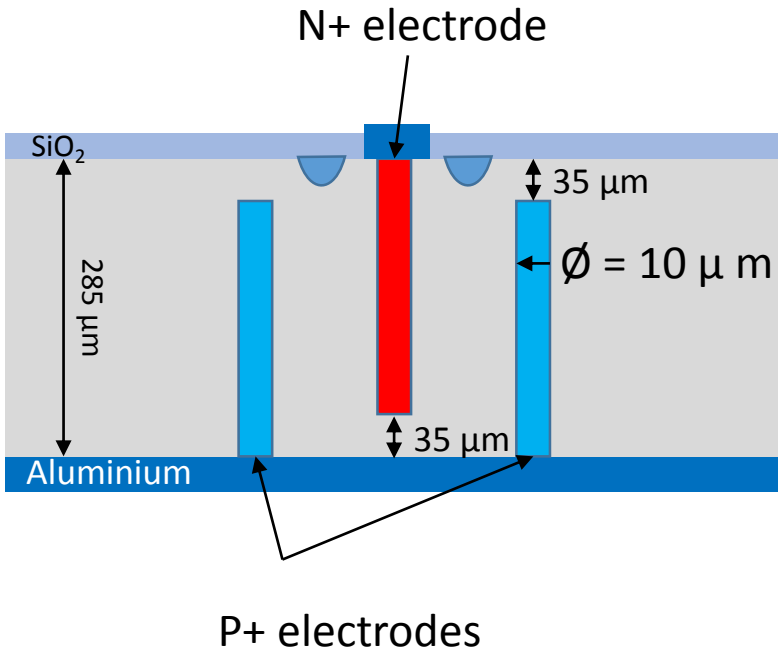
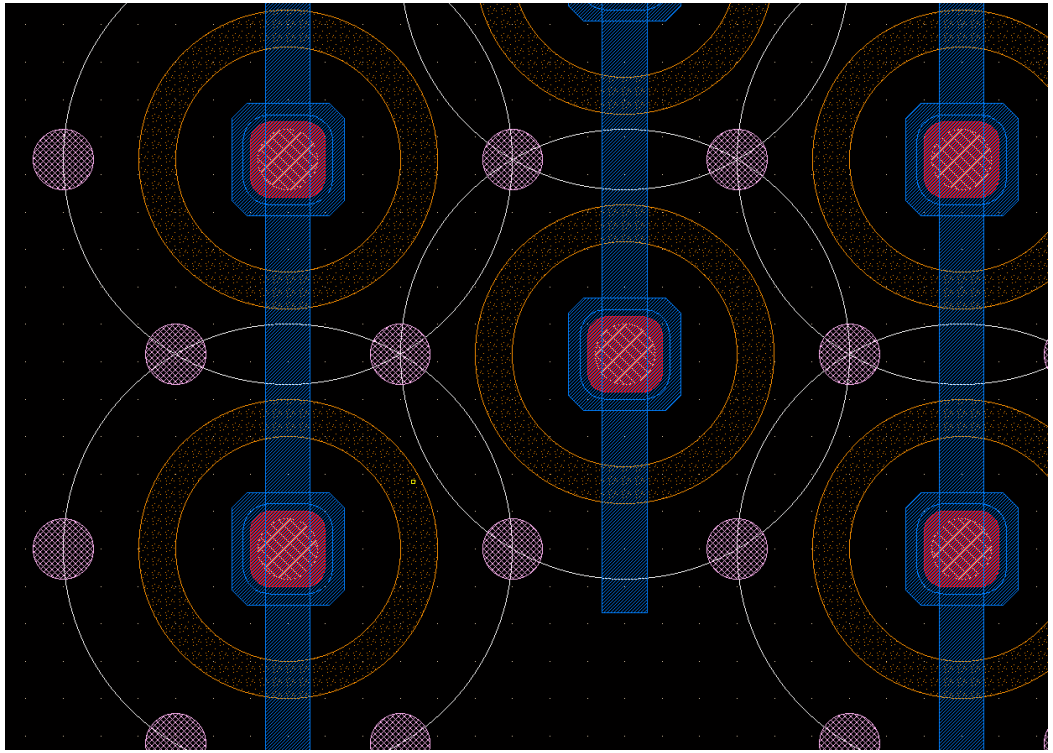
3D Detectors for timing applications

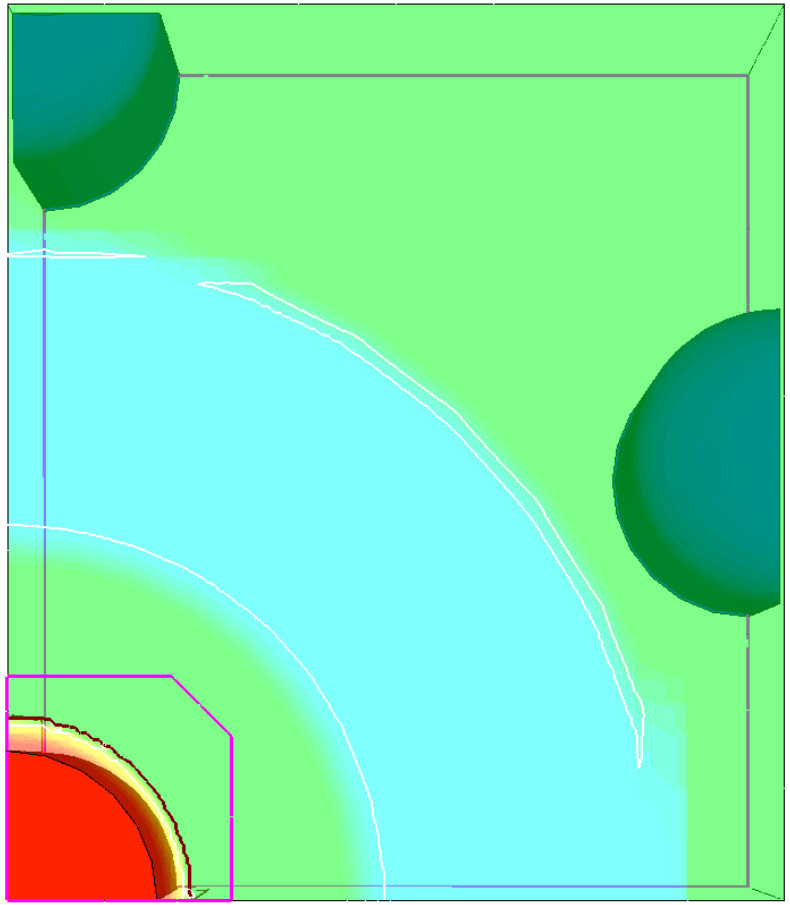
RD50 funded project

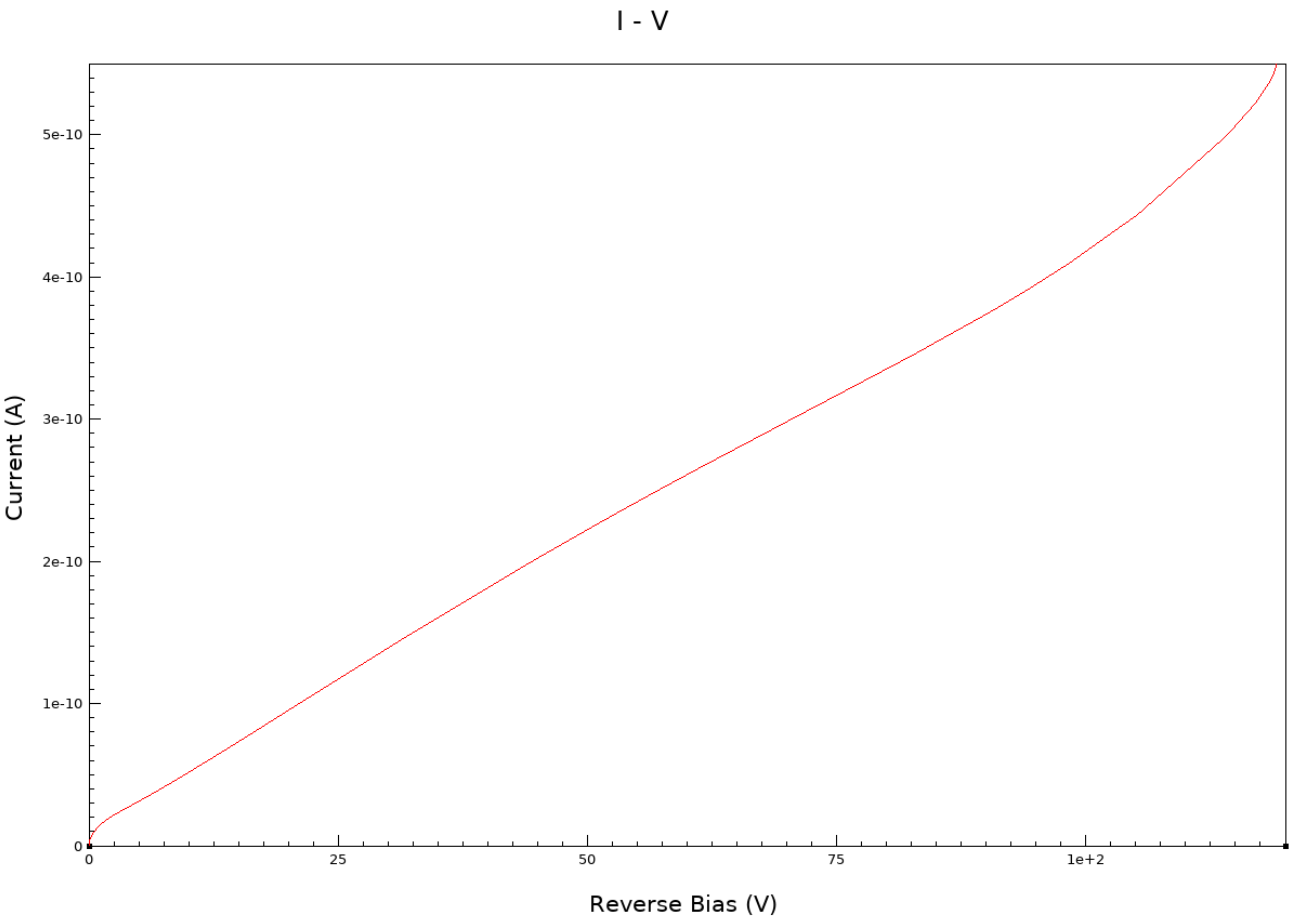
Activity	Institute	Lead
Wafer processing	CNM Barcelona	G. Pellegrini
Process/Detector simulations	CNM Barcelona	G. Pellegrini
Signal/timing performance simulations	JSI, Uni. Freiburg	G. Kramberger
TCT measurements	Uni. Freiburg, JSI, IFAE	U. Parzefall
Electrical characterization	Uni Freiburg, JSI, UZH, IFAE	C. Betancourt
Neutron irradiations	JSI	G. Kramberger
Timing measurements (with discrete electronics, ALTIROC)	JSI, UZH, Uni. Freiburg, IFAE	S. Grinstein

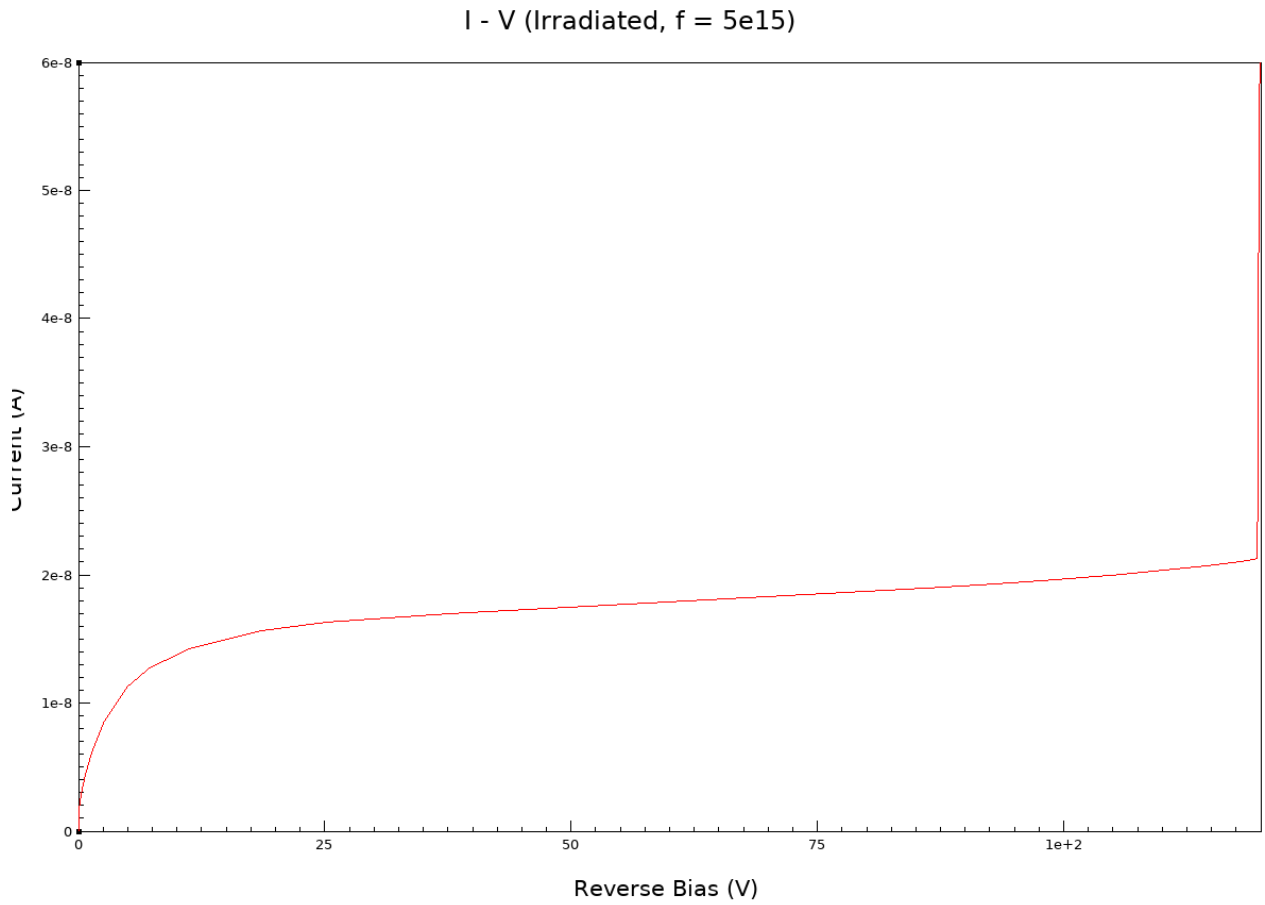


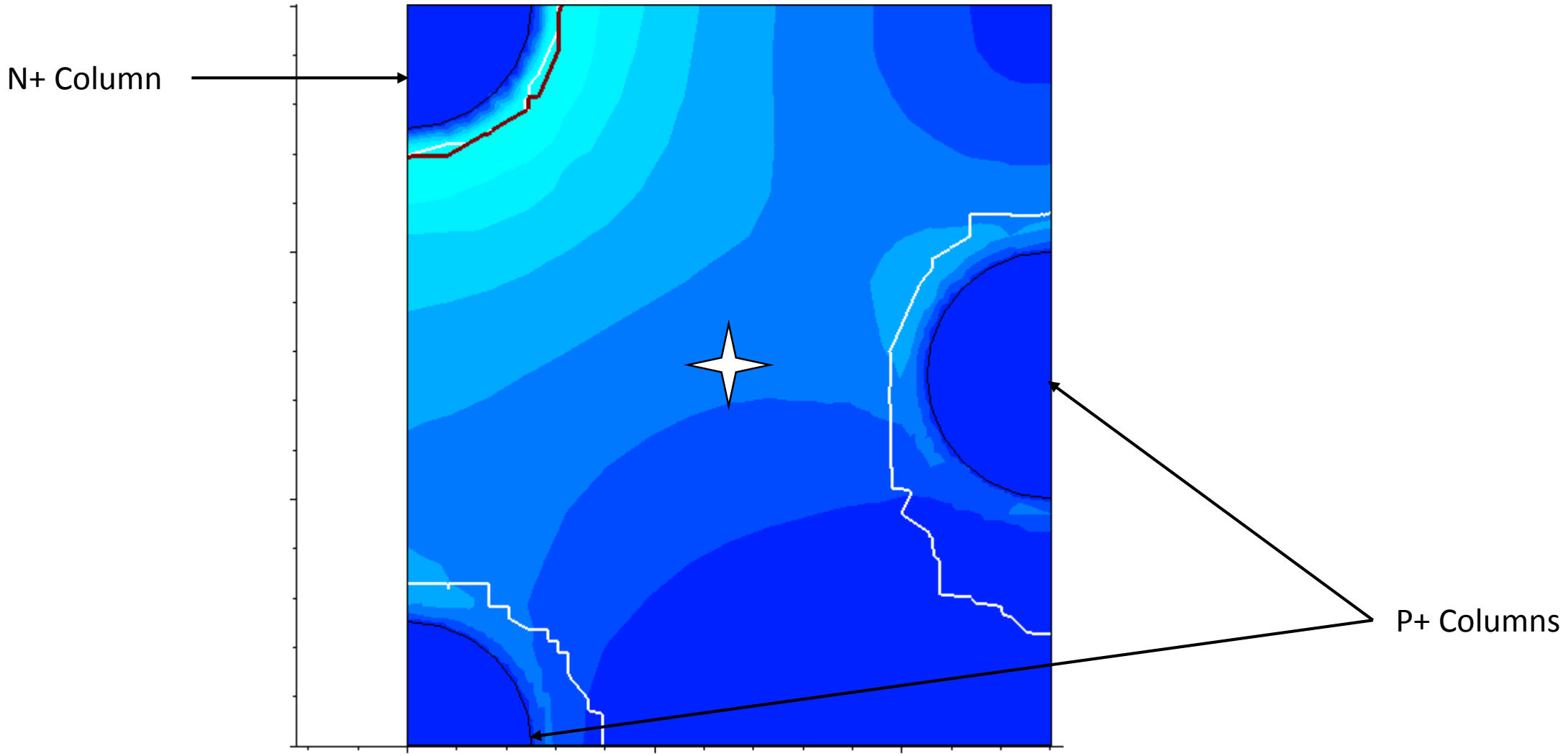
- 3D Double side Technology
- High resistivity p-type wafer, 285µm thick
- 10 µm of diameter
- 250 µm deep column electrodes



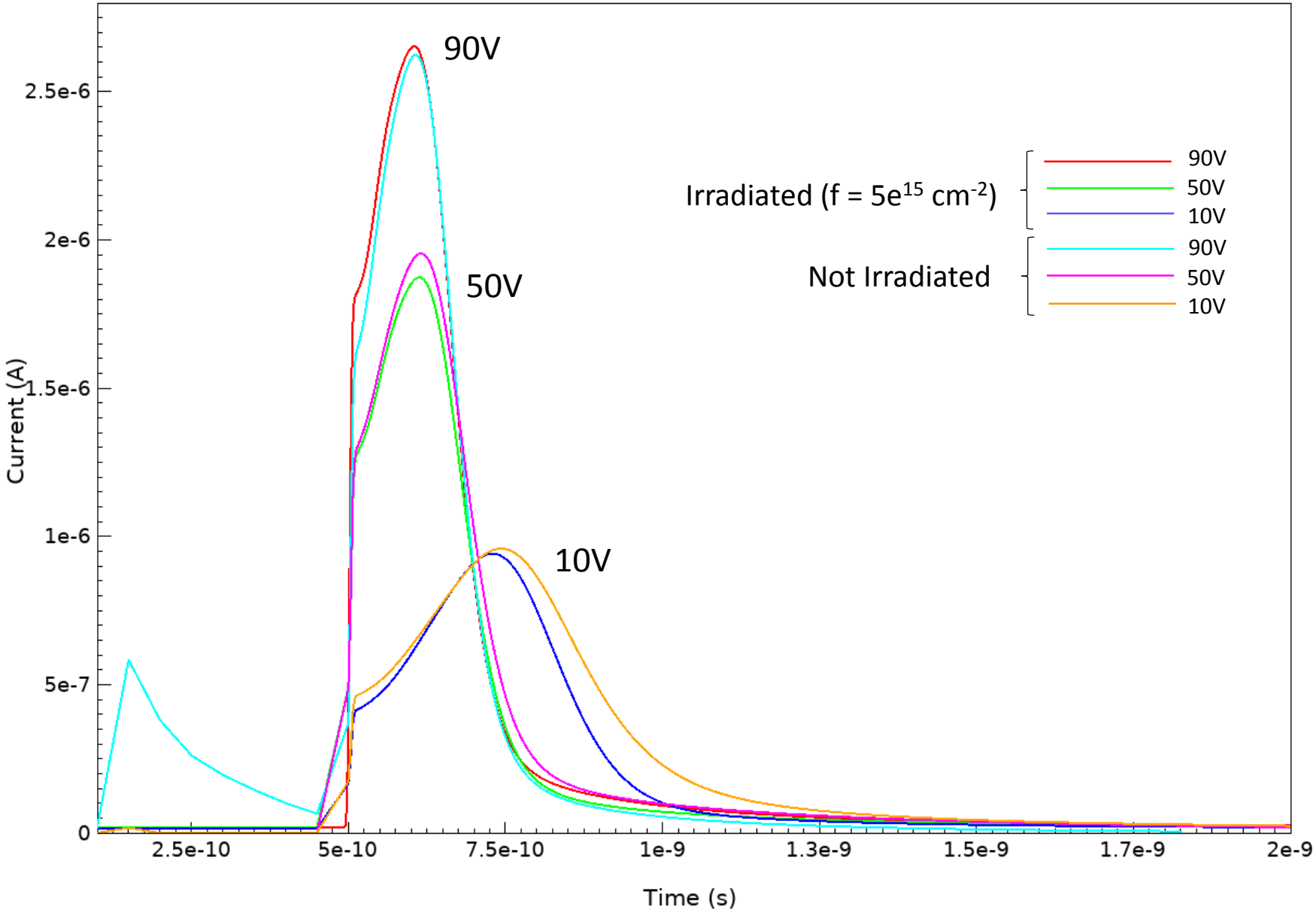

X
Z
Y


I - V
Current (A)
5e-10
4e-10
3e-10
2e-10
1e-10
0
0
25
50
75
1e+2
Reverse Bias (V)

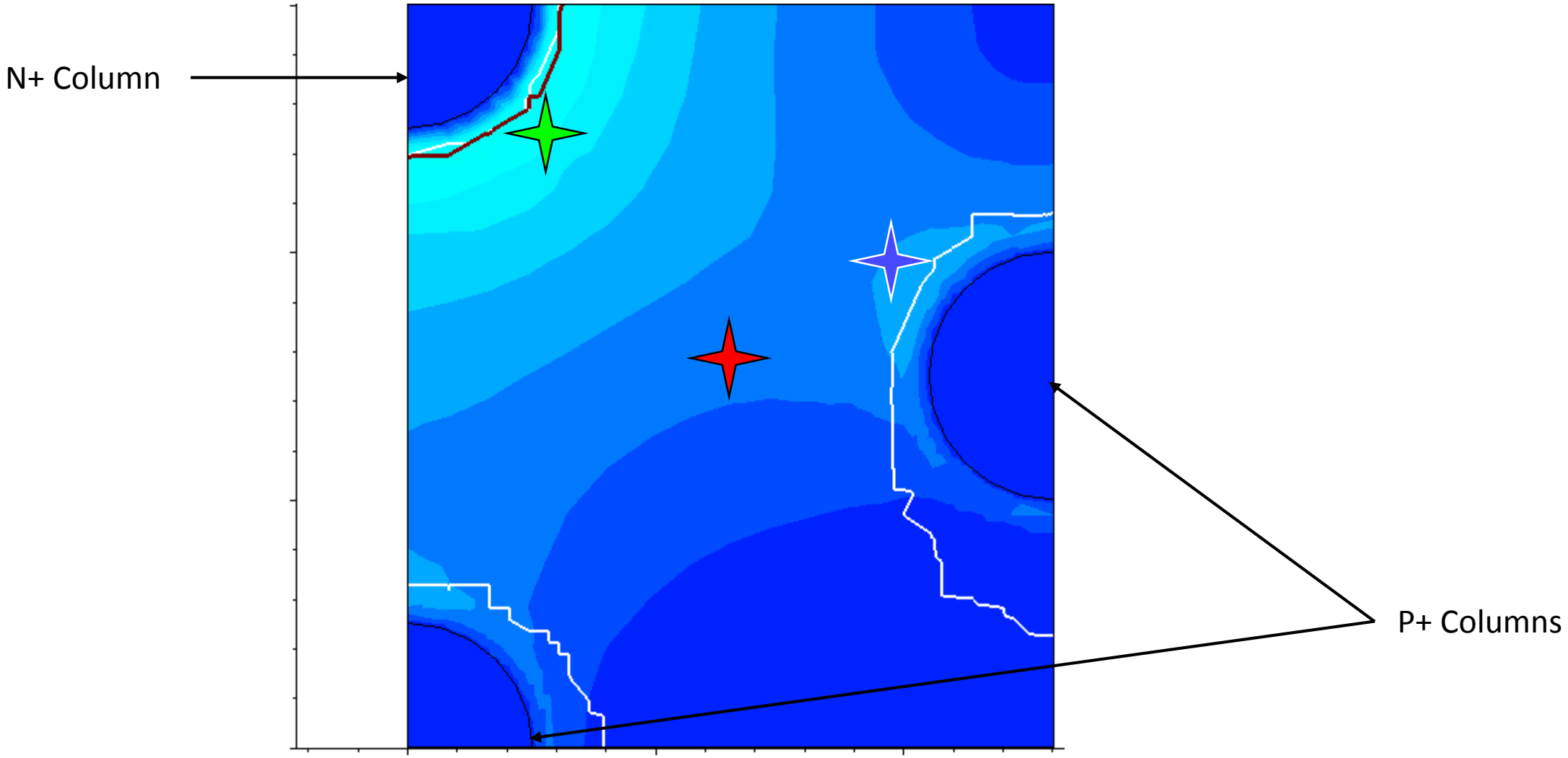

I - V (Irradiated, f = 5e15)
6e-8
5e-8
4e-8
3e-8
2e-8
1e-8
0
0
25
50
75
1e+2
Reverse Bias (V)



Electric Field at bias = 10V


90V
50V
10V
Irradiated (f = 5e15 cm-2)
90V
50V
10V
Not Irradiated
90V
50V
10V
Current (A)
2.5e-6
2e-6
1.5e-6
1e-6
5e-7
0
2.5e-10
5e-10
7.5e-10
1e-9
1.3e-9
1.5e-9
1.7e-9
2e-9
Time (s)

Simulation Results – Hit position dependence



Waveforms @10V, f = 5e15cm^{-2}