



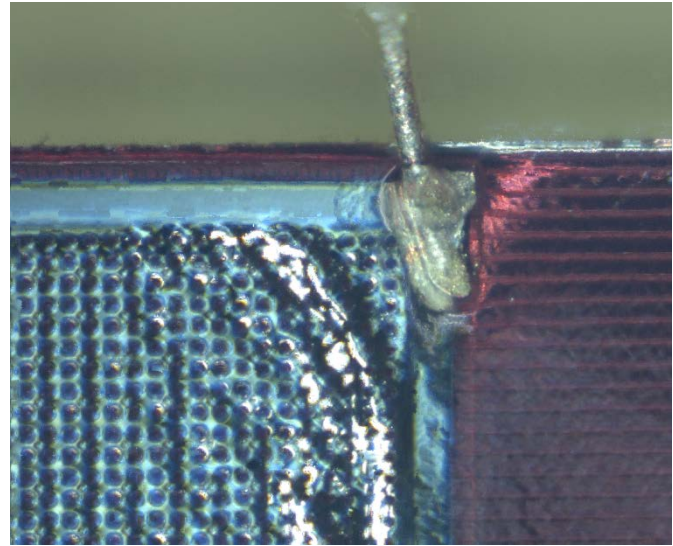
Micro dispensing/ SixNy resistivity

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Nikhef/Bonn LepCol meeting
February 27, 2017

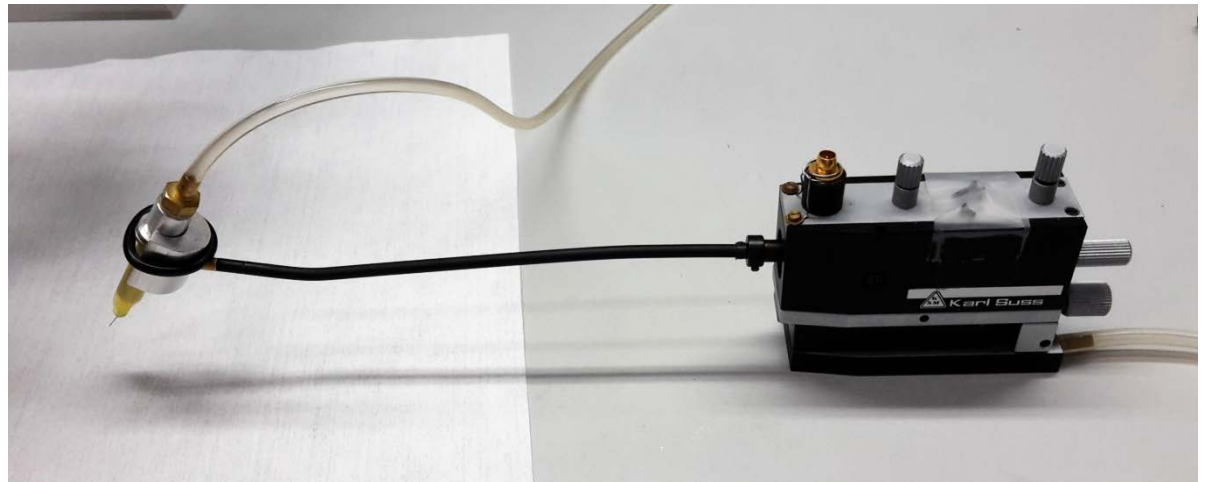
Micro dispensing

- Grid voltage connection
 - Conductive glue
- Problems
 - $< 200 \mu\text{m}$ dyke width
 - Glue into hole gives fatal shortcut
- Using $202 \mu\text{m}$ OD dispensing needle
 - $100 \mu\text{m}$ ID
- Probe for micro manipulation



System operates!

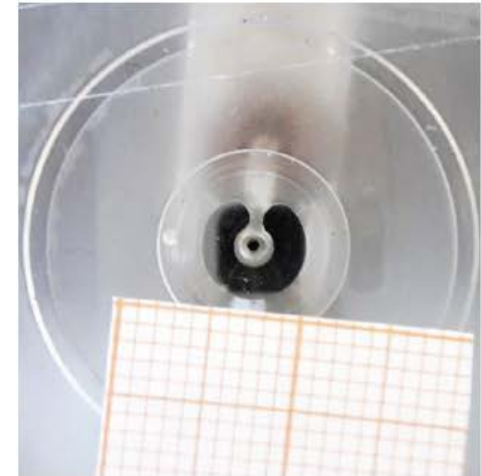
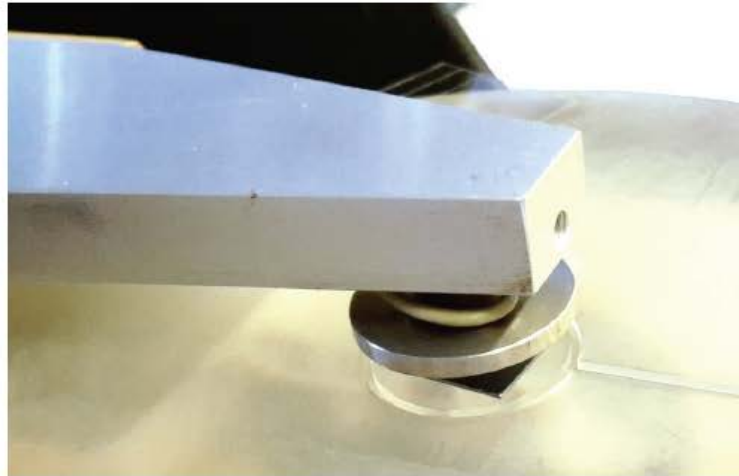
Using Traduct silver
glue
Sufficient flow through
needle at 2 bar



Resistivity measurement



- Front contact by liquid mercury
- Back contact with stainless steel cylinder
- Vacuum pump pushes the mercury against the sample
- Kidney shaped contact area of about 19 mm^2



Kindly offered by J. Schmitz, MESA+, TU Twente

Resistance protection layer

- For practical reasons plotted in Ω/mm^2

- Using 4 μm layer thickness

- TPX1 has **~10 x** higher resistivity than dummy
- Dummy has 100% pad size

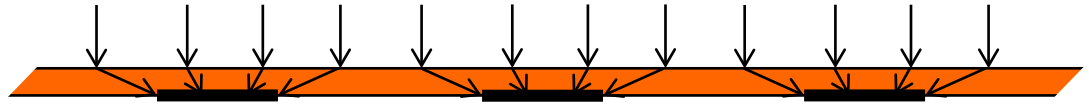
- Comparing at TPX1 4 μm vs 8 μm

- Factor 2 difference in slope expected using these plot scales

- But less than factor 2 slope difference observed

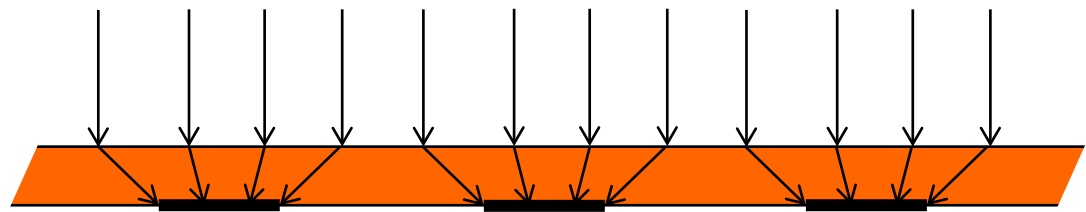
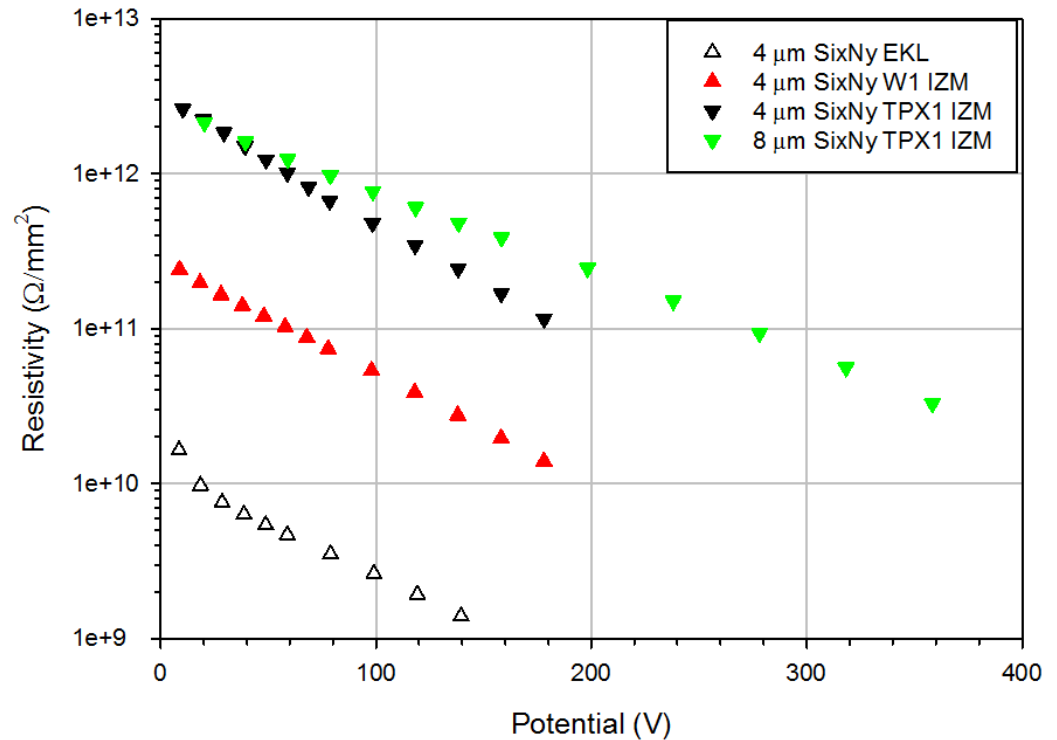
- => geometrical effect

- For small potentials (< 100 V) 4 and 8 μm have ~same resistivity



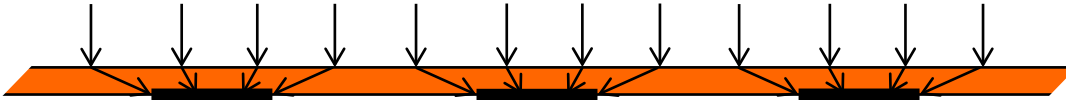
Resistivity per mm^2 of protection layers vs the applied potential

Measured with Hg probe
negative potential on layer surface
measured on August 15, 2016 and Feb 7-17, 2017
Fred Hartjes, Nikhef



Fred Hartjes

Comparing 4 μm SixNy at TPX3 to TPX1



Resistivity per mm^2 of protection layers vs the applied potential

All layers 4 μm SixNy
Measured with Hg probe
negative potential on layer surface
measured on Feb 7-21, 2017
Fred Hartjes, Nikhef

■ TPX3 still smaller pads than TPX1

■ Resistivity TPX3 still **$\sim 4 \times$** higher than for TPX1

■ **$40 \times$** compared to dummy

■ **\Rightarrow it would be wise to increase the pad size of TPX3 during post processing**

