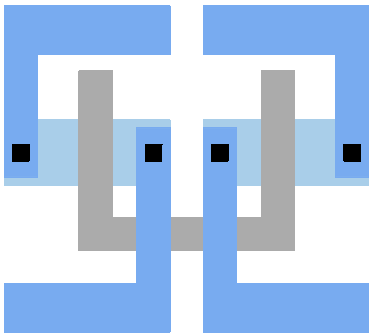
UNIVERSITÄT HEIDELBERG

Switcher4 Irradiation



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Belle II PXD/DEPFET Meeting

Prague

26.01.2010-27.01.2010

Setup

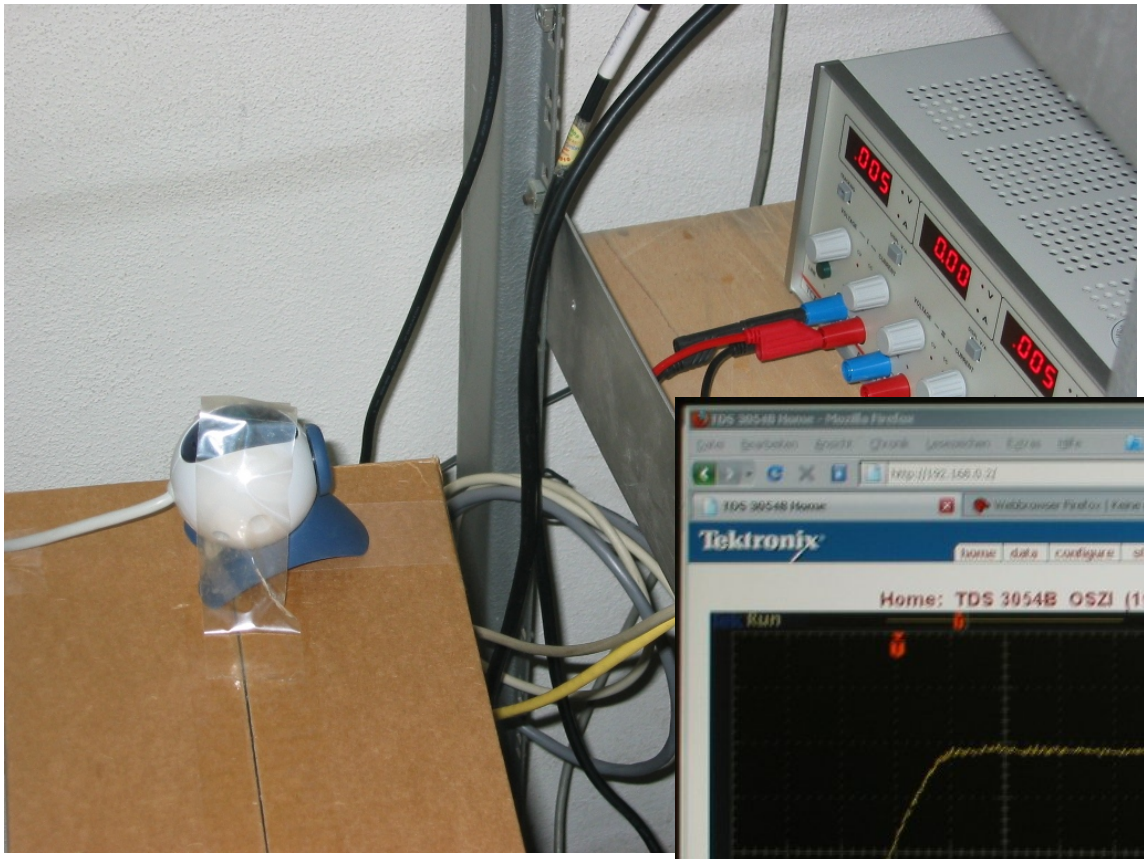
- Xray irradiation of Switcher4 testchip at Karlsruhe
  - Thanks to Karlsruhe for flexibility and support!
- Xray settings:
  - 60kV 33mA
  - Vanadium filter used
  - 175mm distance

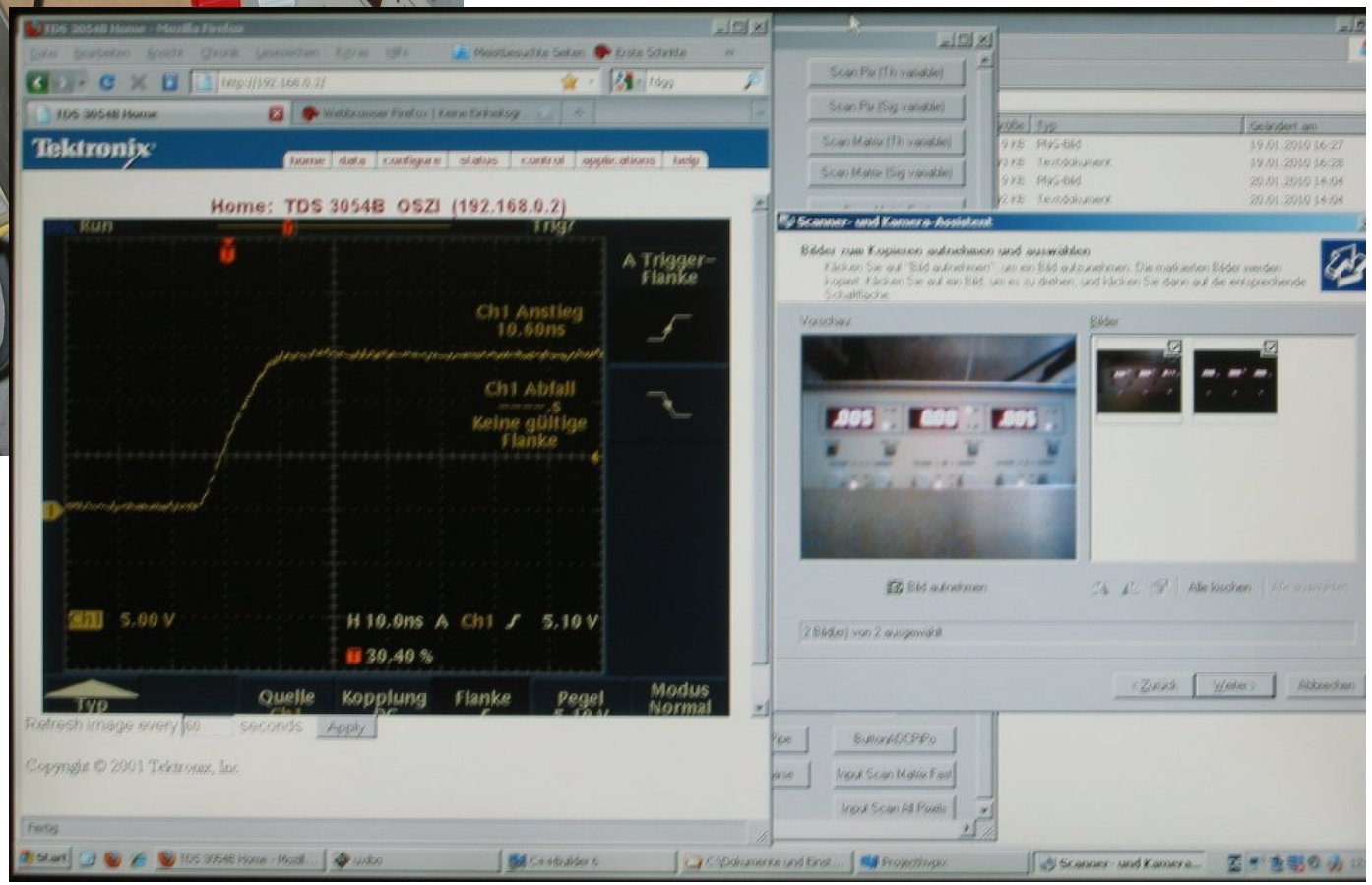
  → 527krad/h
- Duration: 72h → 36Mrad
- Chip was biased during irradiation

new: remote irradiation

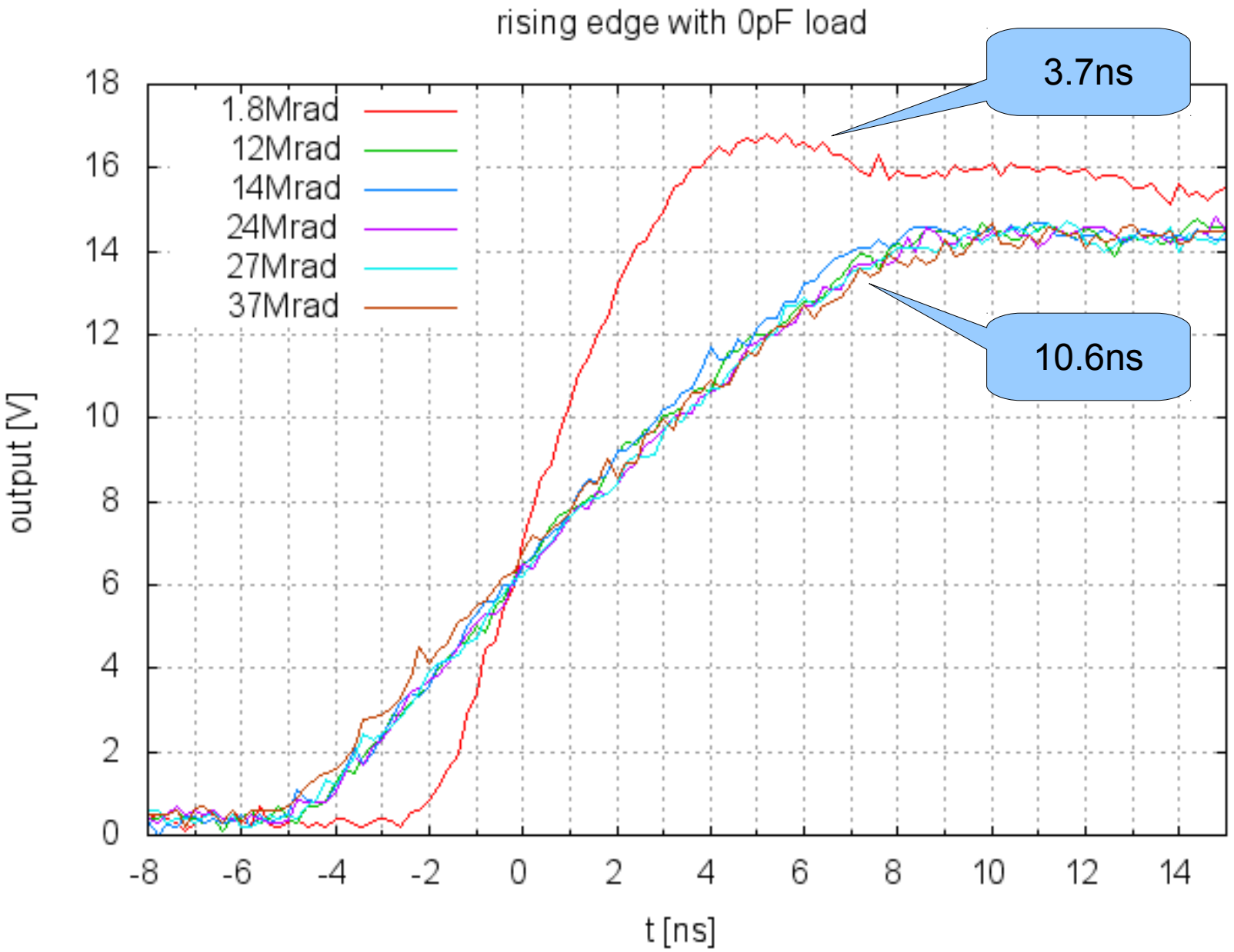
- Laptop at Karlsruhe
  - Switcher control software
  - Oscilloscope controlled via web
  - Webcam to monitor powersupply :-)
- connected to laptop at Karlsruhe from Mannheim
  - setup scope
  - Switch channel on and off
  - download data from scope
- improvements for next remote irradiation
  - use webcam to monitor Xray HV-generator
  - use GPIB powersupply instead of webcam :-)

remote irradiation setup

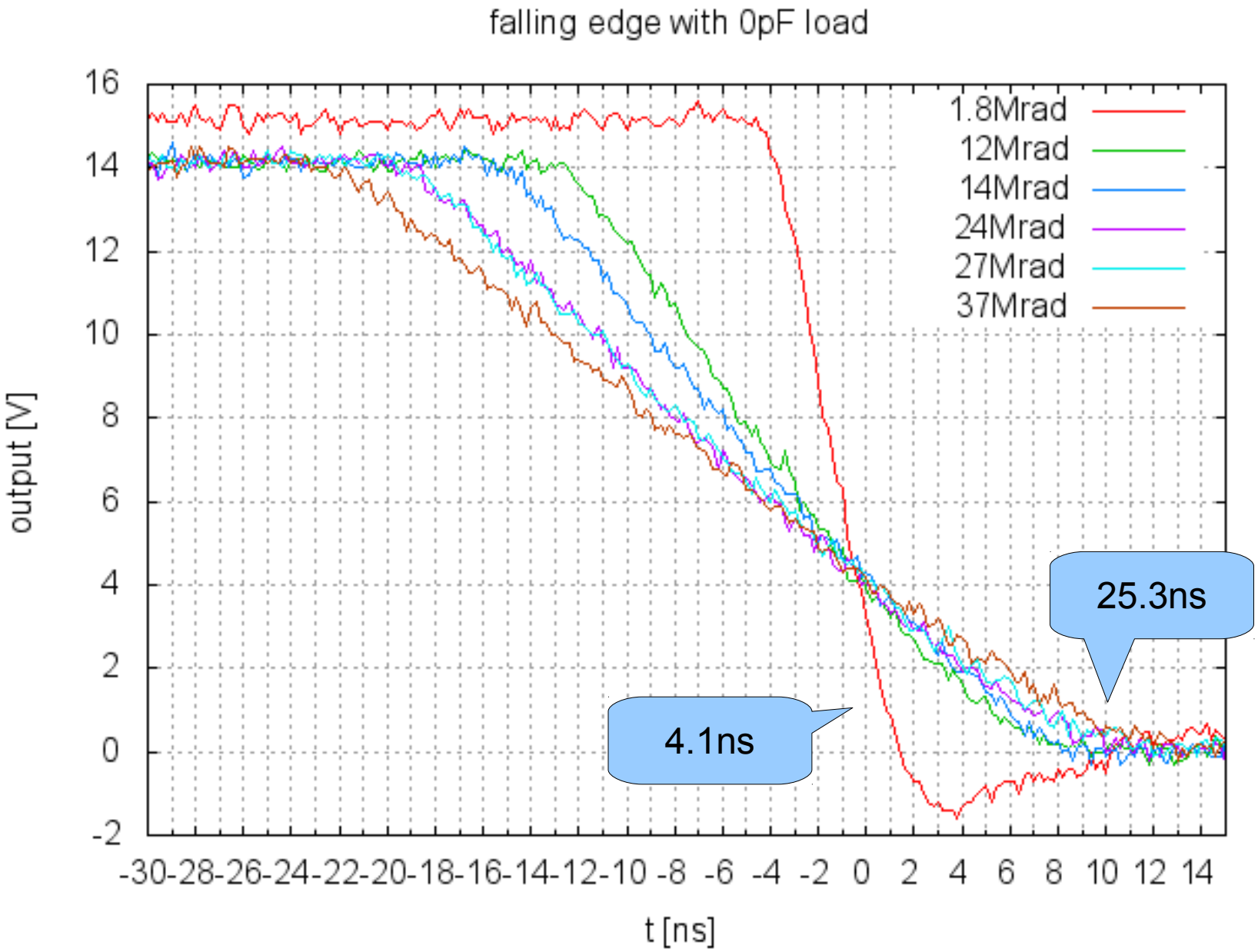




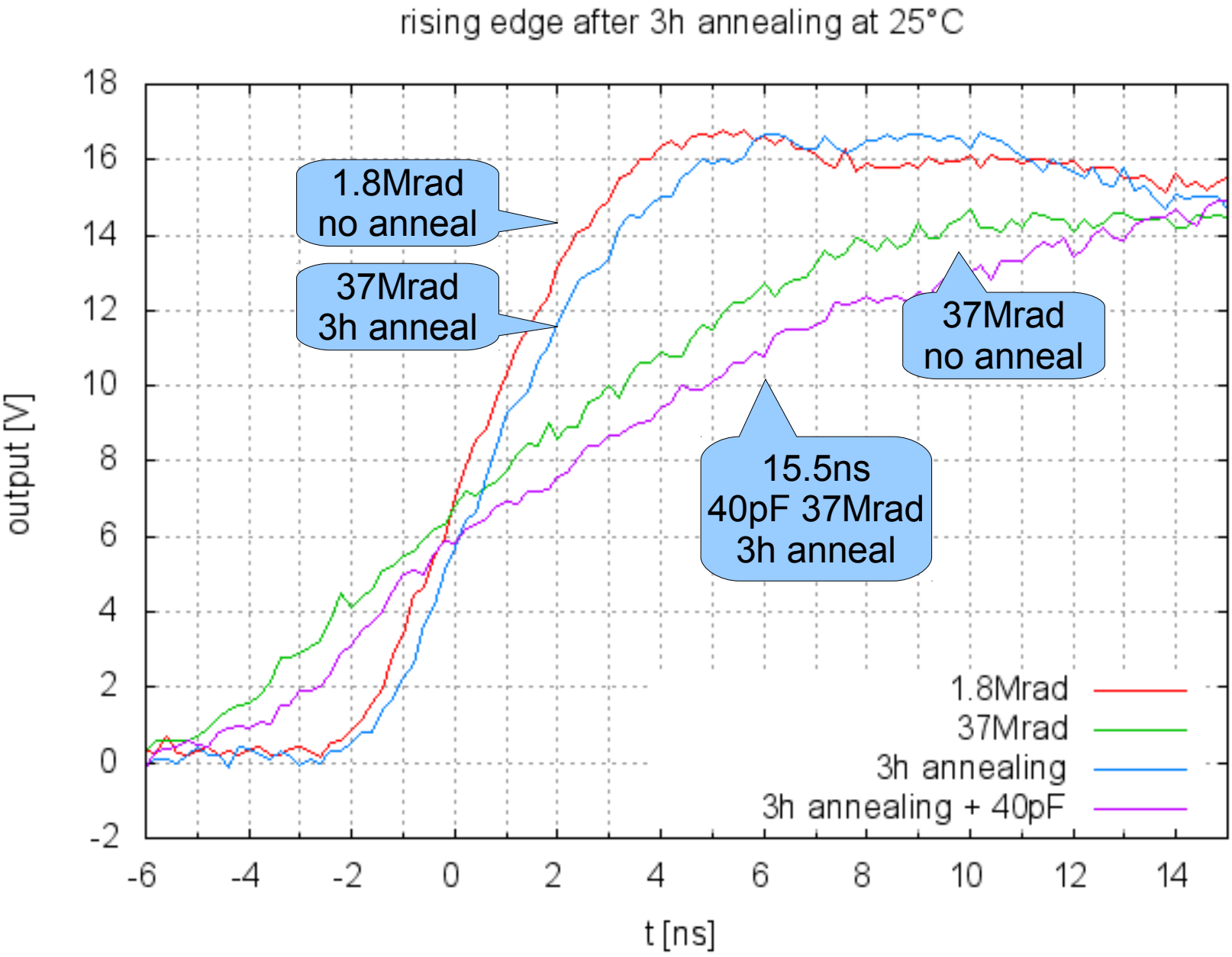
rising edge


rising edge with 0pF load
3.7ns
10.6ns
1.8Mrad
12Mrad
14Mrad
24Mrad
27Mrad
37Mrad
output [V]
t [ns]
0
2
4
6
8
10
12
14
16
18
-8
-6
-4
-2
0
2
4
6
8
10
12
14

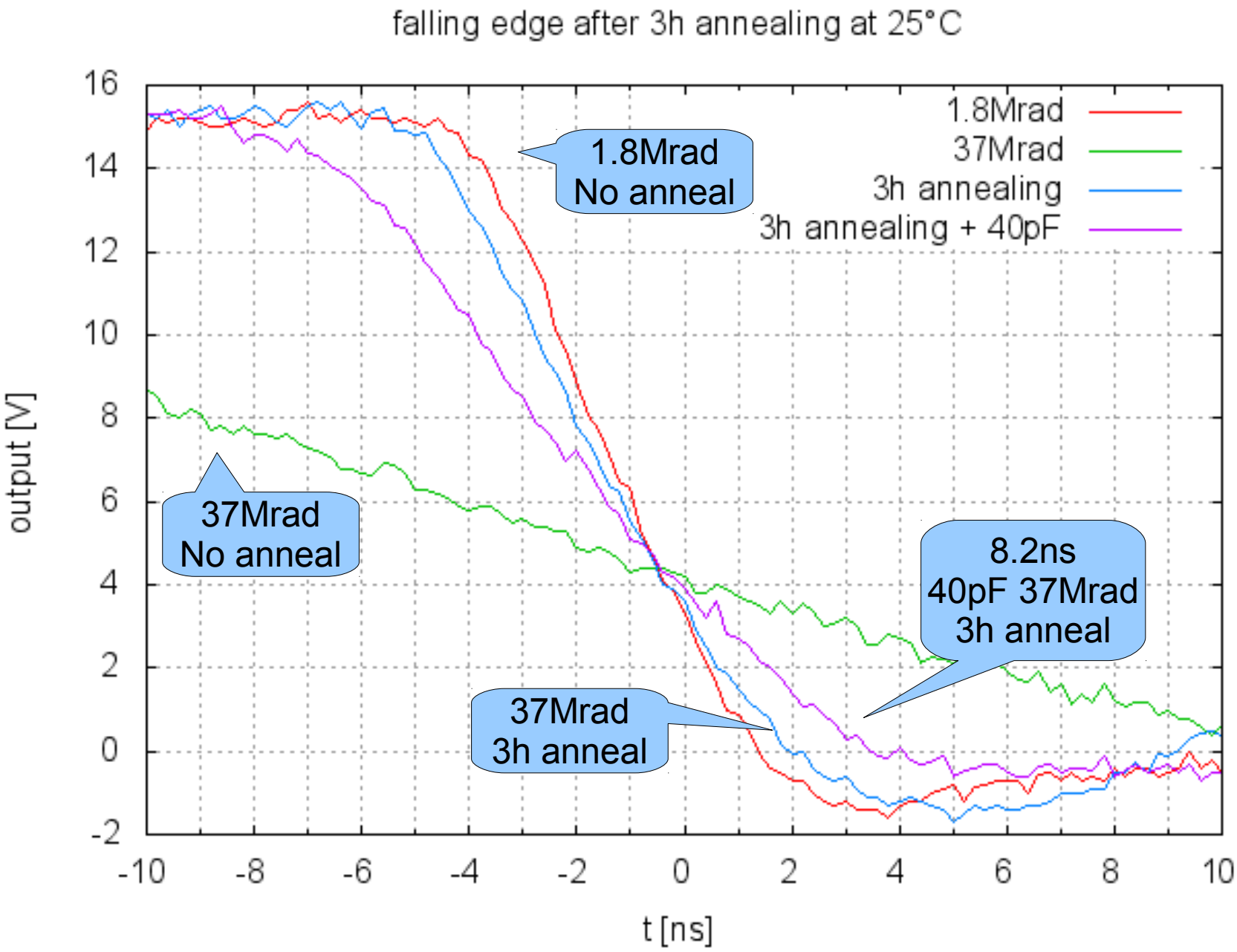
falling edge



Annealing effect - rising edge



annealing effect - falling edge



conclusion

- irradiation finished on friday
  - not all effects understood yet
- Chip is working after 37Mrad
- Supply current
  - increases from 10mA to 20mA within first 1Mrad
  - decreases down to 5mA
  - back to 10mA after annealing
- falling edge @ 40pF 37Mrad 3h annealing: 8.2ns
- rising edge @ 40pF 37Mrad 3h annealing: 15.5ns

Thank You!