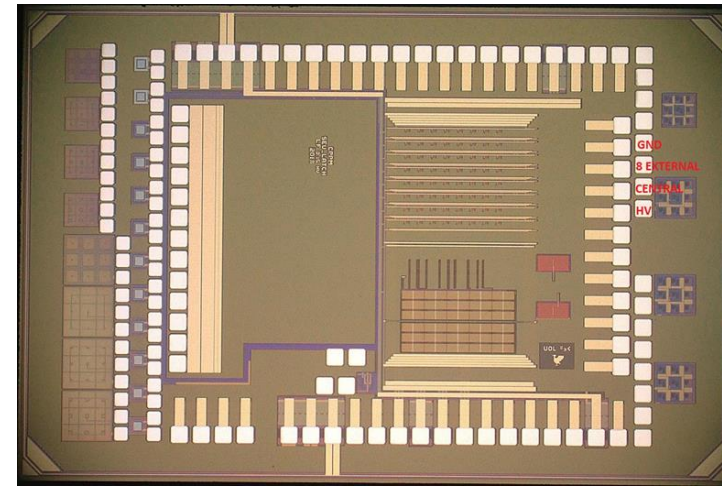
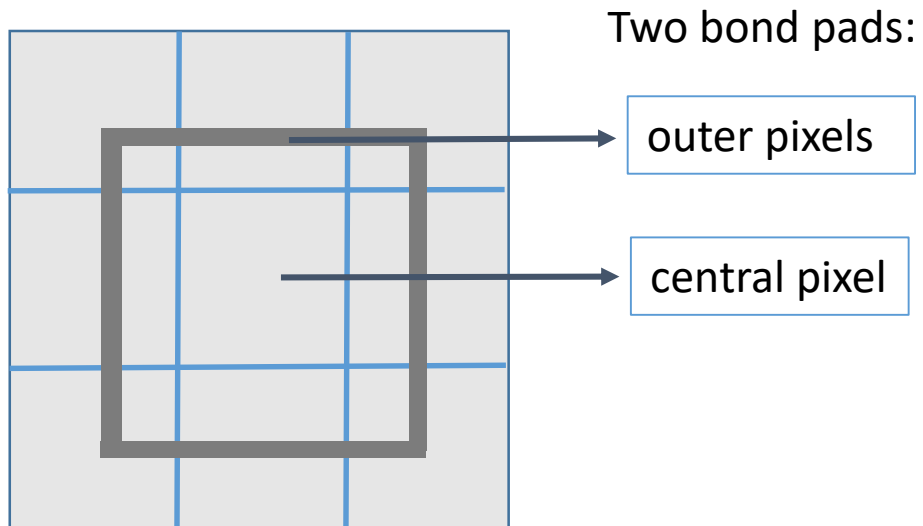


RD50 MPW2 Test structure

- RD50 project
- LFoundry, 4 resistivities
- followup of RD50-MPW1 → (low breakdown)

- 60 μm x 60 μm pixel
- 3x3 pixel array
- central pixel one bond pad
- outer pixels connected together another bond pad



In our setup:

DNWELL connected to
+ HV

Substrate (HV)
to GND

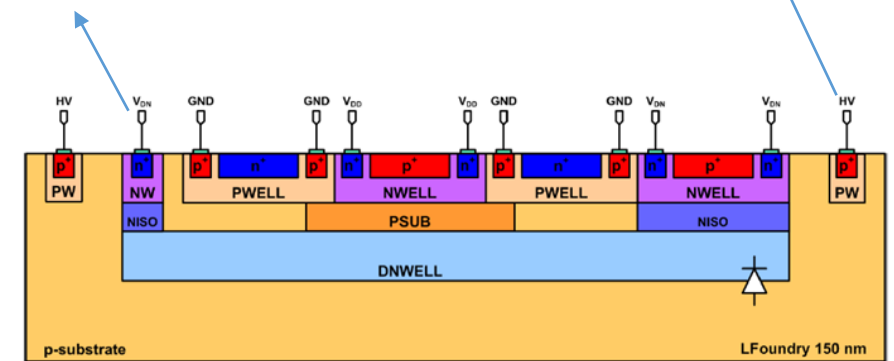
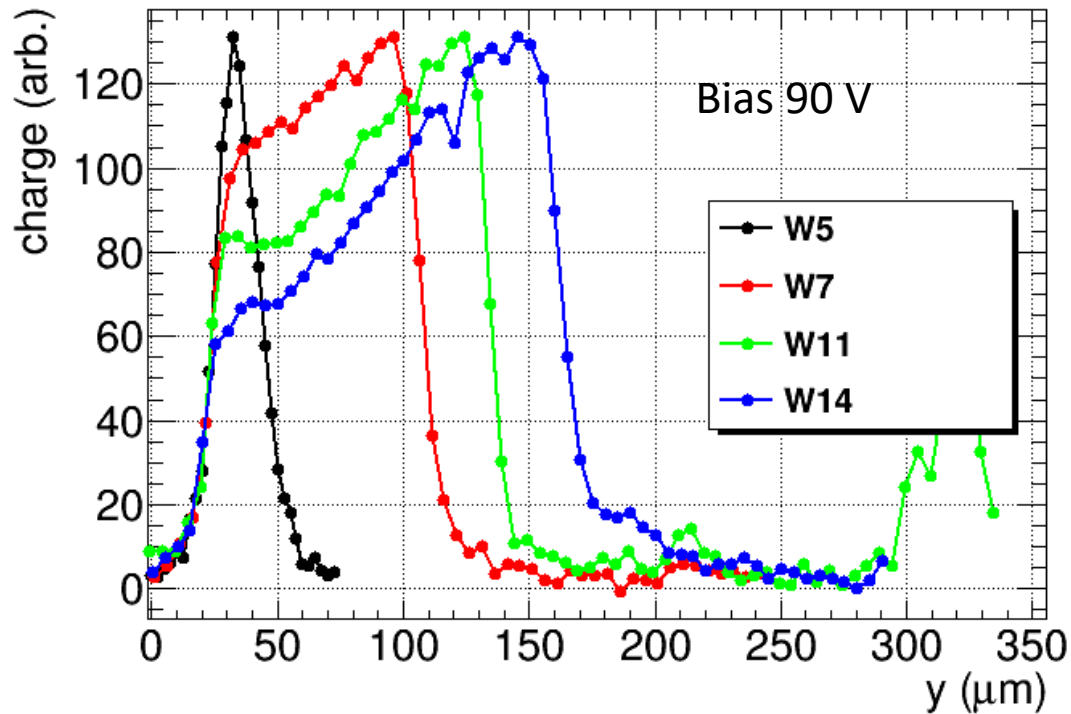


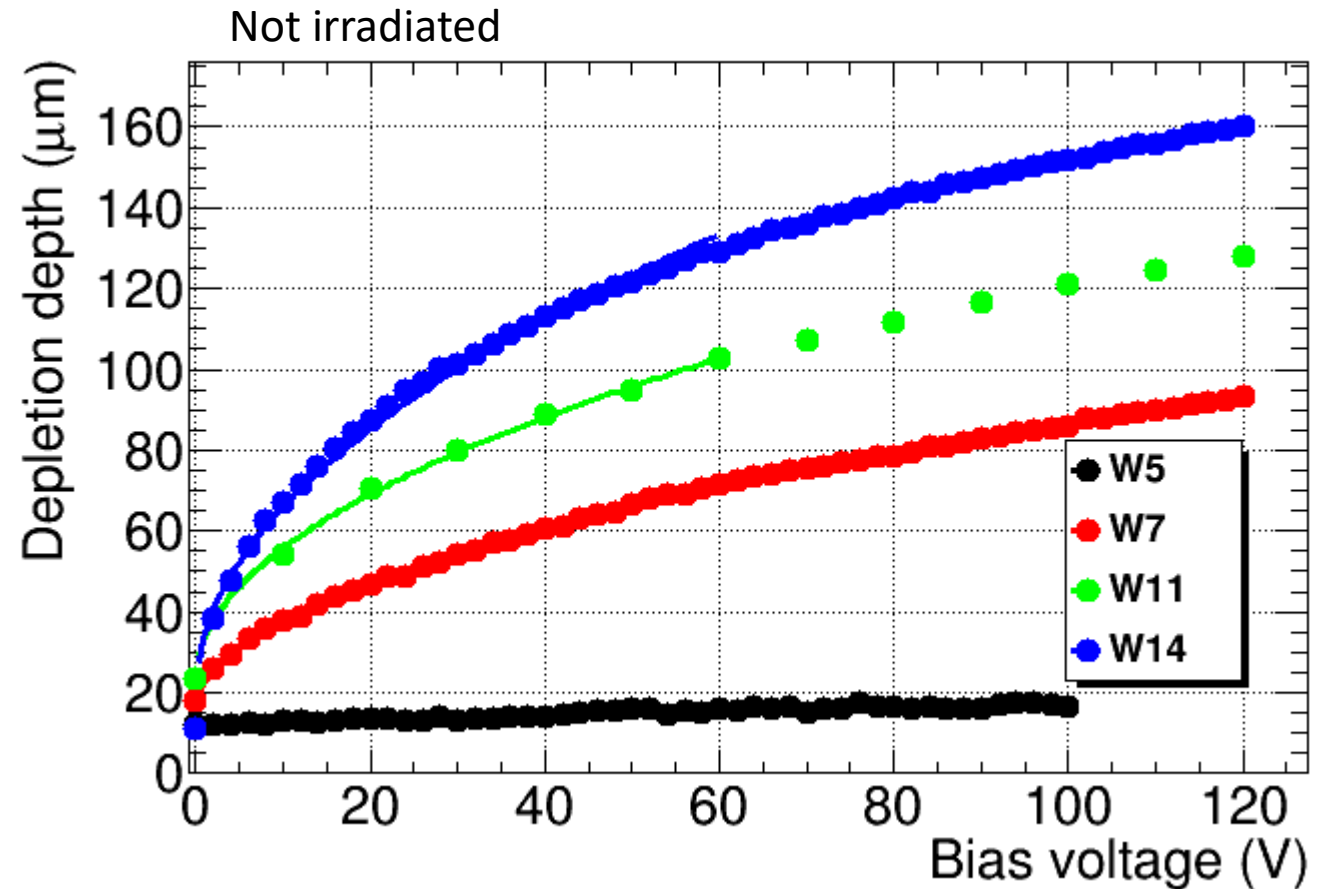
Figure 12. Simplified cross-section of one pixel

Charge collection profile

- bias up to 120 V, low current (W5 to 100 V, breakdown at ~ 105)



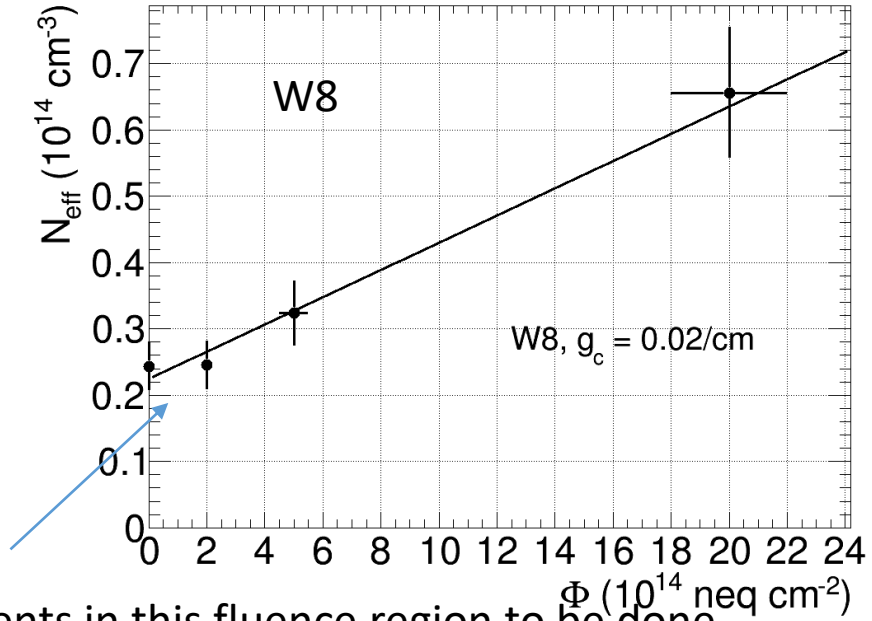
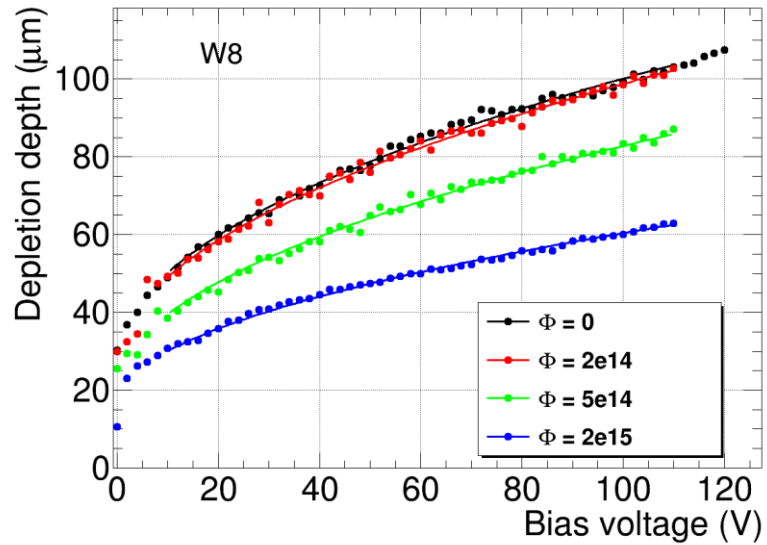
- scan across centre of central pixel
- profiles normalized to same maximum



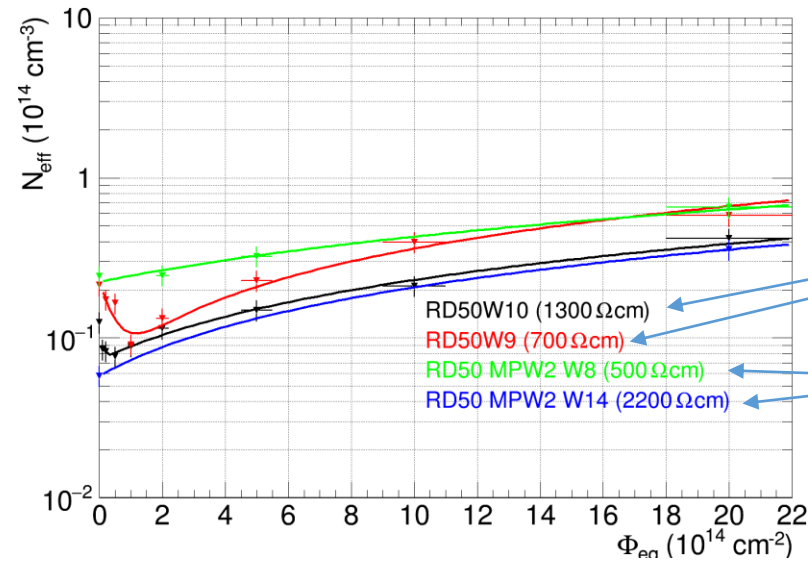
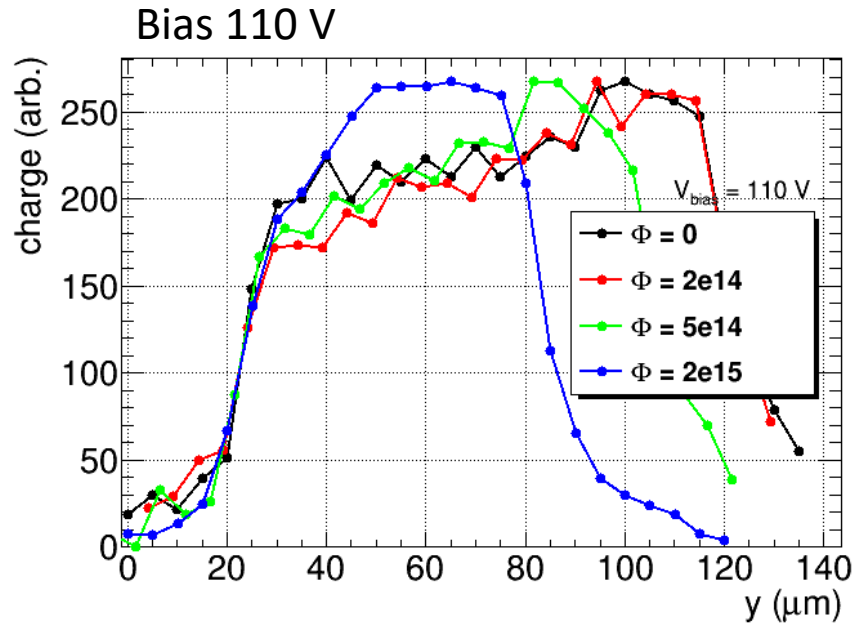
W5: $N_{eff} = 3.2e15 \text{ cm}^{-3} \rightarrow 4 \text{ } \Omega\text{cm}$
 W7: $N_{eff} = 2.4e13 \text{ cm}^{-3} \rightarrow 0.5 \text{ k}\Omega\text{cm}$
 W11: $N_{eff} = 1.2e13 \text{ cm}^{-3} \rightarrow 1.1 \text{ k}\Omega\text{cm}$
 W14: $N_{eff} = 5.9e12 \text{ cm}^{-3} \rightarrow 2.2 \text{ k}\Omega\text{cm}$

\rightarrow numbers accurate to $\sim 20\%$, W5 worse

W8 500 Ohm-cm Irradiation study



Measurements in this fluence region to be done

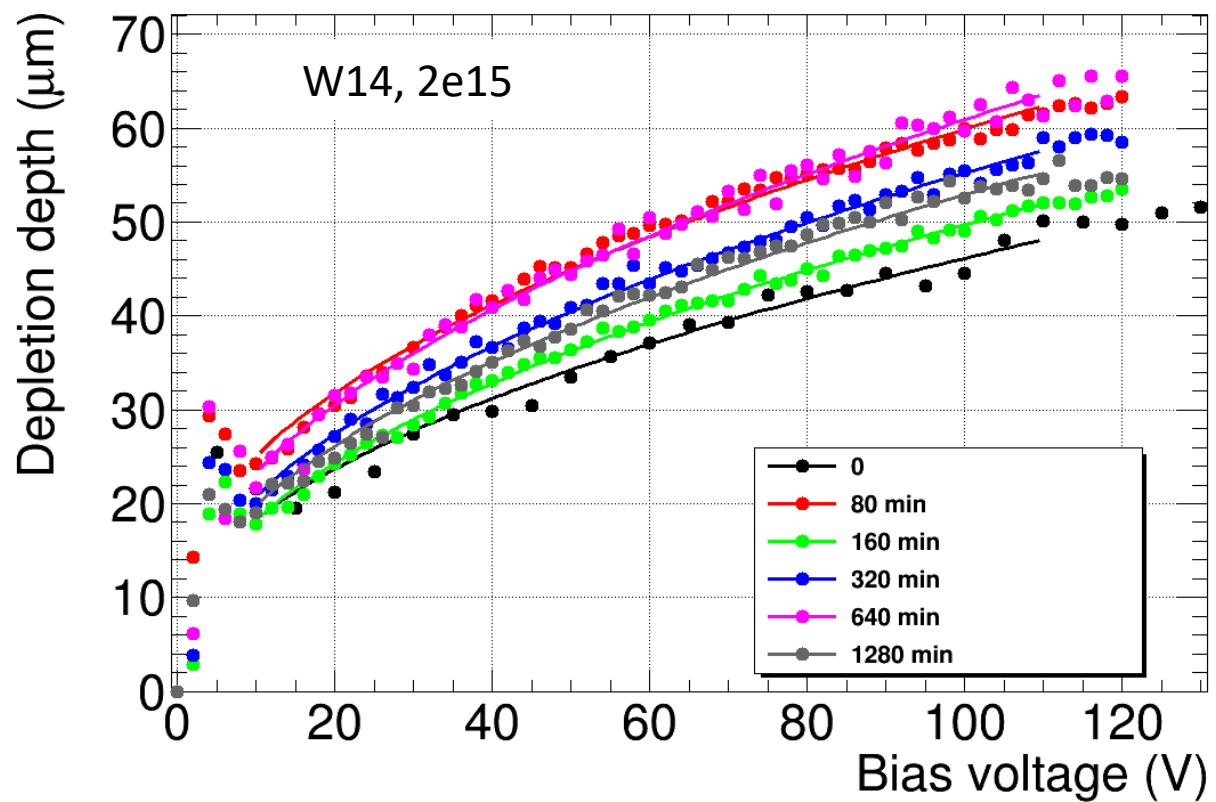
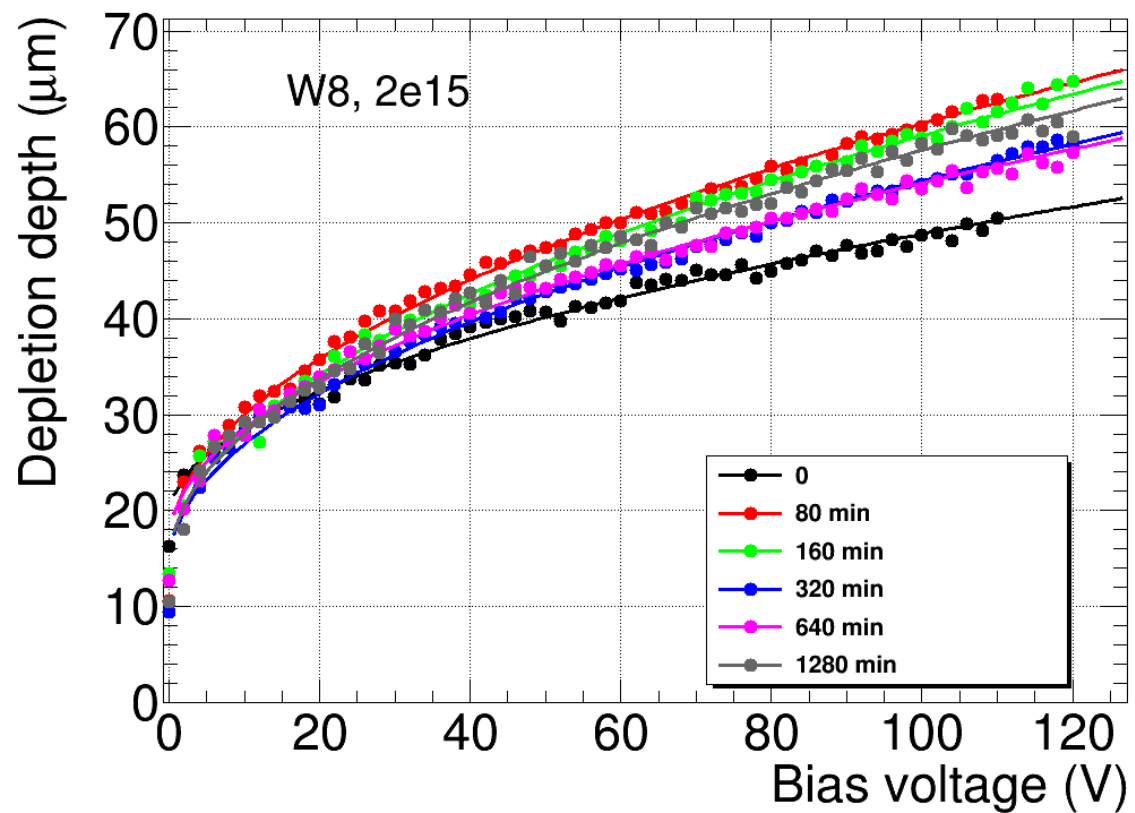


RD50 MPW1
(measured 2018)

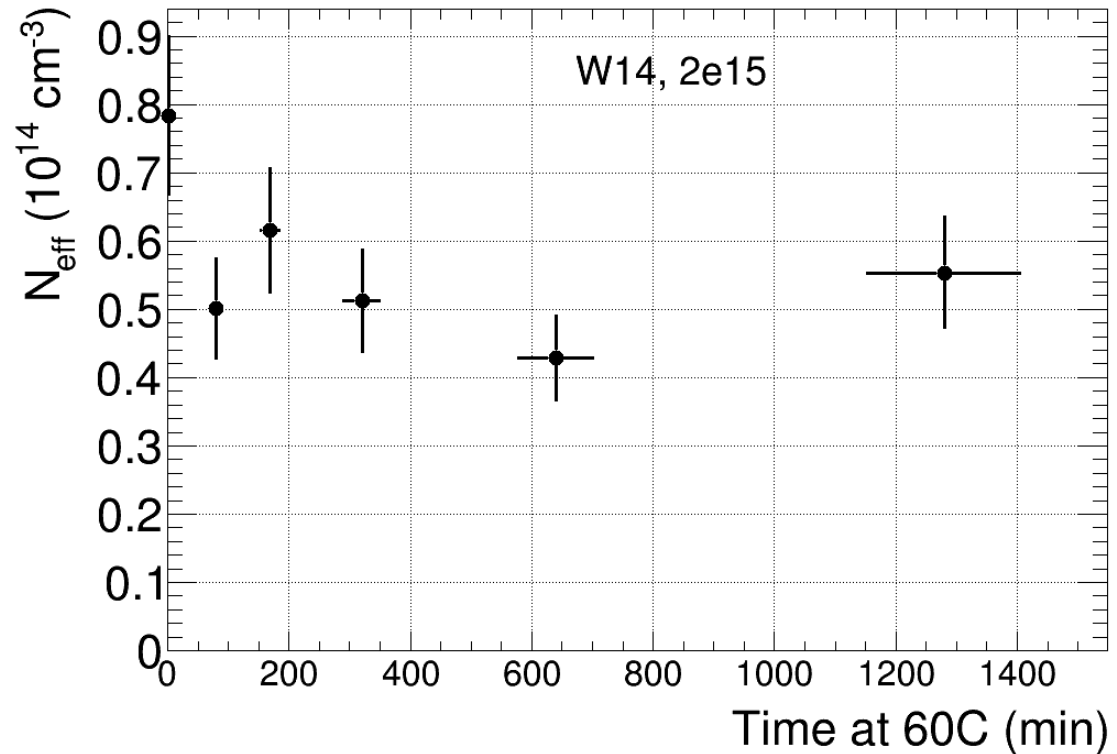
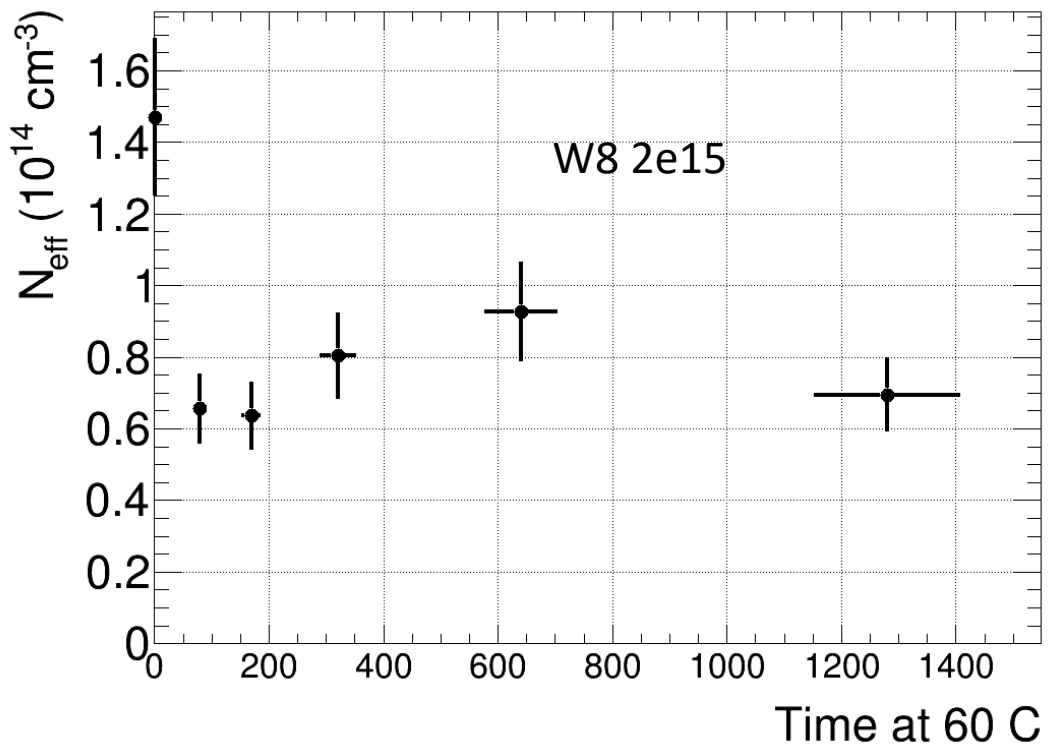
RD50 MPW2

Annealing studies

Anneal devices irradiated to $2e15$ at 60 C up to 1280 minutes

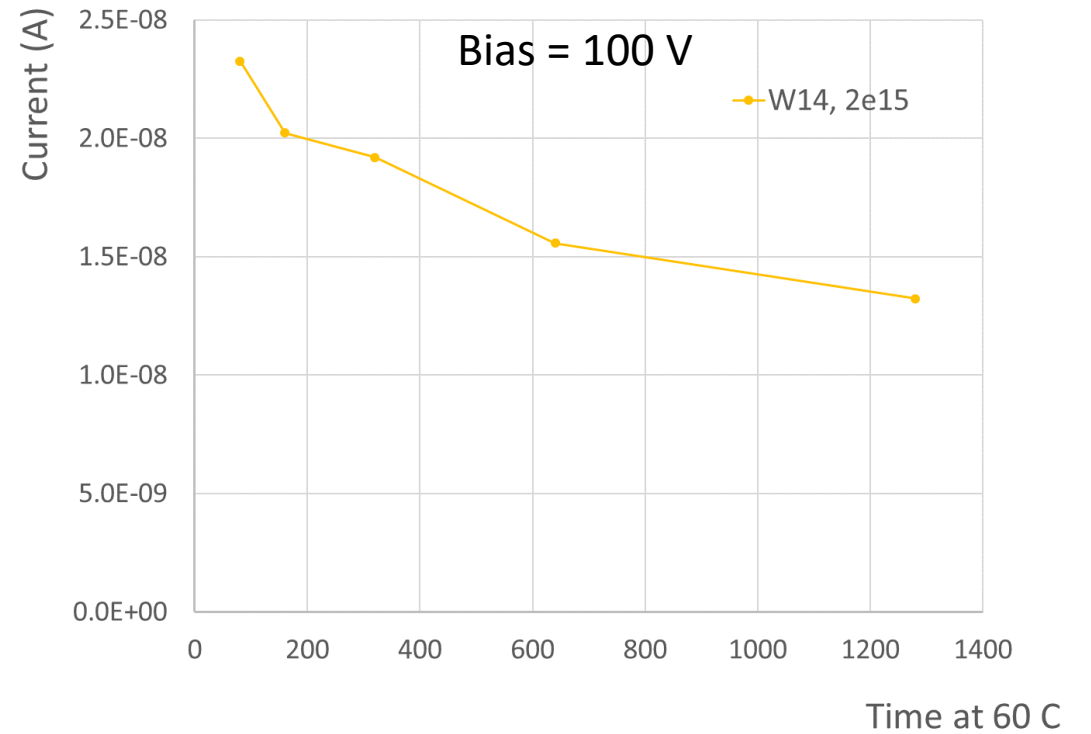
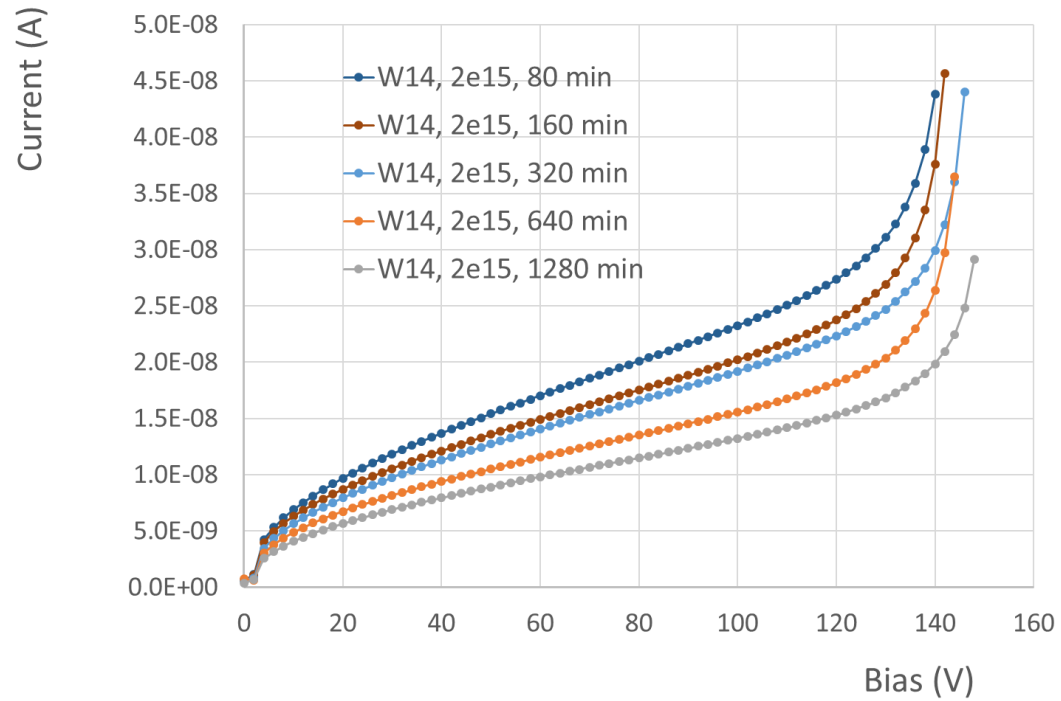


- Significant effect of the first annealing step (80 minutes)
- Not much change after more annealing



Annealing of reverse current W14, 2e15

Central pixel current measured on probe station, T=20°C



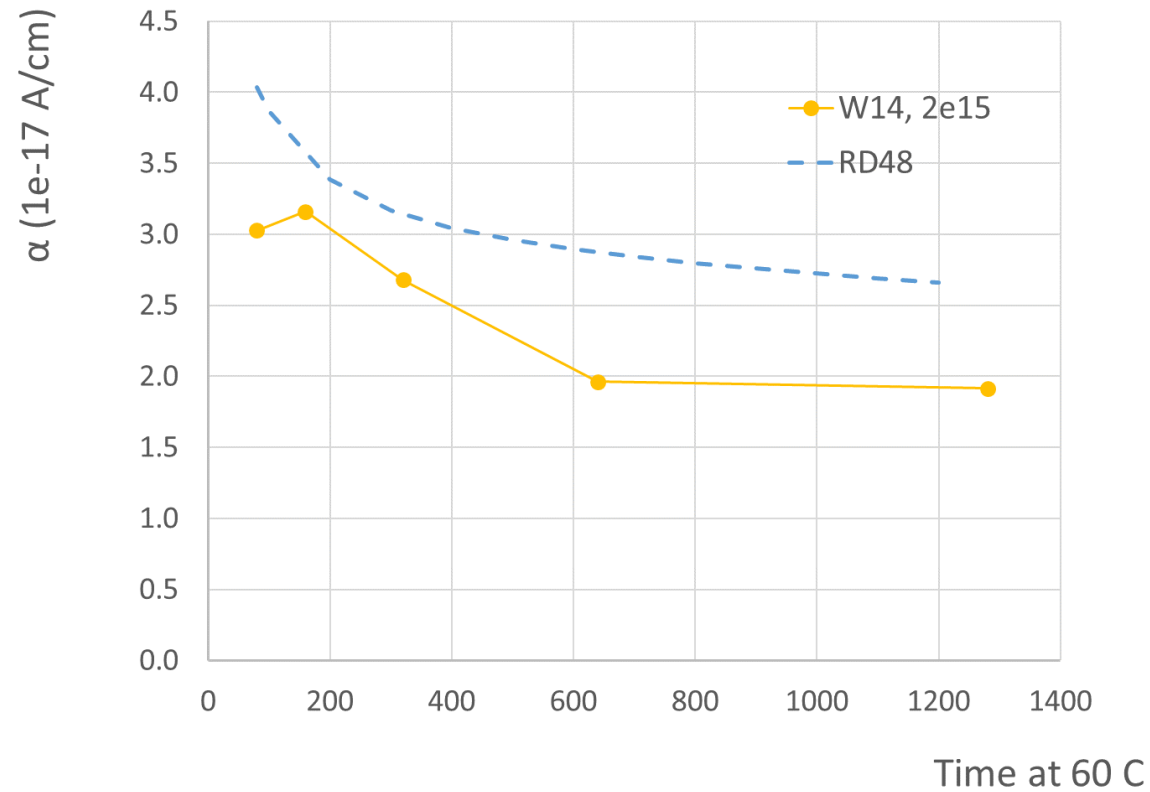
$$\alpha = I/V\Phi$$

→ Volume: $V = 60 \times 60 \text{ um}^2 \times \text{depletion_depth}$

→ Depletion_depth from E-TCT

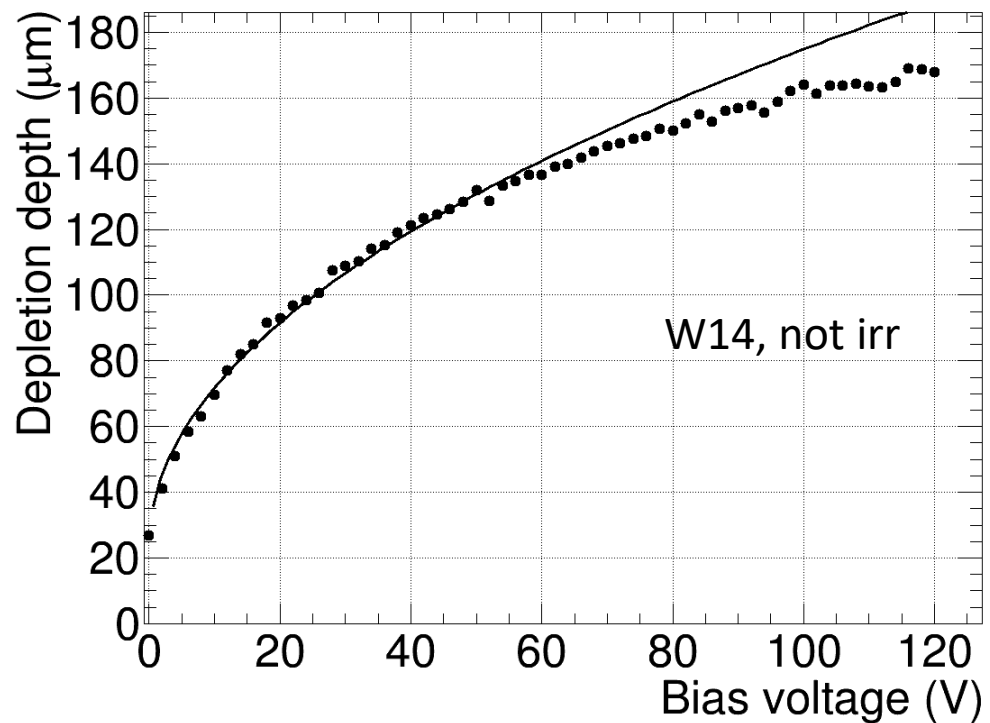
RD48

Somewhat lower alpha than expected → most probably because of overestimated depleted volume

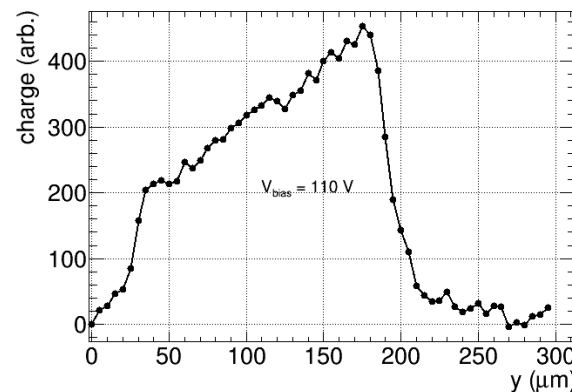
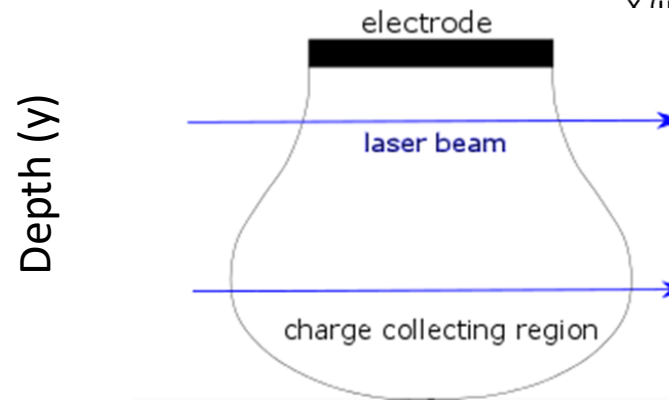
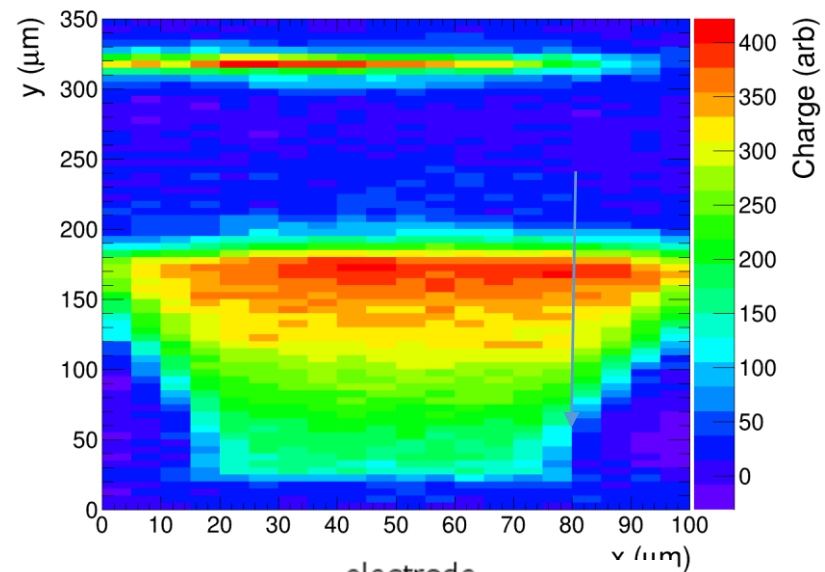


Problem funkcija ne fita OK

$$d = d_0 + \sqrt{\frac{2\epsilon\epsilon_0}{e_0 N_{eff}} \cdot V_{sub}}$$



Kadar depletirano območje čudne oblike,
korenska odvisnost ni prava?



- Problem je, če je depletirana globina širina profila pri 50% maksimuma, pri takšni obliki
→ ampak tudi če fitaš levi rob z $\text{erf}(x)$, ne pomaga, še vedno koren ne pofita odvisnosti od napetosti

