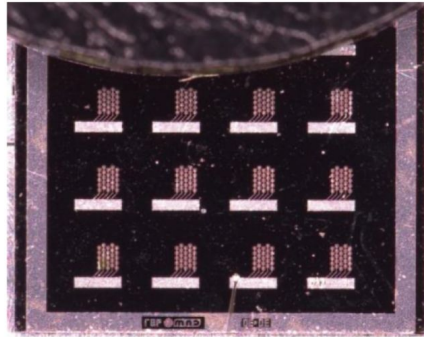
- Ongoing irradiation at the TRIGA reactor: 2 x V1 TW5 to 2.5E15 n_{eq} cm⁻² + 1 x V1 TW5 to 1.5E15 n_{eq} cm⁻² -> goal: to measure V1 devices with different trench depth (previously measured V2)

Sample	Delivered equivalent fluence (n/cm ²)	
V1R5-19	2.96E14	
V1R5-21	5.33E14	+ 5E14 n
V1R5-16	7.99E14	
V1R5-26	6.51E14	+ 5E14 n
V1R5-52	7.69E14	+ 8E14 n
V1R5-7 (3a)	1.01E15	
V1R5-7 (4b)	9.17E14	
V1R5-25	7.69E14	
V1R5-17	1.01E15	
V1R5-28	8.28E14	
V1R5-20	7.69E14	
V1R5-24	1.01E15	

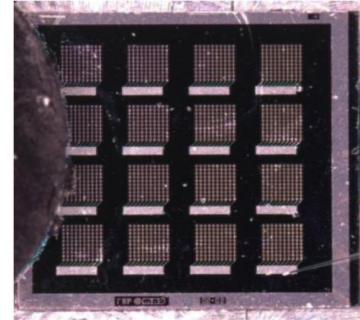
Sample	Nominal Fluence [p/cm ²]	LGAD1 V _{gl} [V]	LGAD2 V _{gl} [V]
V1R5 28	1.2×10^{15}	21.6 ± 0.8	20.0 ± 0.6
V1R5 52	1.2×10^{15}	20.9 ± 0.6	20.5 ± 0.6
V1R5 25	1.2×10^{15}	20.2 ± 0.5	19.8 ± 0.3
V1R5 17	1.2×10^{15}	21.3 ± 0.5	19.9 ± 0.4
V1R5 20	1.2×10^{15}	21.2 ± 0.4	20.1 ± 0.2
V1R5 24	1.2×10^{15}	22.2 ± 0.3	20.4 ± 1.0
V1R5 26	8×10^{14}	21.8 ± 0.5	20.9 ± 0.7
V1R5 16	8×10^{14}	22.4 ± 0.1	21.3 ± 0.9
V1R5 19	4×10^{14}	23.8 ± 0.1	23.0 ± 0.75
V1R5 21	4×10^{14}	21.1 ± 0.4	21.2 ± 0.7

HGTD proton-irradiated QC-TS -> mixed irradiation with neutrons (ongoing)

4-x HEX



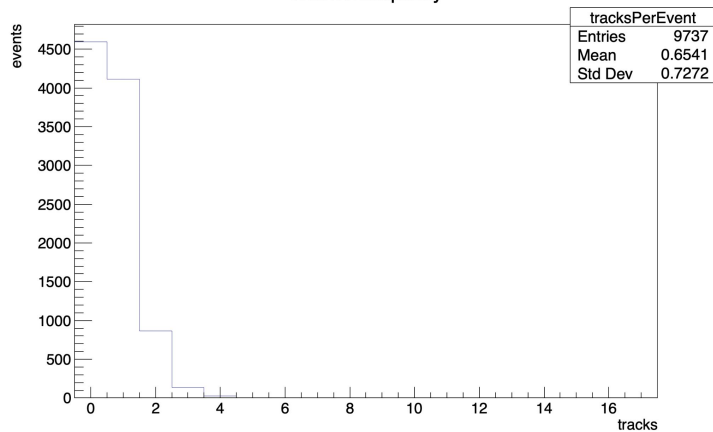
6-x SQUARE



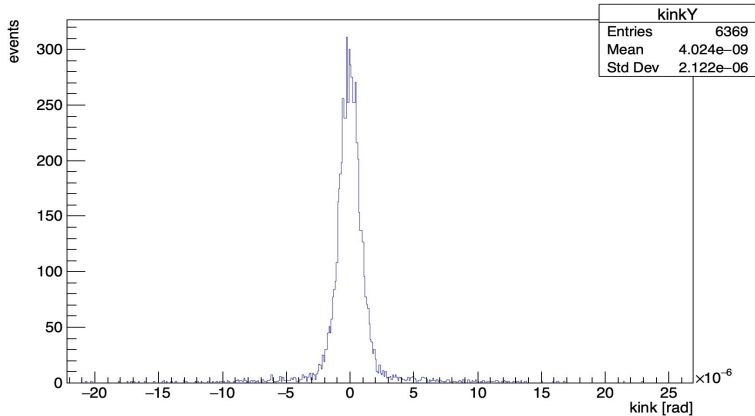
3D structures in preparation for ELI measurements

- 50x50 μm square cell 10 x 10 pixels (unirradiated + irradiated to $10^{17} n_{\text{eq}} \text{cm}^{-2}$)
- 52 μm hexagonal cell 5 x 5 pixels (2 x unirradiated + irradiated to $10^{16} n_{\text{eq}} \text{cm}^{-2}$)
- 50 x 50 μm square cell 5 x 5 pixels (irradiated to $10^{16} n_{\text{eq}} \text{cm}^{-2}$)

Track multiplicity



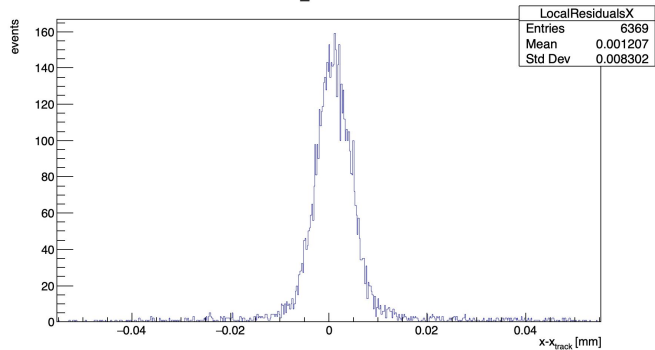
RD53B_115 kinkY



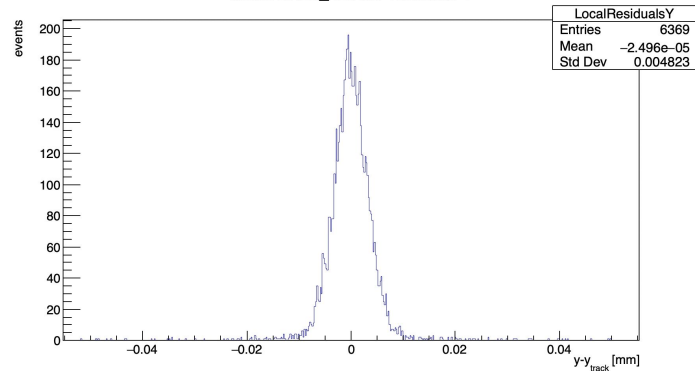
Testbeam ongoing analysis

- A bug in CAEN channels assignment was identified
- Currently working on providing DUT intercepts and efficiency

MIMOSA26_0Local Residual X



MIMOSA26_4Local Residual Y



- Database upload ongoing for pilot batch (currently showing to Brigita)
- Annealing studies -> IHEP + USTC samples were irradiated and annealed @60 °C for 80 min -> (when should we start measuring?)
- The Sr90 scope is under maintenance
- TILGAD acceptor removal + laser scans should be done before next test beam in October
- Which TCT setup will be used for R&D + mixed irradiation studies?

Discussion