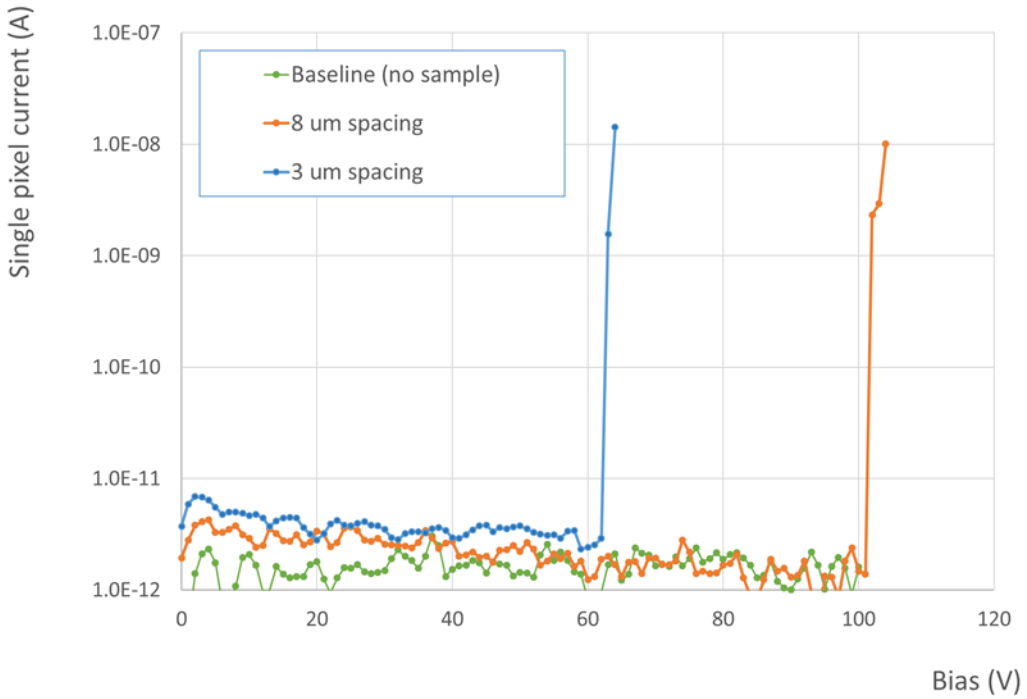
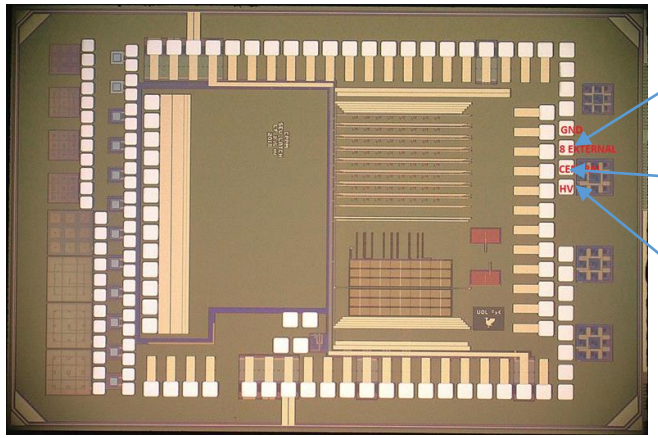
IV on W5 (std. resistivity)





Outer pixels to 0 V (guard ring)

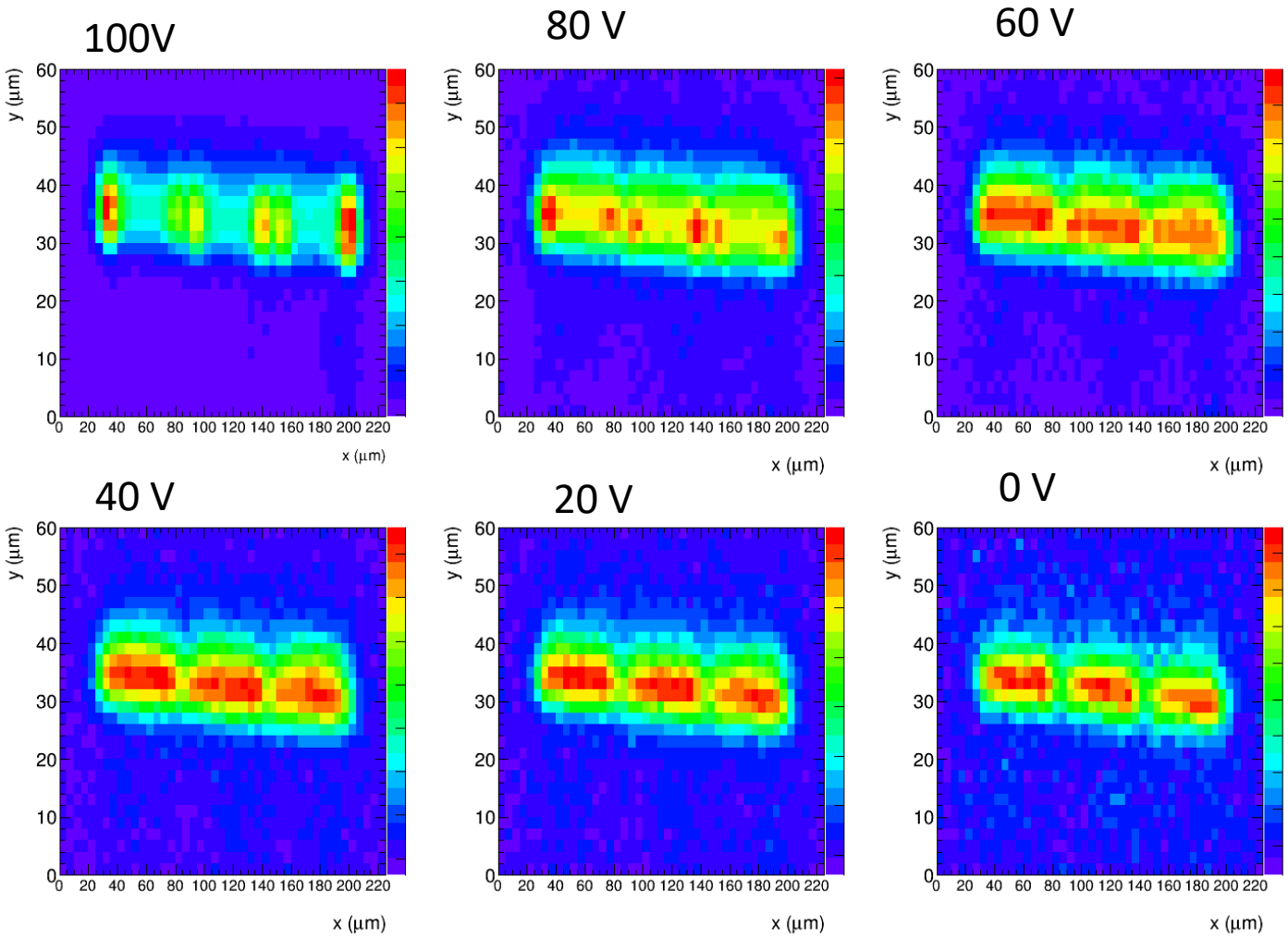
Central pixel to 0 V
→ measure current on this pad

- HV

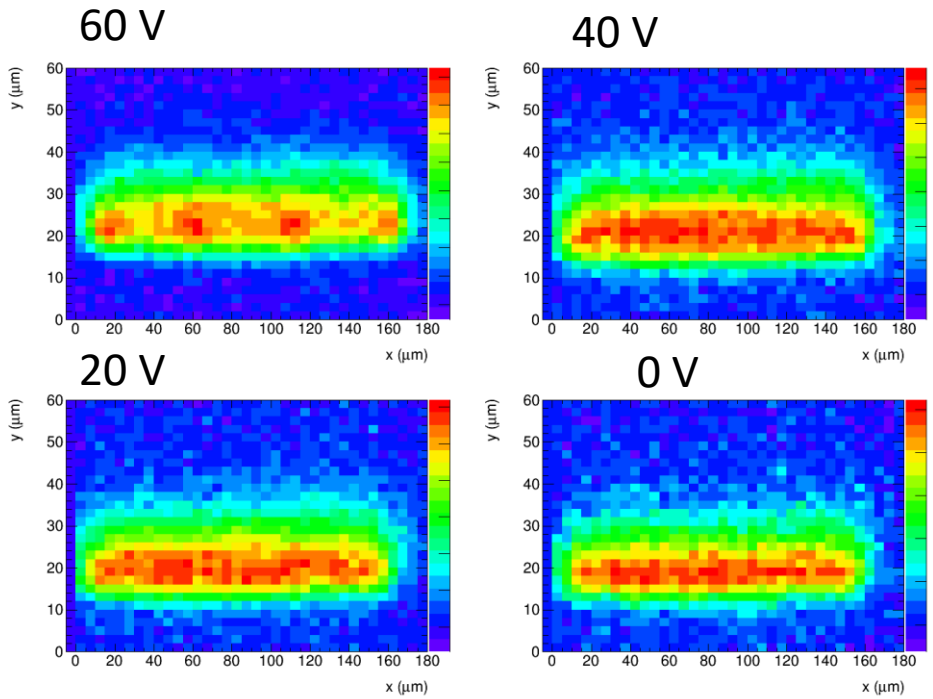
- sensitivity of the setup ~ 10 pA
- current in MPW2 near or less than the sensitivity
- breakdown: 63 V for pixel with 3 um spacing
  102 V for 8 µm spacing

W5, std resistivity, E-TCT, all pixels read out

Charge collection profile, 8 um p-n spacing

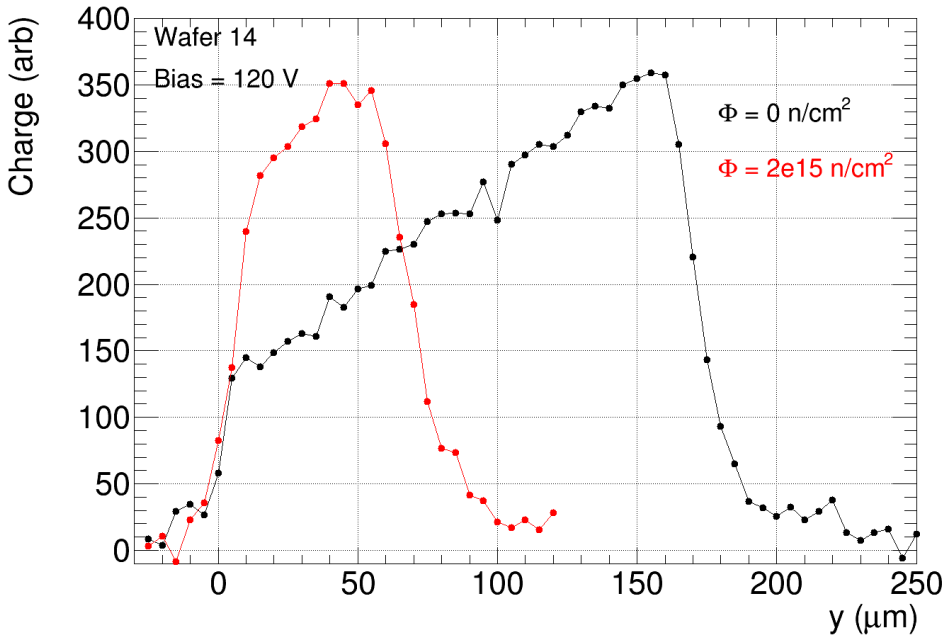


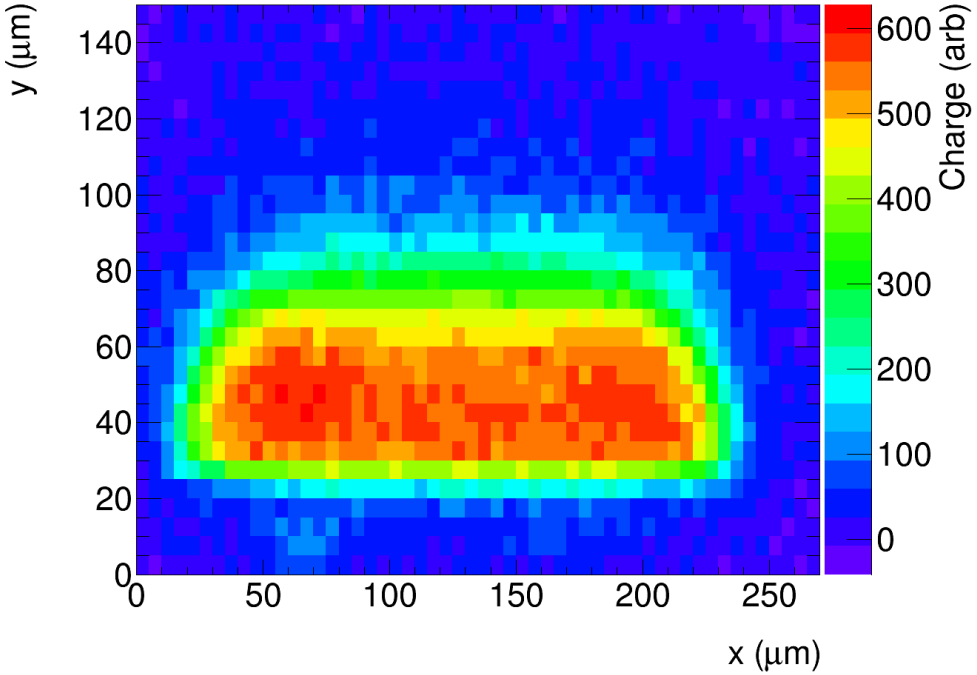
3 um p-n spacing



➔ no lower efficiency regions between pixels with smaller p-n spacing

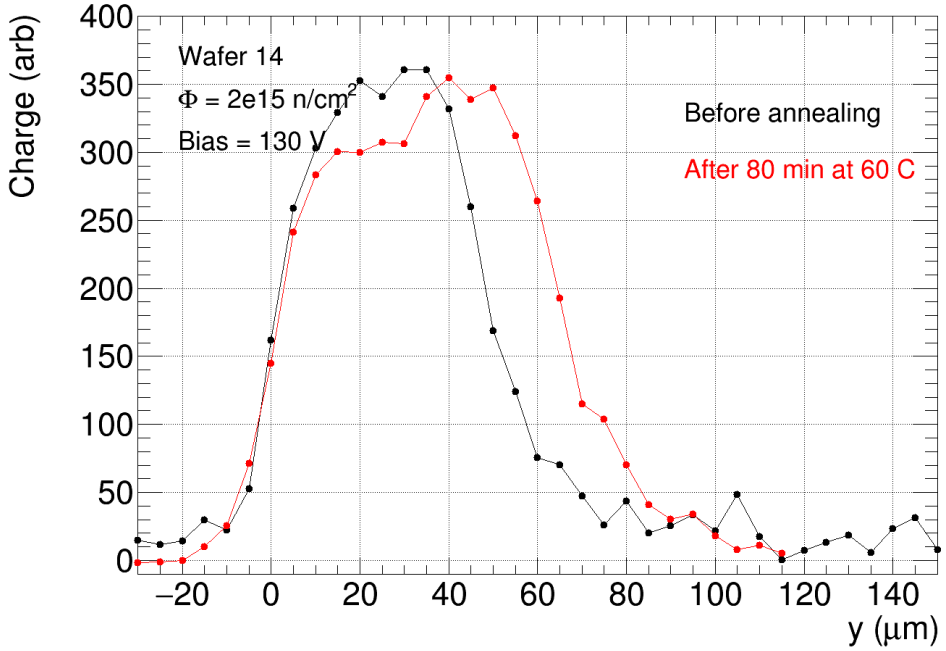
- Measurements with W14 (highest resistivity) irradiated to 2e15

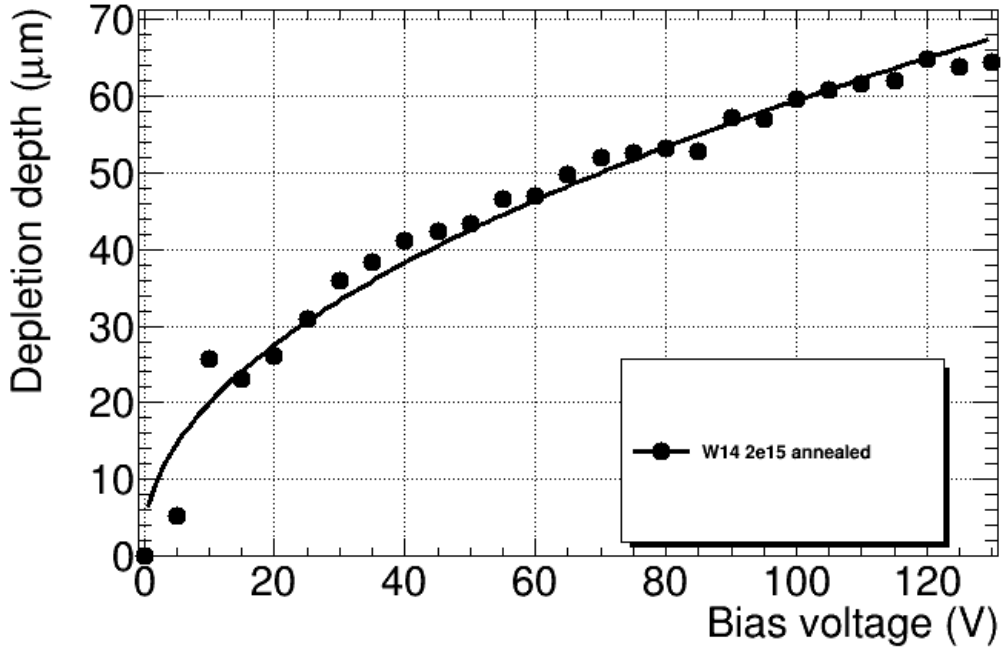




- depletion depth shrinks because of irradiation
  → but ~ 70 um depleted at 120 V after 2e15

- all pixels read out
  → no efficiency gaps between pixels





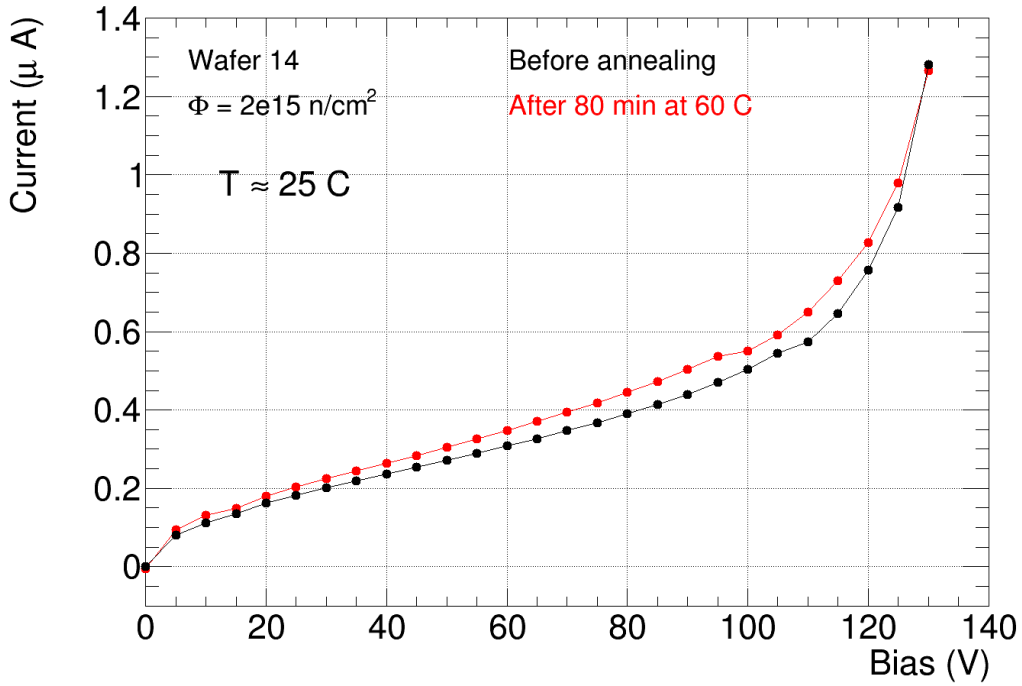
- effect of annealing can be clearly seen

N_{eff} = 4e13 cm^{-3}

$N_{eff} = g_c * \Phi \rightarrow g_c$ = 0.02 cm^{-1}

W14 irradiated to 2e15

Current from 9 pixels (measured on e-TCT setup)



$I = \alpha * \Phi * V$,
α = 4e-17 cm^{-1} (at 20 C)
Φ = 2e15 n/cm^2
V = (180 μm)**2 * 50 μm = 1.6e-6 cm^3

I = 130 μA

➔ measured current right order of magnitude but somewhat larger:
→ depleted volume larger
→ temperature 25 C

- similar breakdown voltage as before irradiation
- slight increase of current after annealing
  → related to the increase of depletion depth with annealing