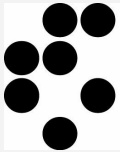


Institut ”Jožef Stefan”, Ljubljana, Slovenija

Plans and Readiness for the October DRD3 2025 Test Beam Campaign

Iskra Velkovska

05/09/2025

Introduction

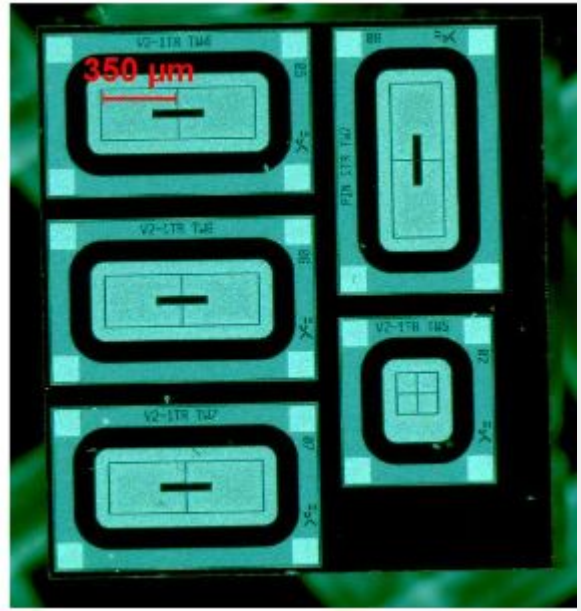
1) Test beam DRD3 in October (1-15) for 2 weeks (priority in the second week -> V1)
2) Samples to be tested: TI-LGADs Wafer 2 trench border versions: V1 + V2, TW 1/2/3/4/5/6/7 TR1
3) Will 3D FBK structures be tested?
4) Manpower at the test beam ?
5) Infrastructure for the upcoming testbeam
6) Samples were irradiated @TRIGA reactor at JSI and were annealed for 80 min @ 60 ℃
7) Google sheet for the upcoming test beam: October_testbeam_2025

TI-LGAD test structures

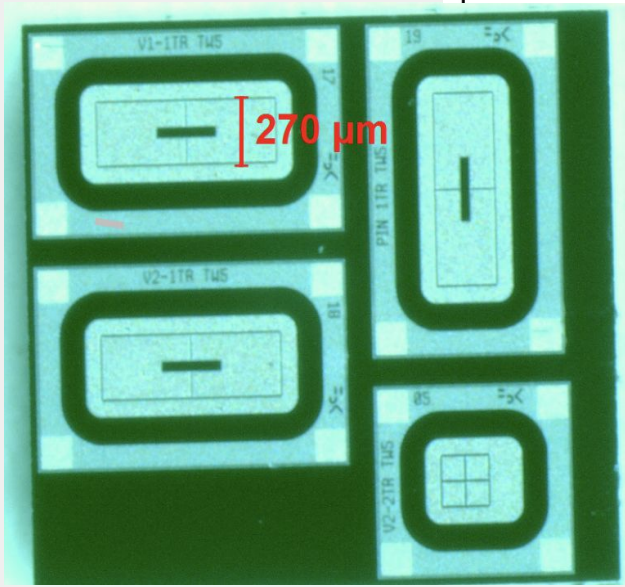
45 µm thick sensors

375 µm × 250 µm pixel pitch

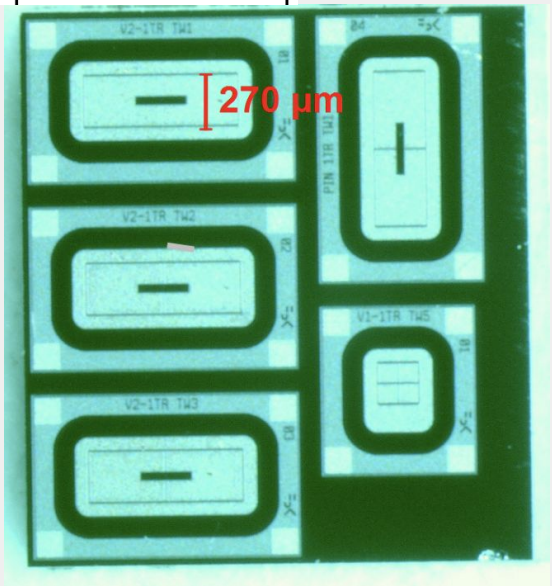
Border version	Number of Trenches
V2	1TR
V1	1TR
V2	1TR
V2	2TR



V2 - 1TR- TW 4/6/7



V1/2 - 1TR- TW 5



V2 - 1TR- TW 1/2/3

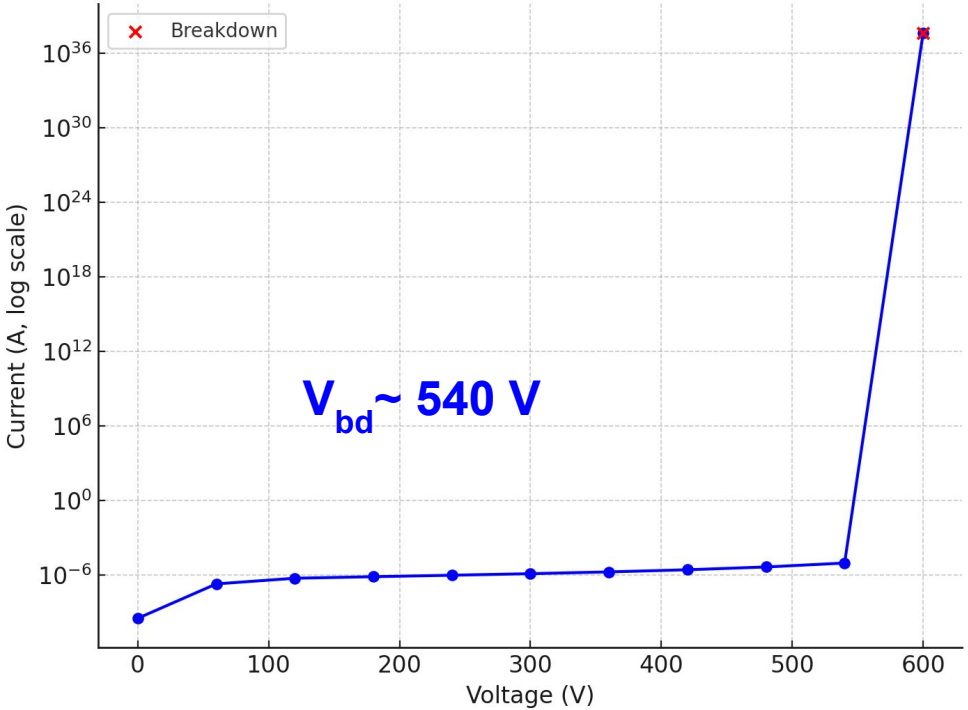
Batches and schematics proposal

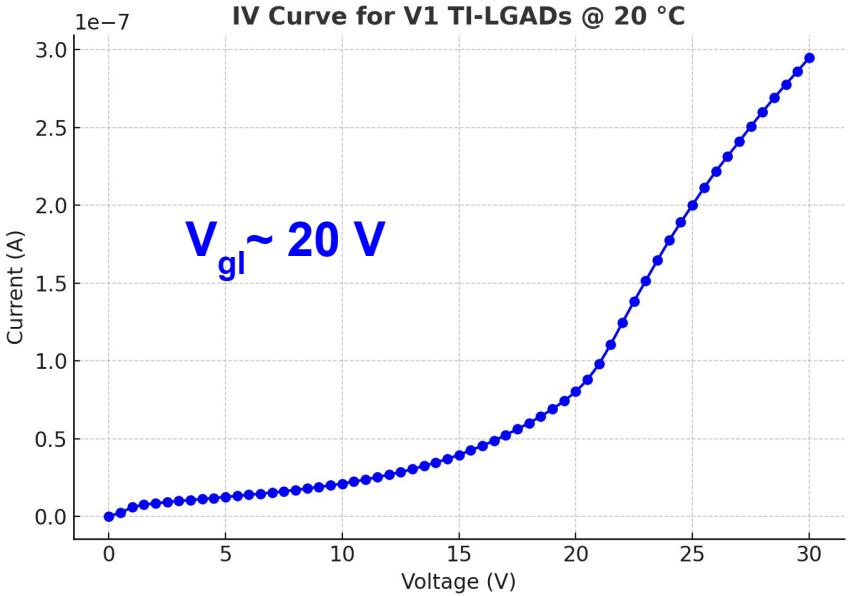
Trench Depth	Trench parameter	Fluence (n_eq/cm^2)	Devices	Number of daughterboard	Chubut CH1,2	Chubut CH3,4	Batch Number (proposed)
V1	TW5	2.50E+15	V1TW5 / V2TW5	1	V1TW5	V2TW5	1
V1	TW5	2.50E+15	V1TW5 / V2TW5	2	V1TW5	V2TW5	2
V1	TW5	2.50E+15	V1TW5 / V2TW5	3	V1TW5	V2TW5	3
V1	TW5	2.50E+15	V1TW5 / V2TW5	4	V1TW5	V2TW5	
					V1TW5	V2TW5	1
V1	TW5	1.50E+15	V1TW5 / V2TW5	5	V1TW5	V2TW5	2
V1	TW5	1.50E+15	V1TW5 / V2TW5	6	V1TW5	V2TW5	
V1	TW5	1.50E+15	V1TW5 / V2TW5	7	V1TW5	V2TW5	3
V2	TW 4/6/7	1.50E+15	Standard	8			
V2	TW 4/6/7	1.50E+15	Standard	9	V2TW4	V2TW6	3
V2	TW 4/6/7	2.50E+15	Standard	10	V2TW4	V2TW6	2
V2	TW 4/6/7	2.50E+15	Standard	11	V2TW4	V2TW6	3
V2	TW 1/2/3	1.50E+15	Standard	12	V2TW1	V2TW2	2
V2	TW 1/2/3	2.50E+15	Standard	13	V2TW1	V2TW2	1
V2	TW 1/2/3	2.50E+15	Standard	14	V2TW2	V2TW3	1
	From previous test beam						
V2	TW 1/2/3	8.00E+14	Standard	15	V2TW1	V2TW2	Backup
V2	TW 1/2/3	1.50E+15	Standard	16	V2TW1	V2TW2	Backup

Current–Voltage Characteristics of TI-LGADs

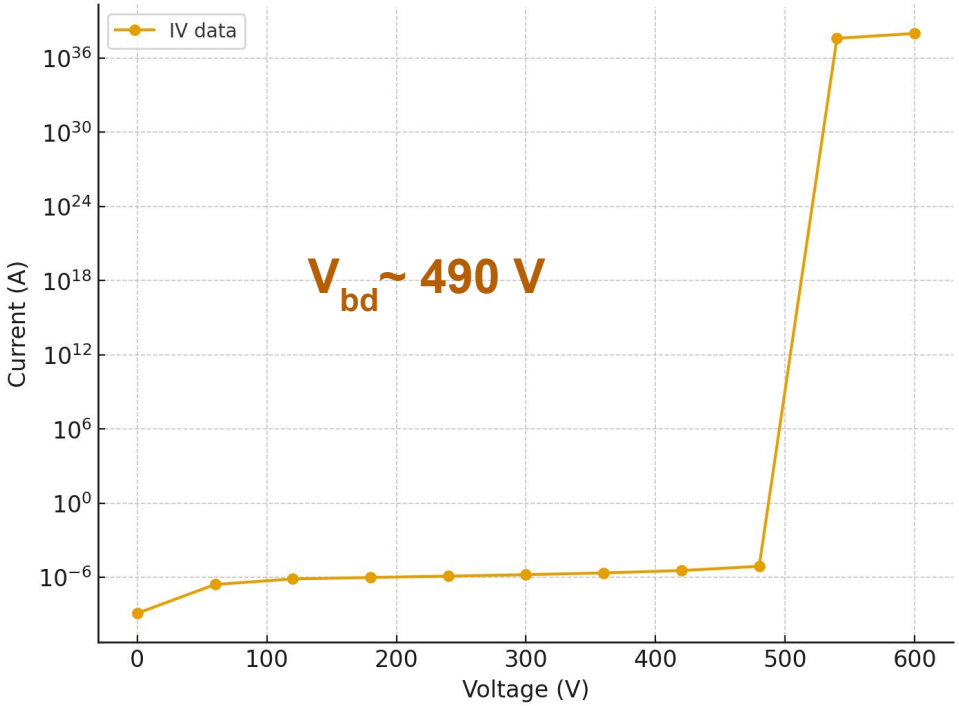
Extraction of V_{gl} and V_{bd}

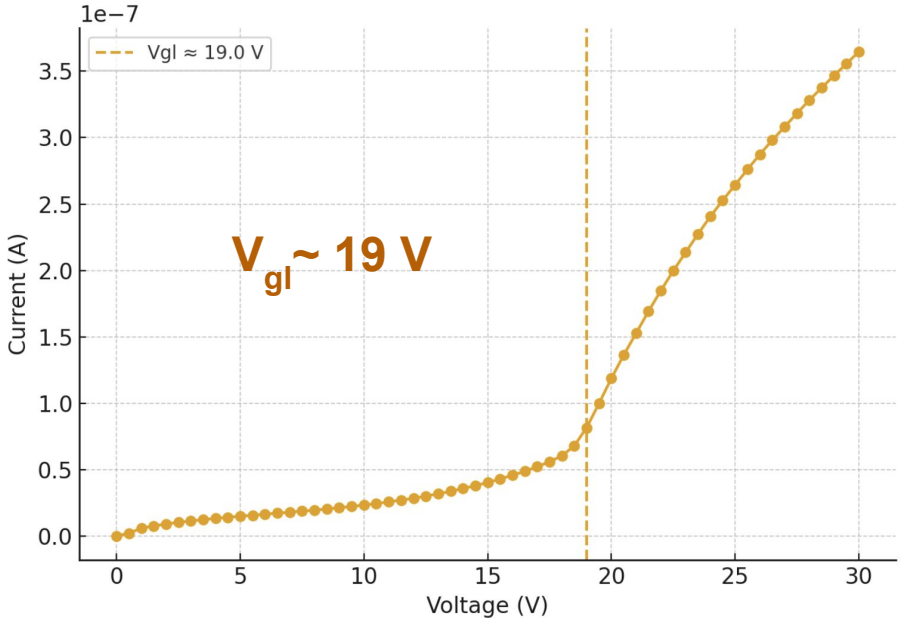
I–V Curve Validation of V1 TW5 TI-LGAD after 1.5×10^{15} n_{eq}/cm^2 irradiation



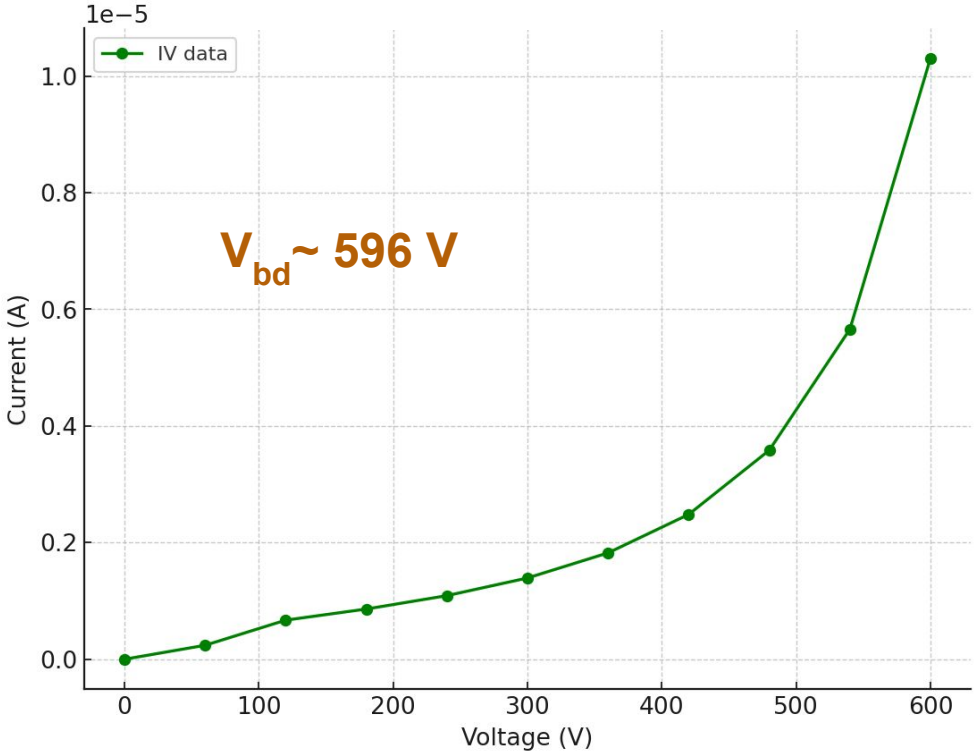


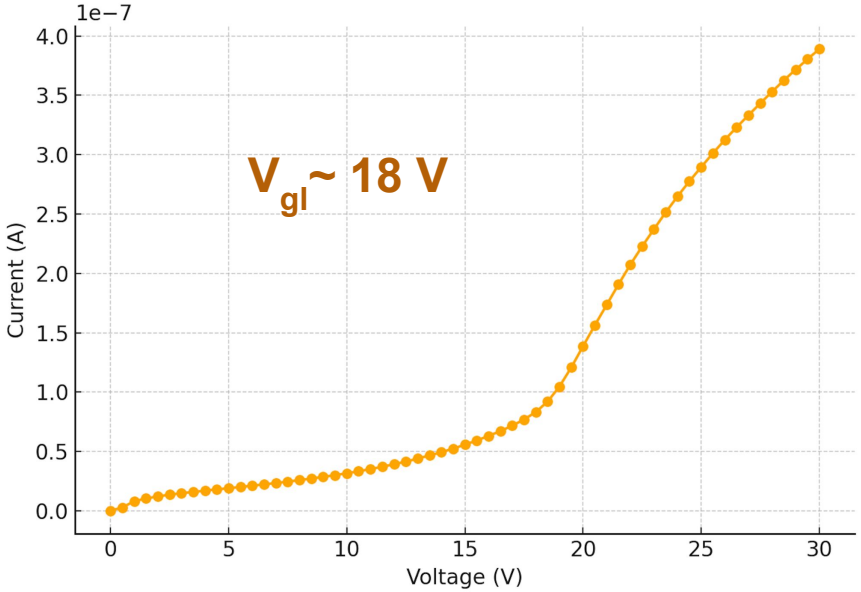
I–V Curve Validation of V2 TW5 TI-LGAD after 1.5×10^{15} n_{eq}/cm^2 irradiation



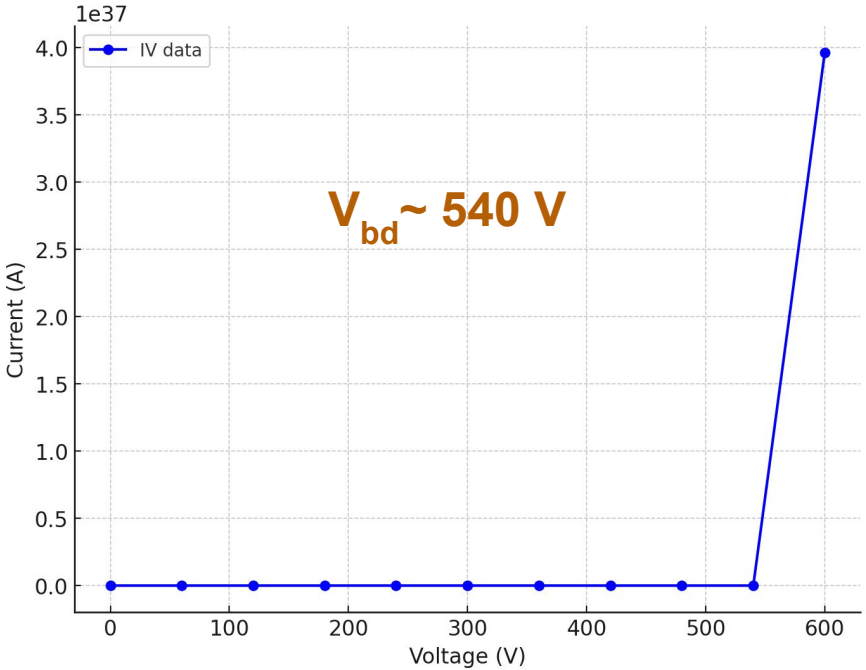


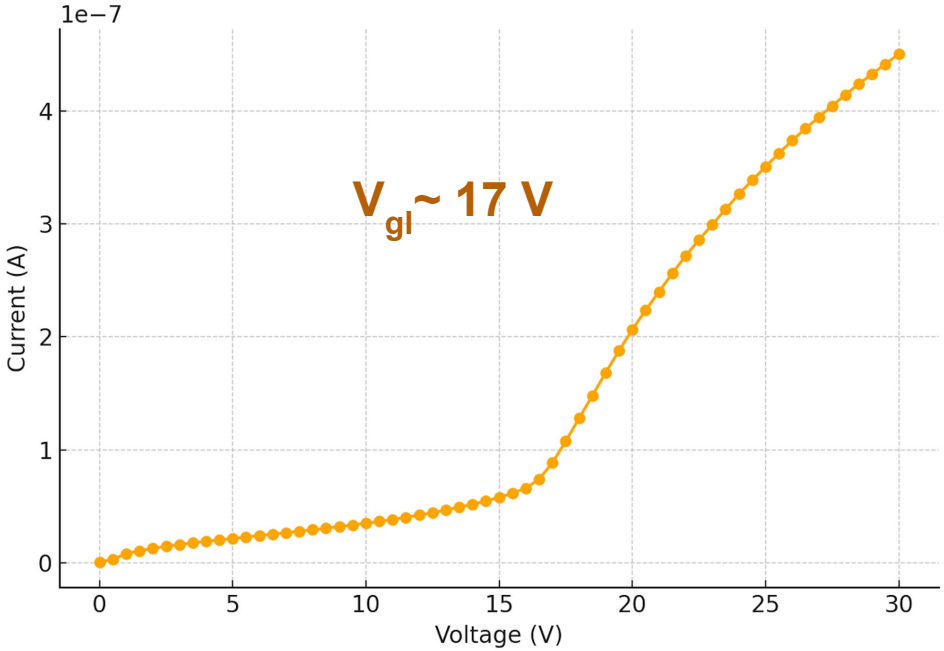
I–V Curve Validation of V1 TW5 TI-LGAD after 2.5×10^{15} n_{eq}/cm^2 irradiation



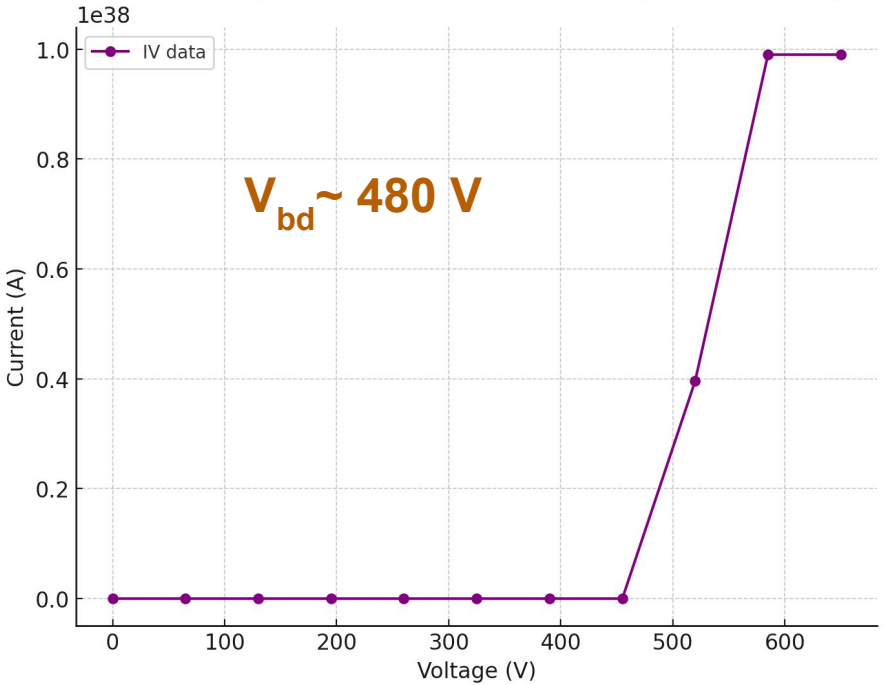


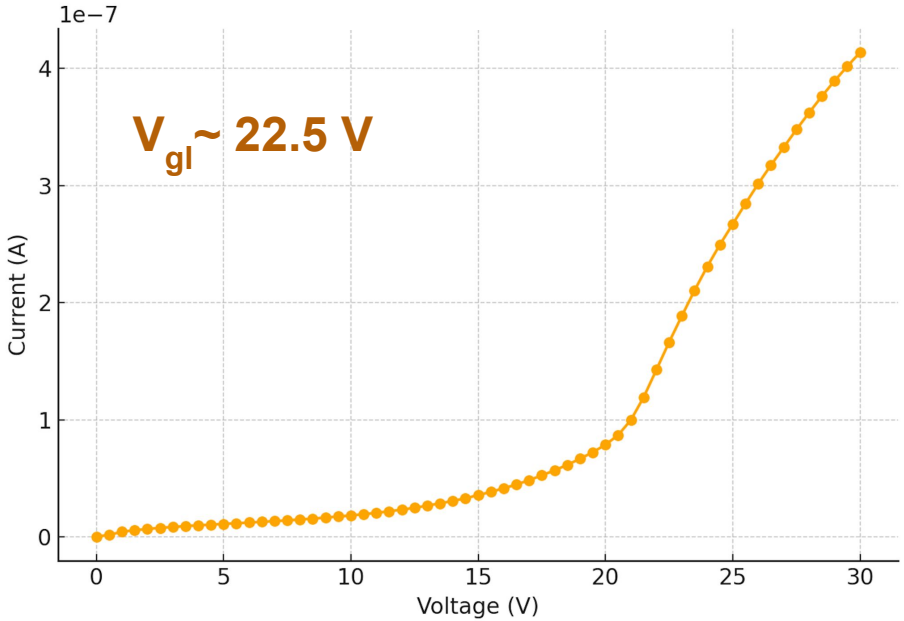
I–V Curve Validation of V2 TW5 TI-LGAD after 2.5×10^{15} n_{eq}/cm^2 irradiation



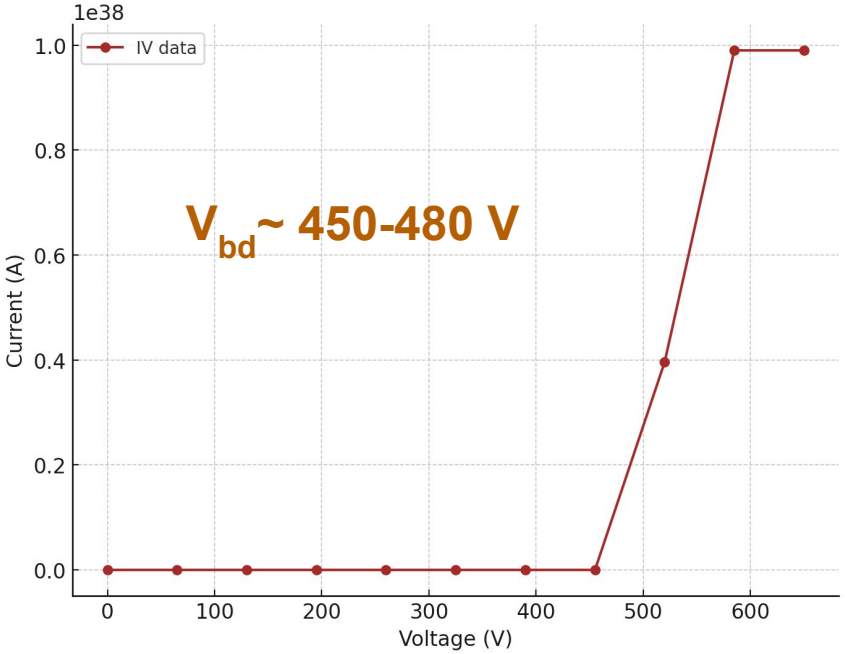


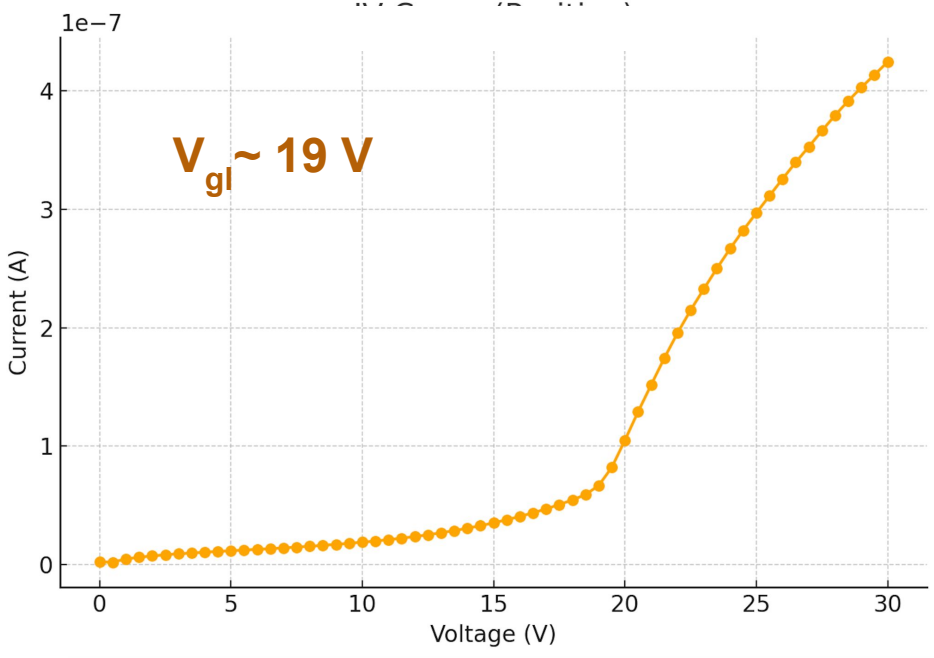
I–V Curve Validation of V2 TW1 TI-LGAD after 1.5×10^{15} n_{eq}/cm^2 irradiation



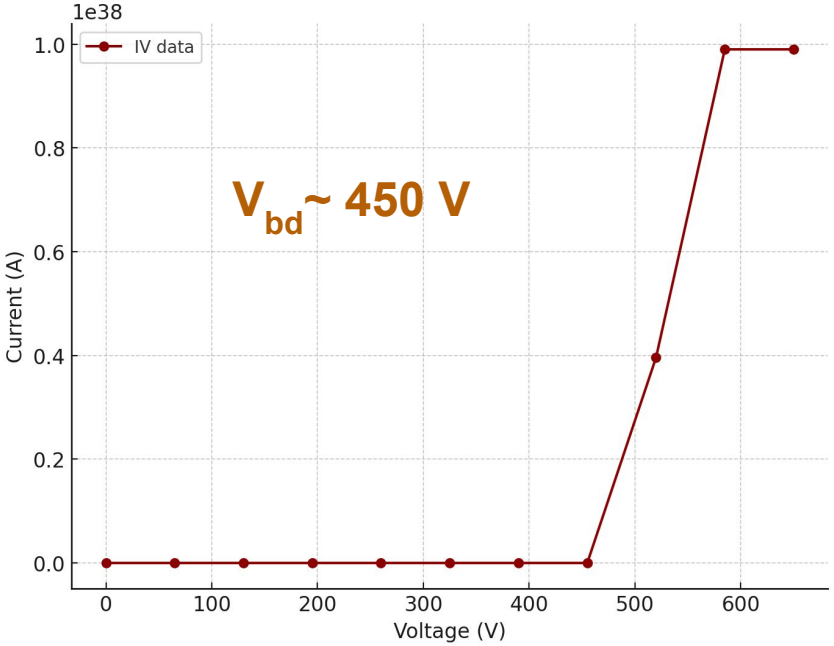


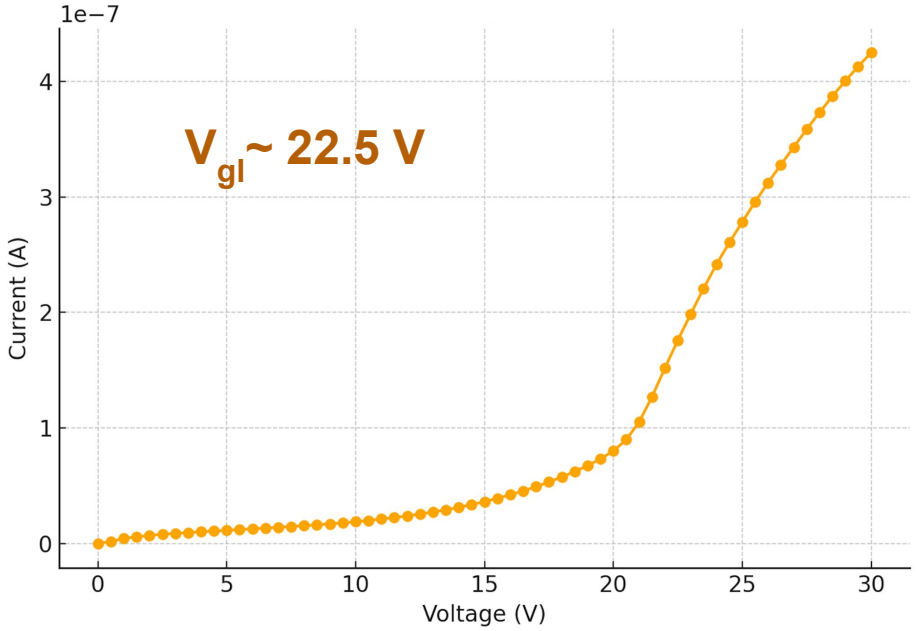
I–V Curve Validation of V2 TW2 TI-LGAD after 1.5×10^{15} n_{eq}/cm^2 irradiation



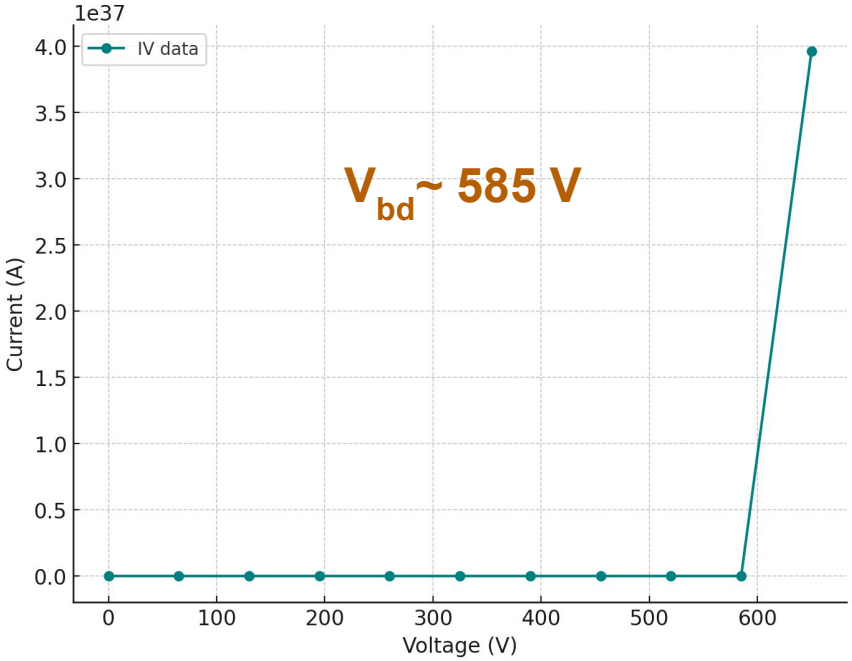


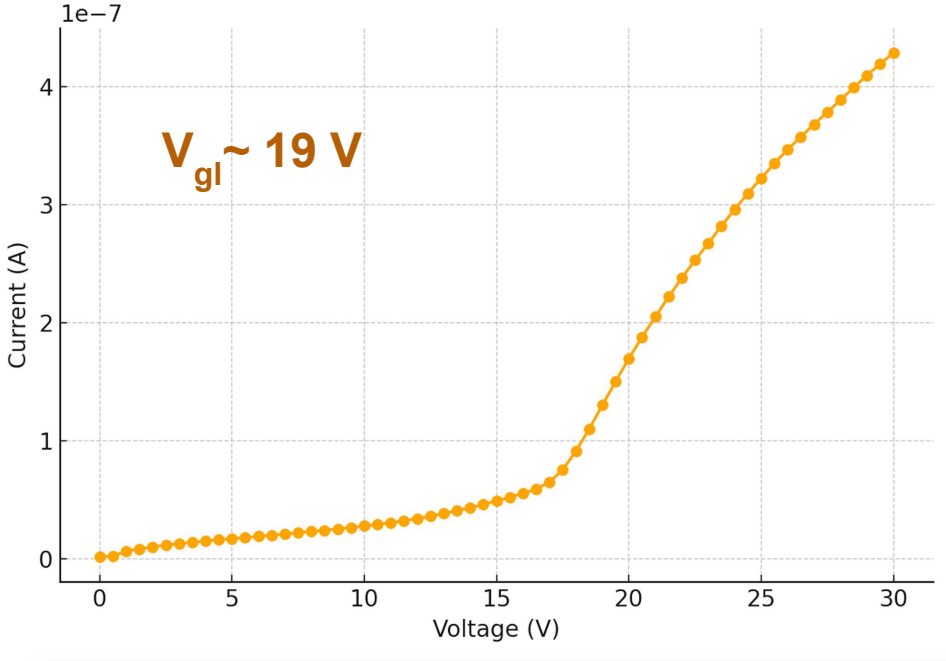
I–V Curve Validation of V2 TW3 TI-LGAD after 1.5×10^{15} n_{eq}/cm^2 irradiation



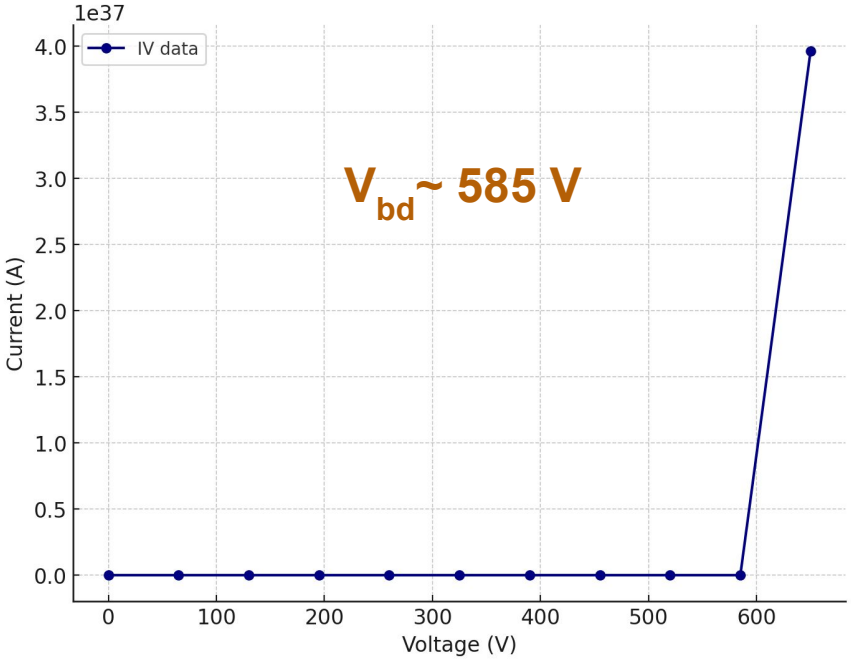


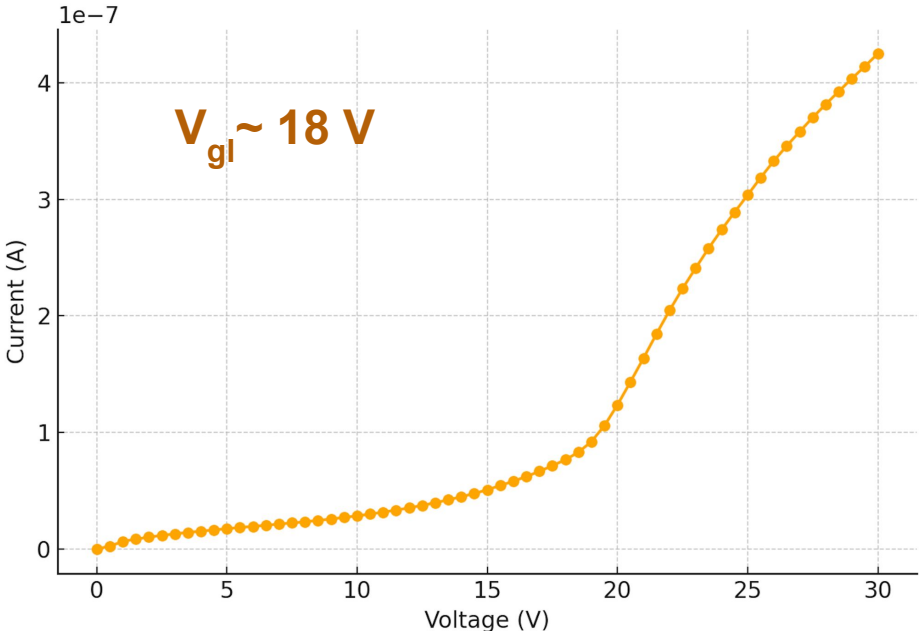
I–V Curve Validation of V2 TW1 TI-LGAD after 2.5×10^{15} n_{eq}/cm^2 irradiation



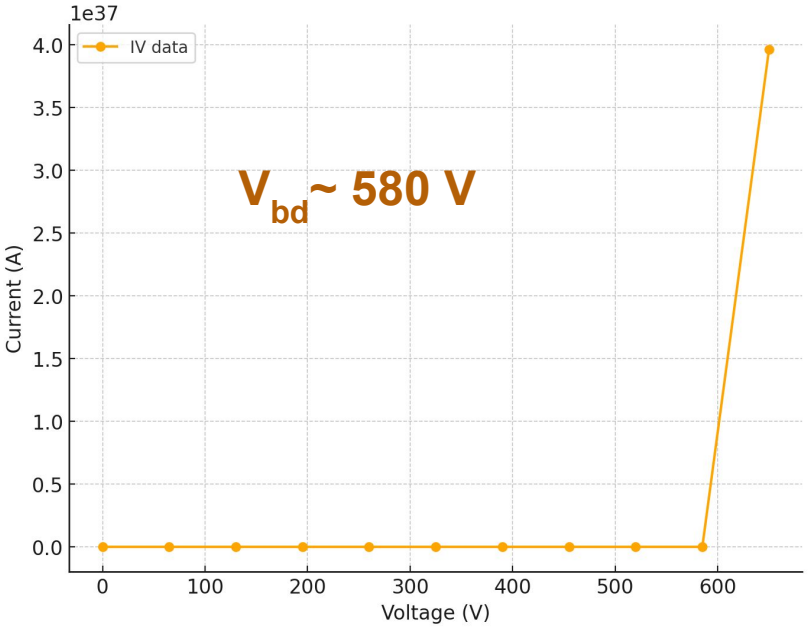


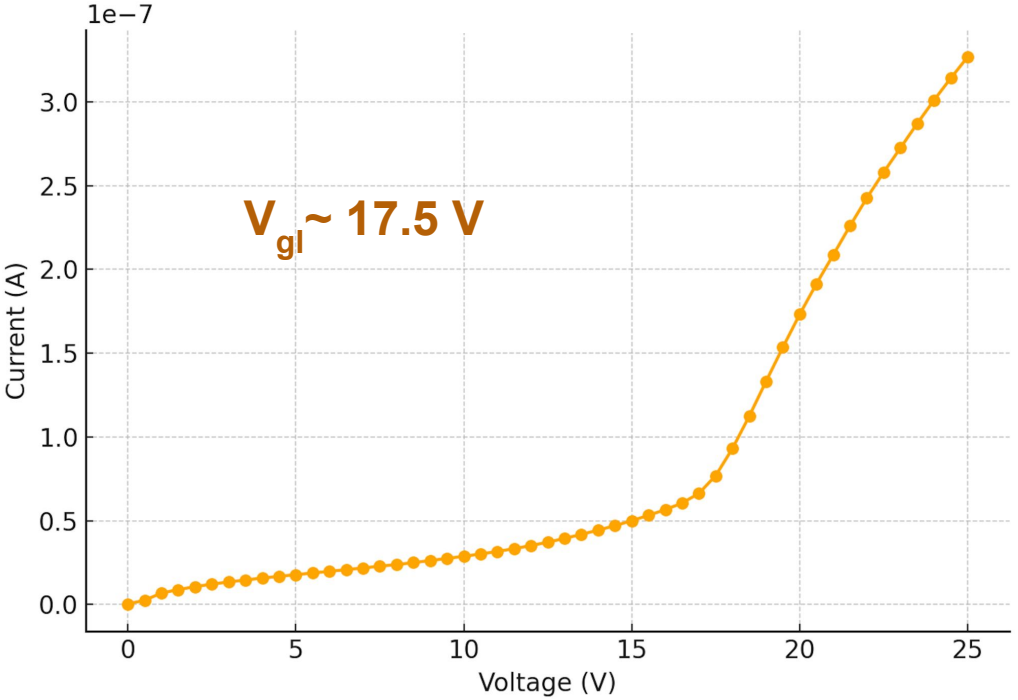
I–V Curve Validation of V2 TW2 TI-LGAD after 2.5×10^{15} n_{eq}/cm^2 irradiation



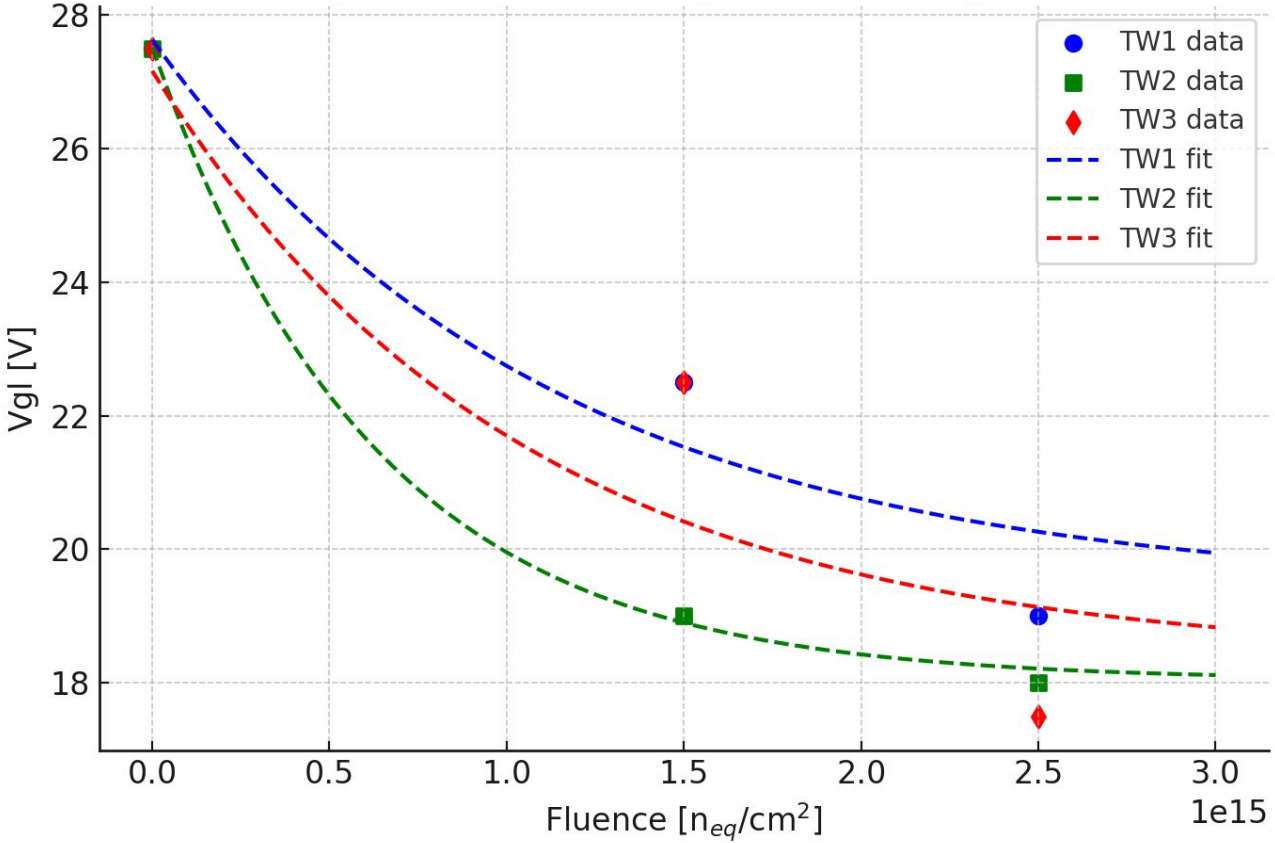


I–V Curve Validation of V2 TW3 TI-LGAD after 2.5×10^{15} n_{eq}/cm^2 irradiation





Acceptor removal of V2 TW1/2/3 TI-LGAD

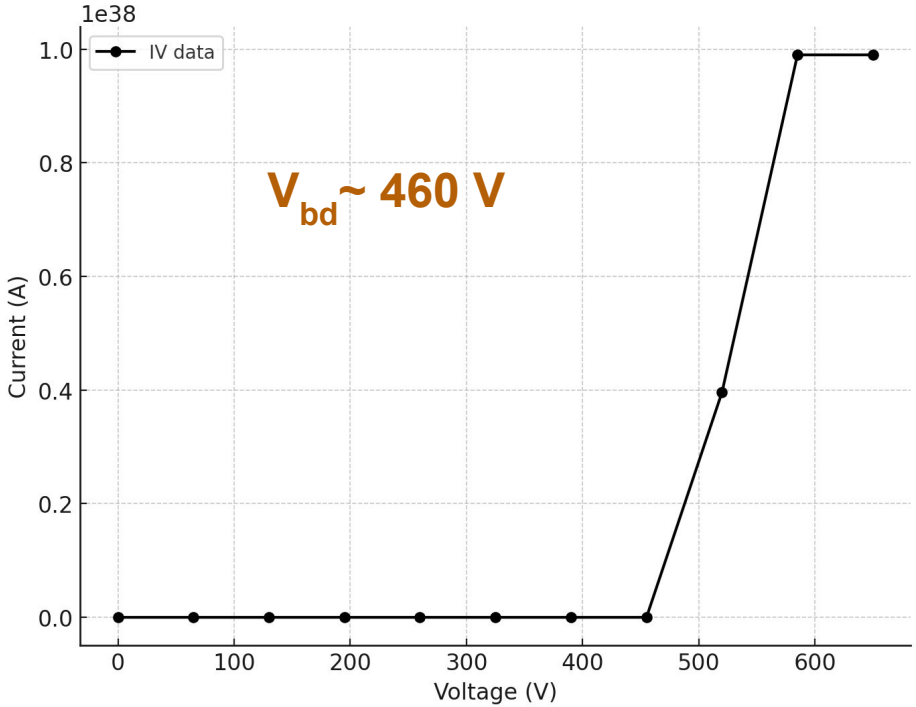


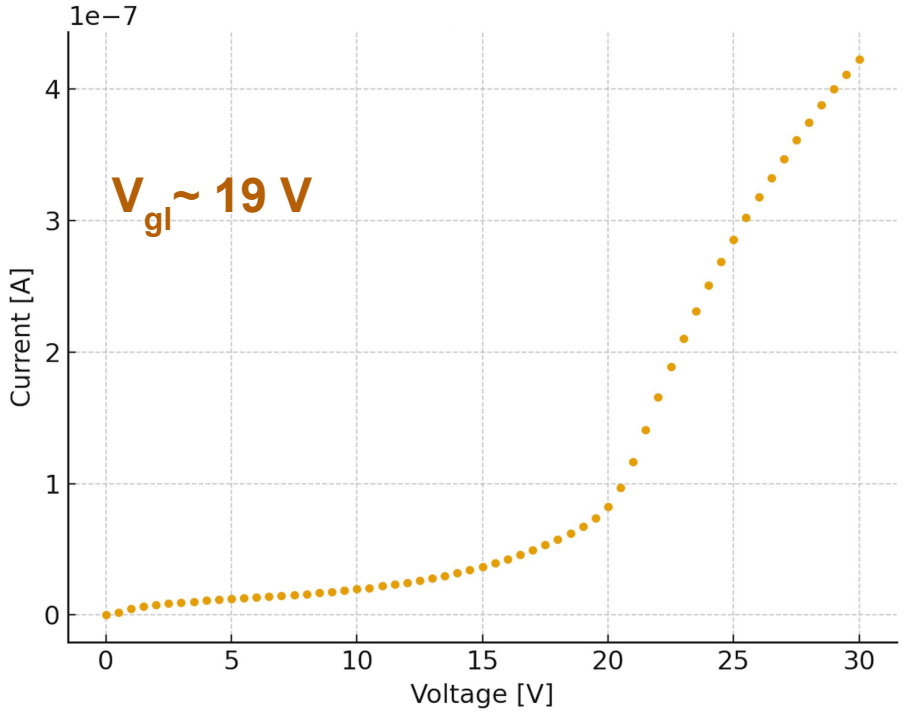
TW1: c≈1.44×10^{-16} cm^2

TW2: c≈1.90×10^{-16} cm^2

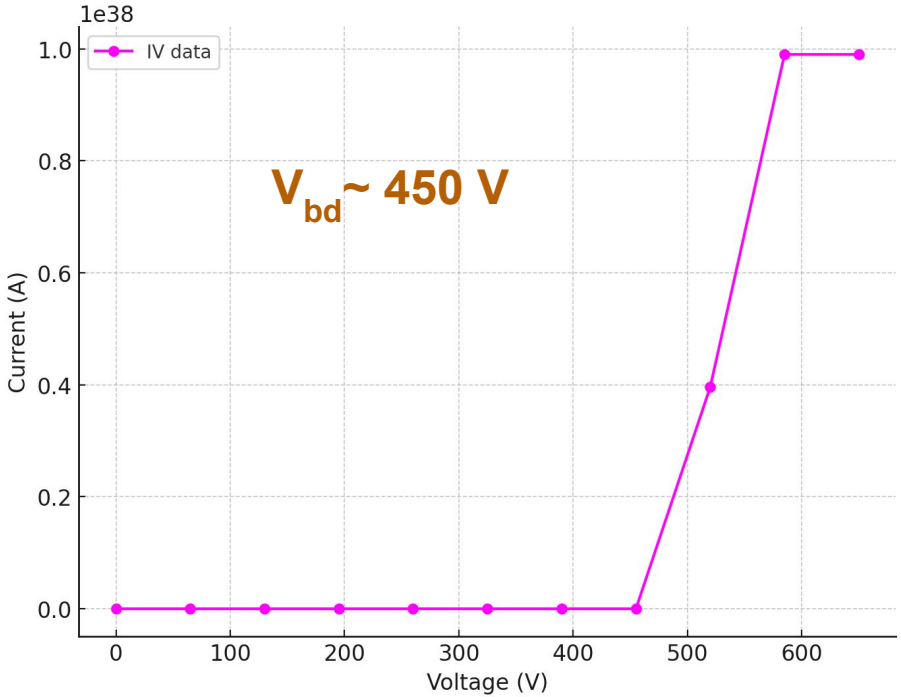
TW3: c≈1.68×10^{-16} cm^2

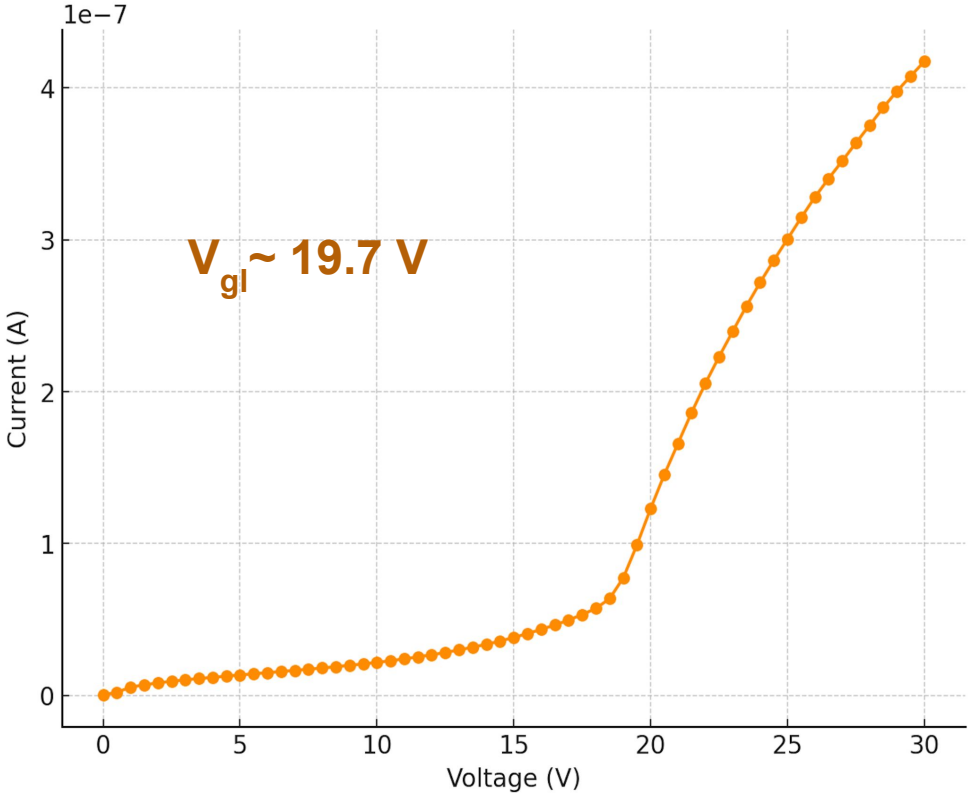
I–V Curve Validation of V2 TW4 TI-LGAD after 1.5×10^{15} n_{eq}/cm^2 irradiation



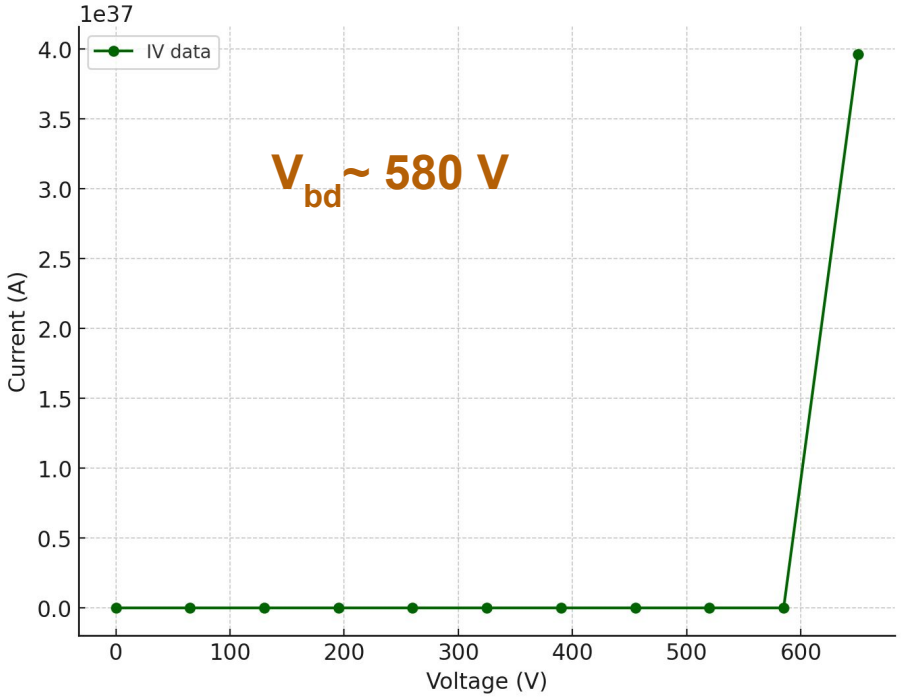


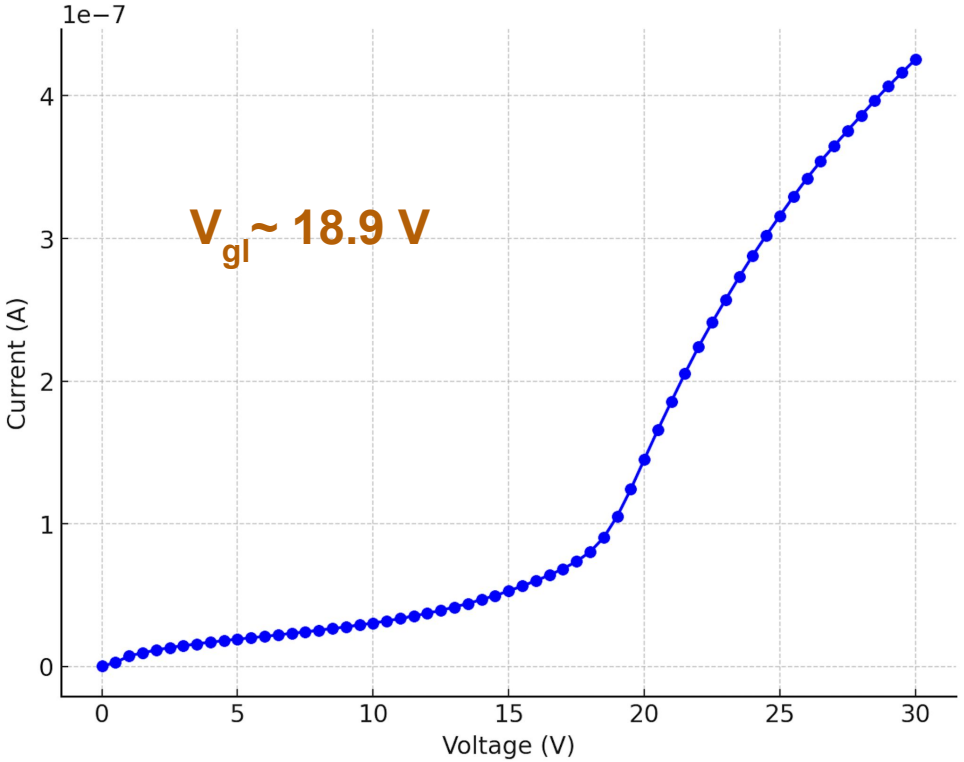
I–V Curve Validation of V2 TW6 TI-LGAD after 1.5×10^{15} n_{eq}/cm^2 irradiation



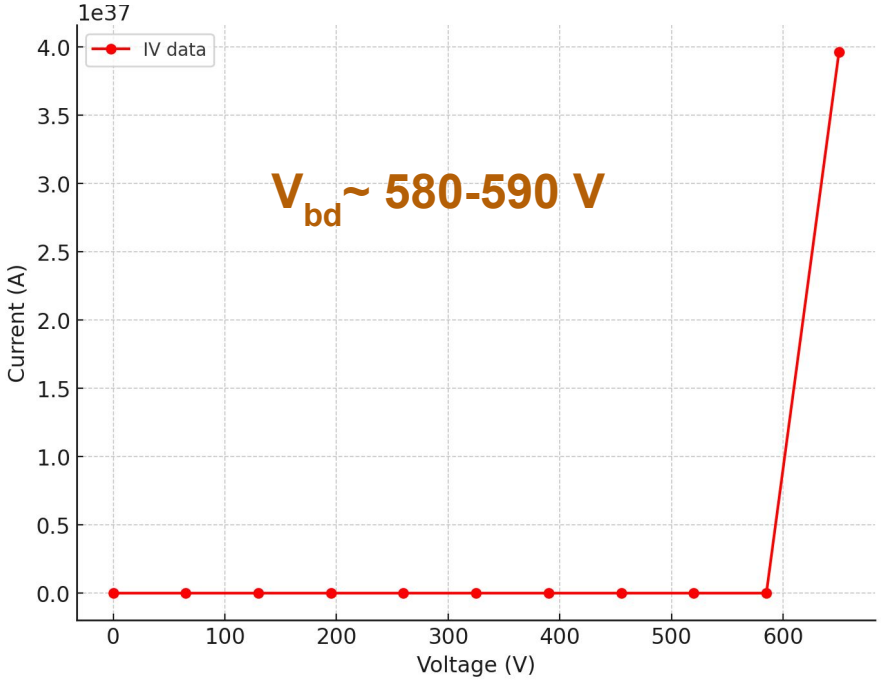


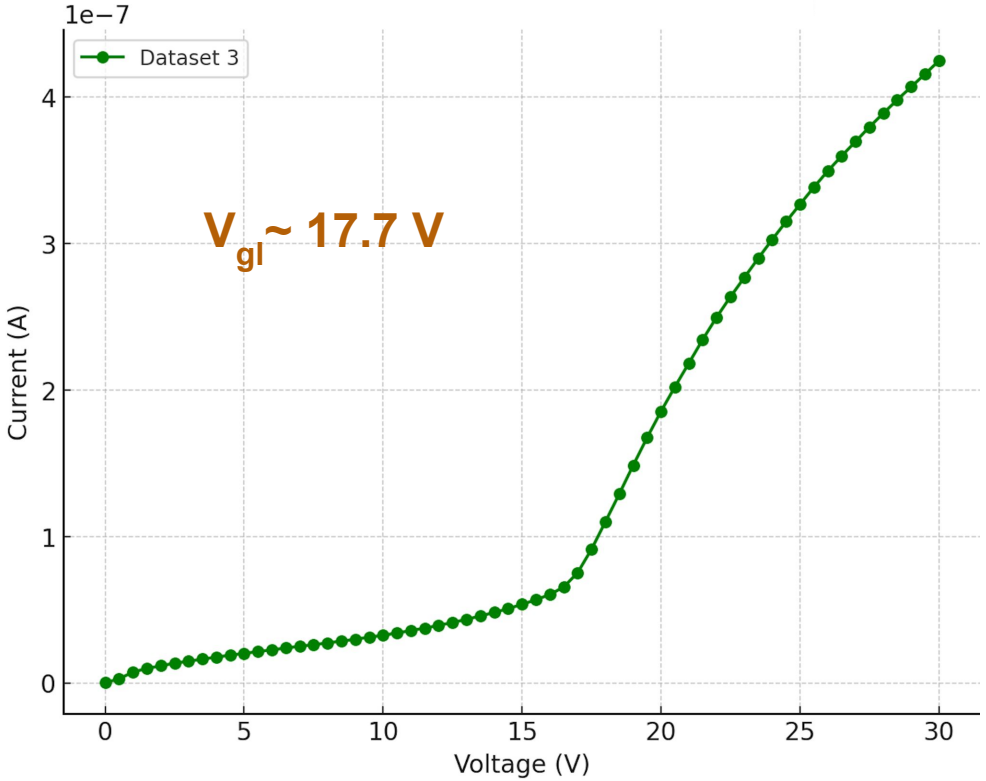
I–V Curve Validation of V2 TW4 TI-LGAD after 2.5×10^{15} n_{eq}/cm^2 irradiation



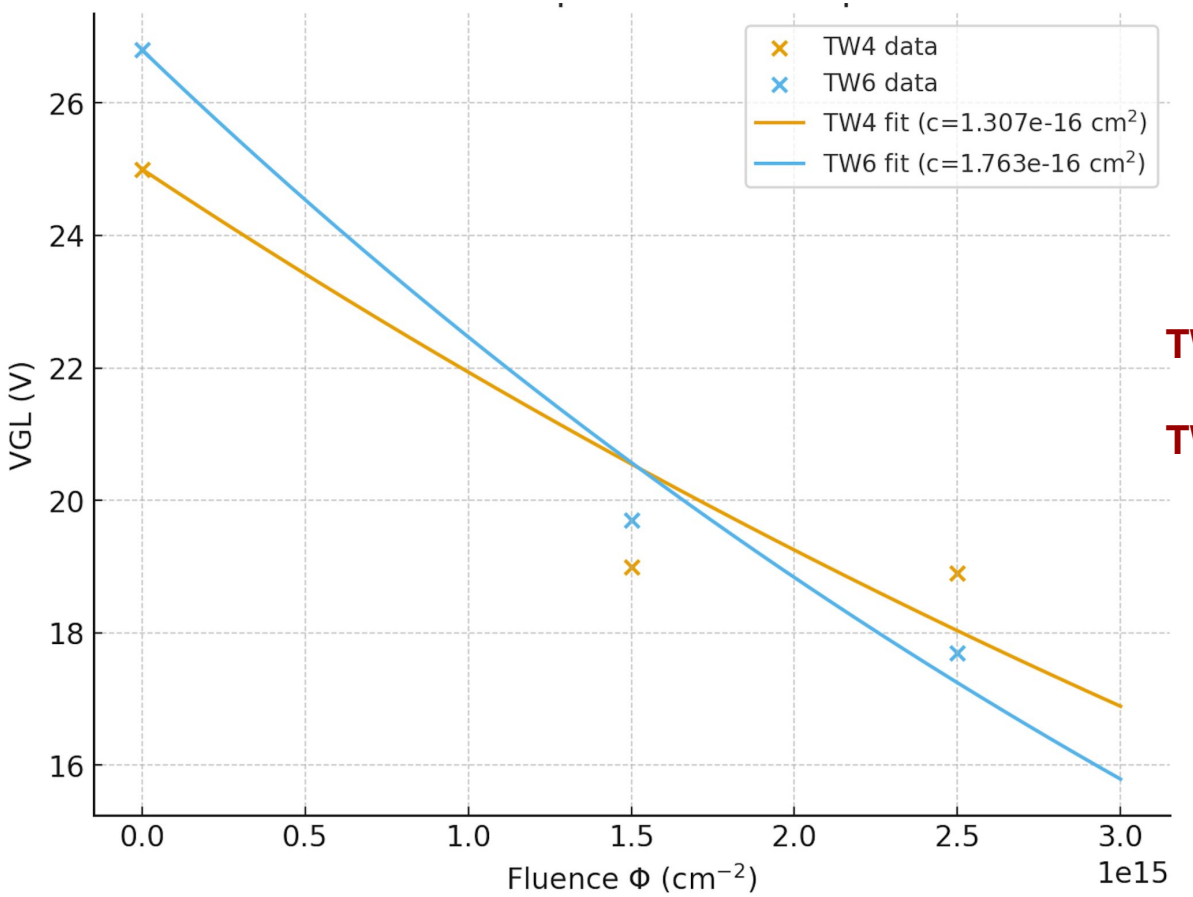


I–V Curve Validation of V2 TW6 TI-LGAD after 2.5×10^{15} n_{eq}/cm^2 irradiation





Acceptor removal of V2 TW 4/6 TI-LGAD



TW4: c≈1.30×10^{-16} cm^2

TW6: c≈1.76 ×10^{-16} cm^2