HR loading in LECCE

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AUW
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Loading Gantry

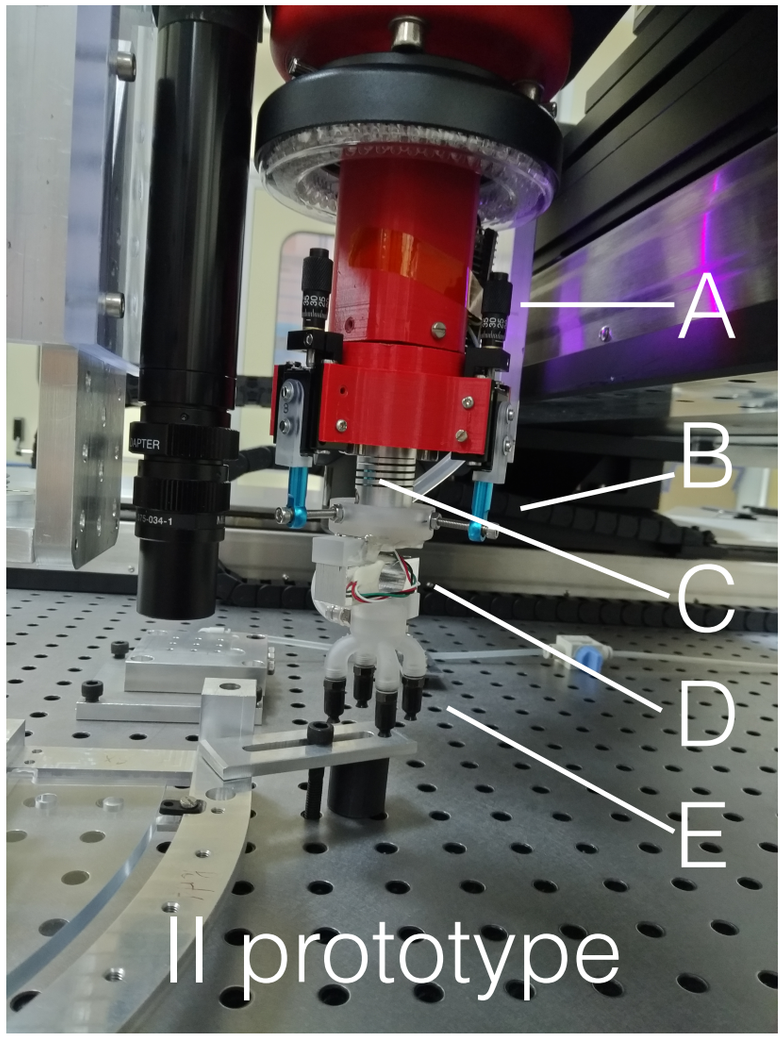
- Loading in Lecce based on Genova ideas and past experience:
  Pick&Place head with integrated force gauge reading

- LE=GE
  - **gantry** (xyztheta stages from PI on breadboard with M6 holes)
  - **z-profilometer** (STIL Optical pen)
  - **usb-microscope**

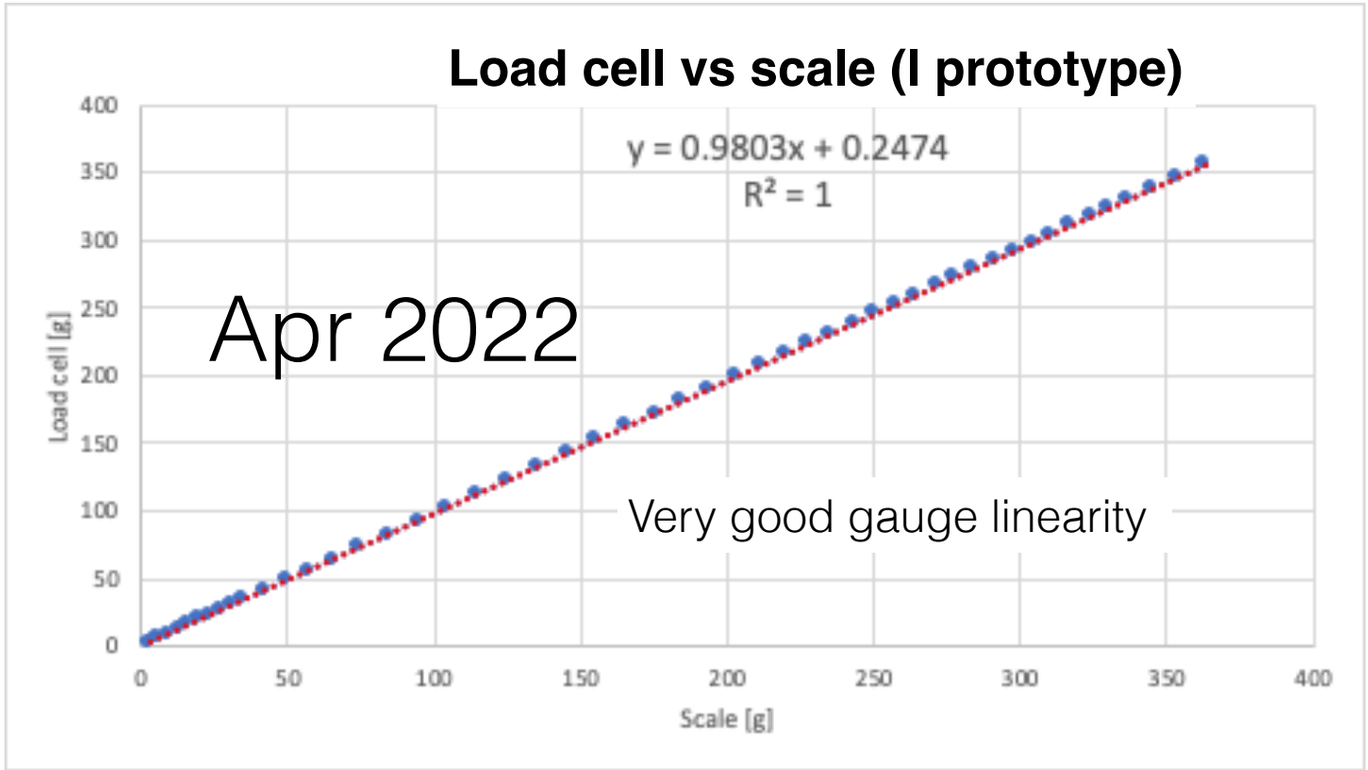
- LE≠GE
  - Z-profilometer larger and on y-stage (not z-stage)
  - Microscope on z-stage (not theta-stage) and magnification x 5? more
  - Not-camera-supervised loading
  - Volumetric glue dispenser (happy with it)
  - Software: Native + Labview vi's (from RAL)
  - Pick-up head with planarity adjustment (next slide)

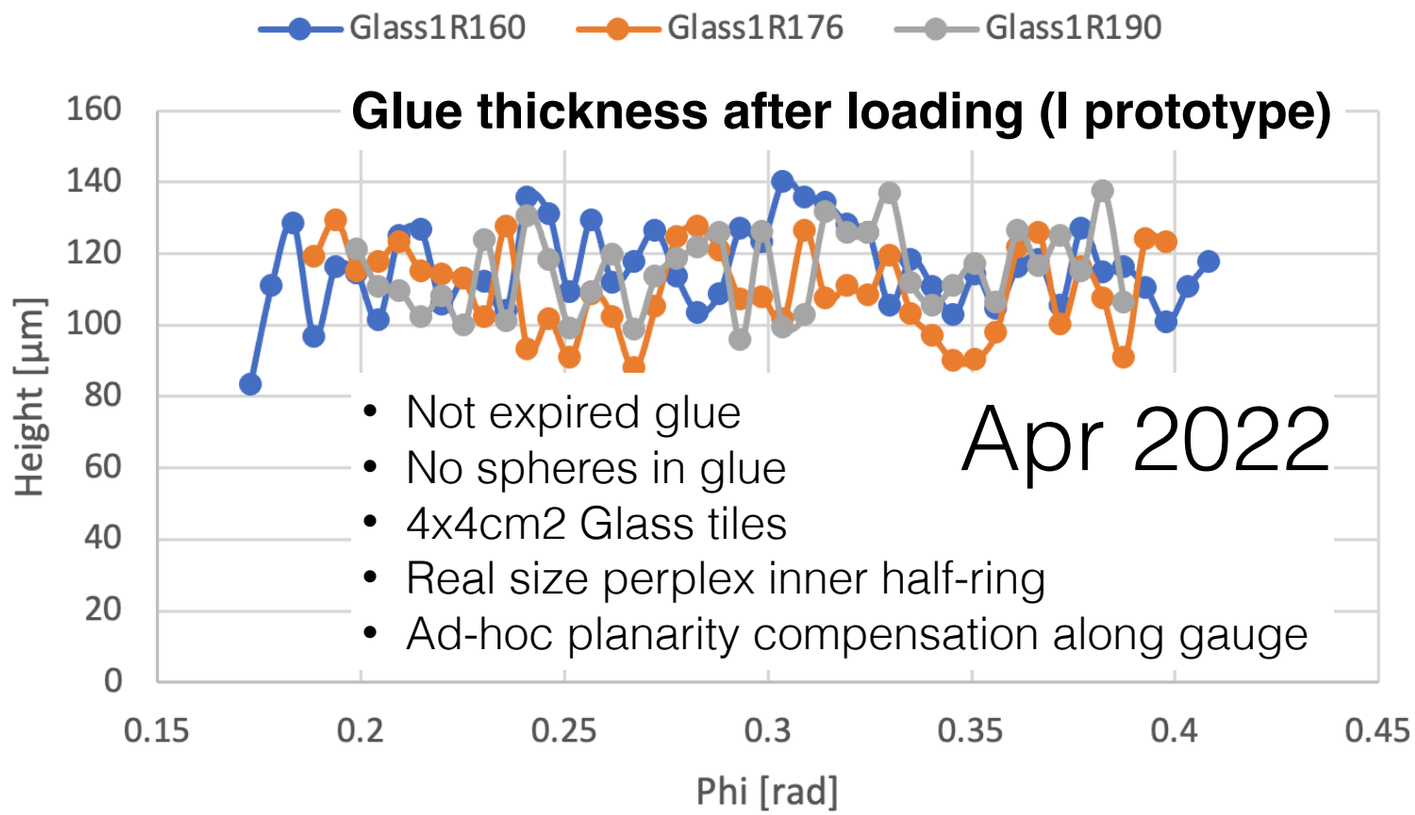
+parking tool
+HR bracket

Pick-And-Place head



A. 3 micro z-translation stages
B. Rod end bearings
C. Aluminum flexible coupler
D. Strain gauge readout by ESP32(wifi and usb)
E. Suction caps

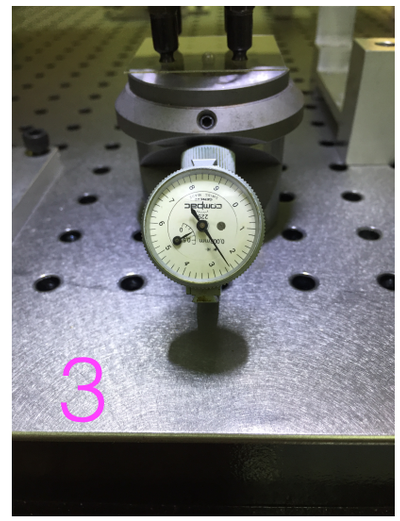


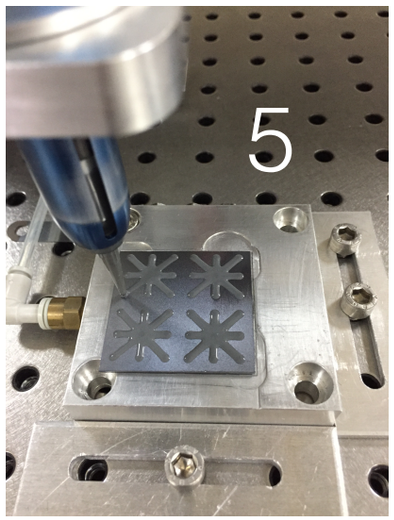


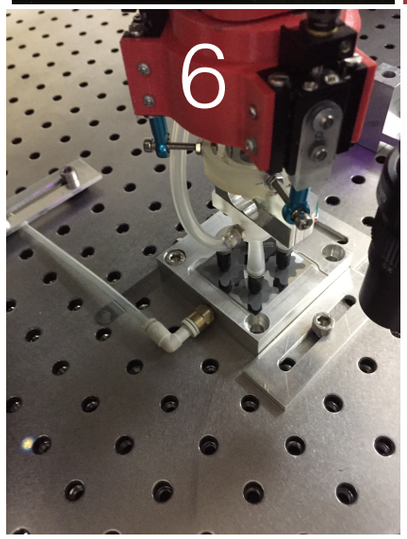
Loading glass on silicon (1)

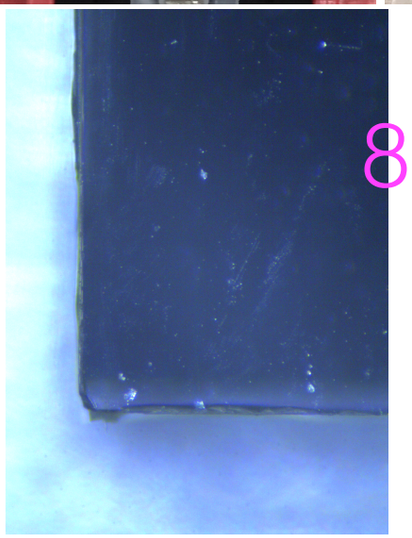
- Aug 2022: II prototype Pick-and-Place head ready.
- Sep 2022: L. Longo mounted, adjusted and calibrated the head on gantry.
- Oct 2022: L. Longo tuned the Pick-and-Place procedure with glass (instead of module) on silicon placed on parking tool (instead of HR)

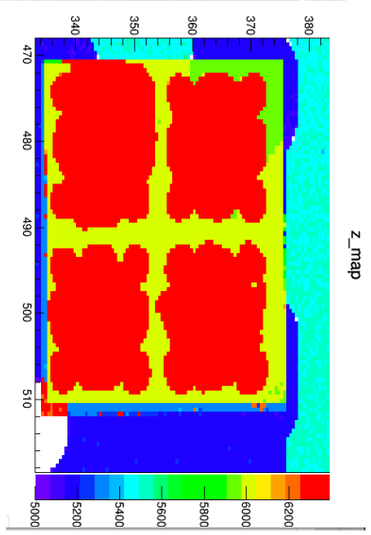
Phase 1: glass metrology
Phase 2: glass pick-up
Phase 3: glass planarity
Phase 3: silicon metrology
Phase 4: run python script to adjust the 3 micrometers
Phase 5: deposit glue on silicon
Phase 6: place glass on silicon
Phase 7: glue curing
Phase 8: metrology after loading











Loading glass on silicon (2)

- Aug 2022: II prototype Pick-and-Place head ready.
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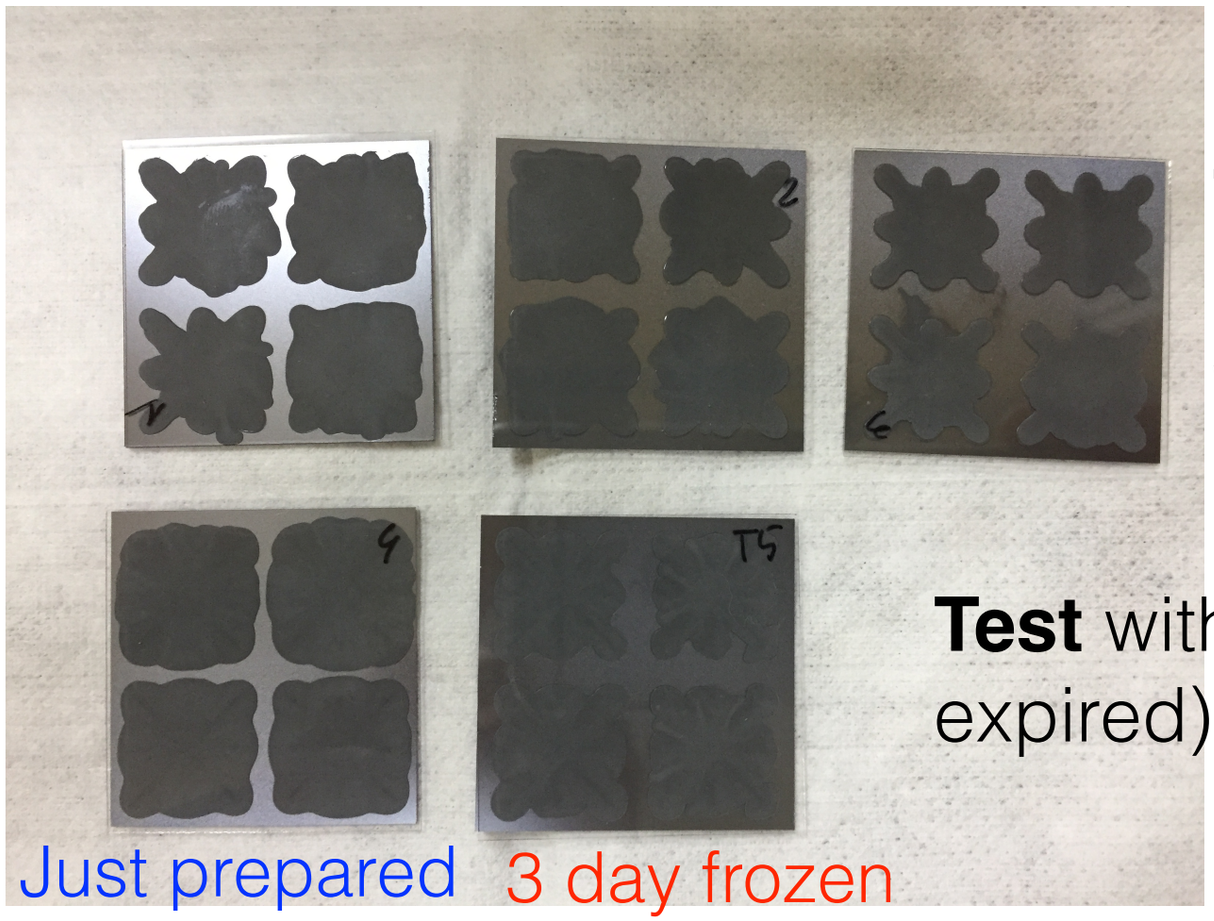


Just prepared syringe with glue

3 day frozen syringe with glue at -32 C (should be -55 C)

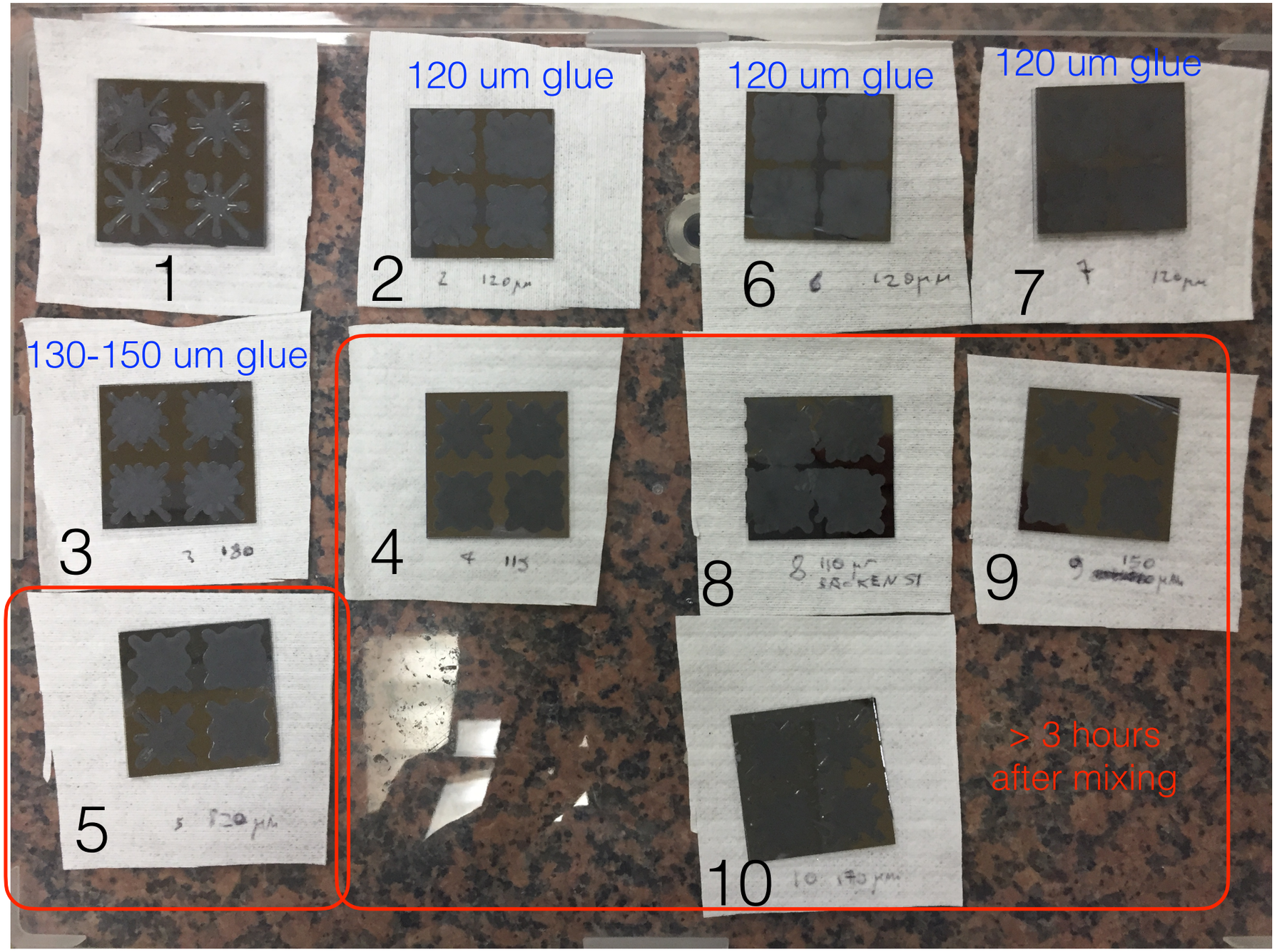
Tuning with glue (6 months expired) without spheres

Test with (6 months expired) with spheres

NB: We can reproduce the blu tagged samples

Loading glass on silicon (3)

- Nov 2022: L. Longo (in leaving from LE) trained G. Chiodini and R. Coluccia



>6 months exp.
Glue with spheres (but 3)

1: glue 5 days old
2: fresh glue
3: fresh glue no spheres
4-5:glue 7 days old
6-7-8-9-10:glue 2 days old

NB: We can reproduce the blu tagged samples

Conclusions glue prepared fresh o stored few days up to -32 C (should be -55 C) shows good coverage and thickness (110-125 um).

Loading glass on silicon (4)

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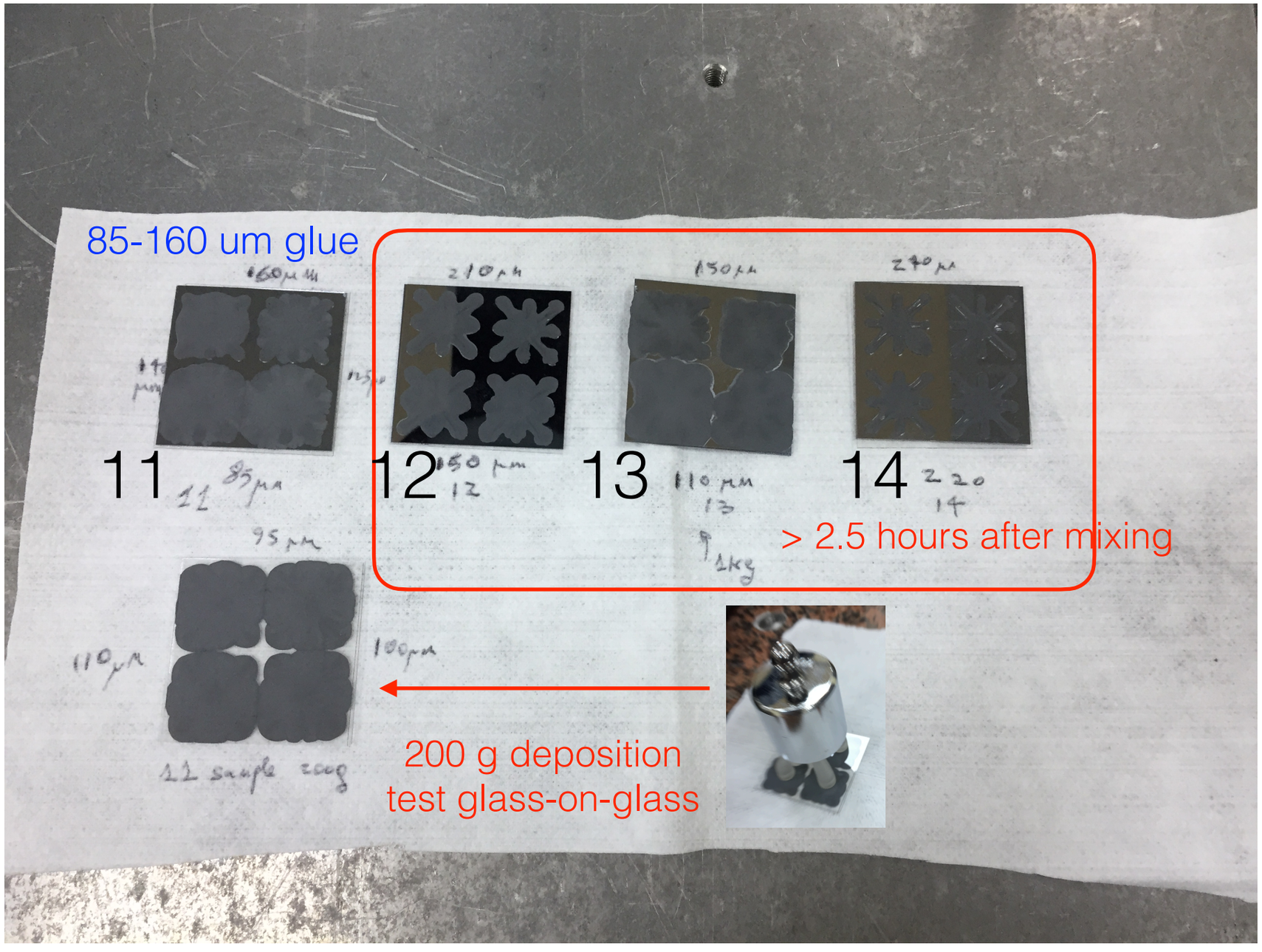


>6 months exp. Glue without spheres 2 days old kept at -32 C

1-2: Planarity adjustment but no gauge offset correction
2-3-4: No planarity adjustment

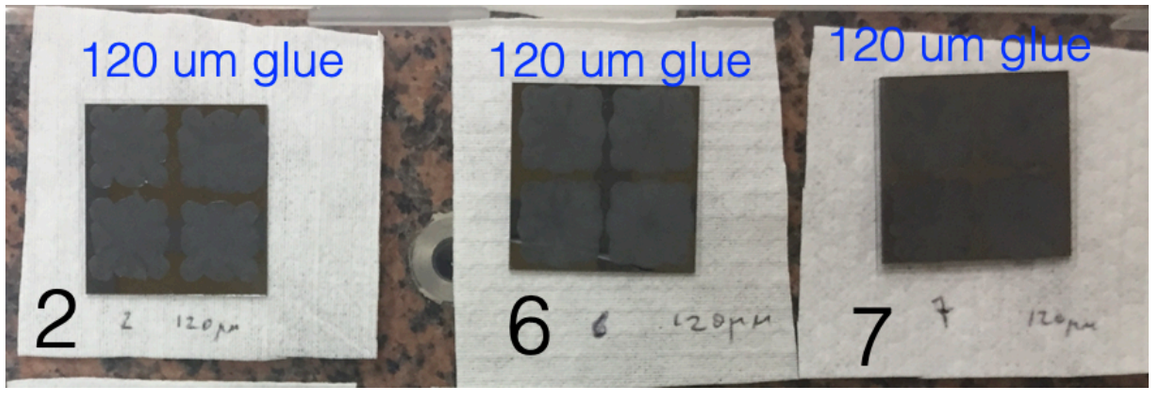
NB: We can reproduce the blu tagged samples

Without spheres in the glue the planarity adjustment and the gauge offset correction is necessary. Likely, this is true also for fresh and not expired glue.

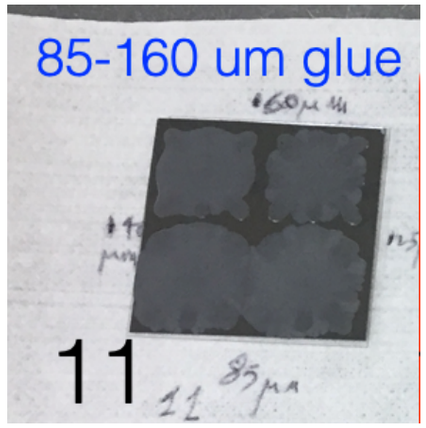
Conclusions and next

Conclusions

- We can pick-up and place modules with wanted planarity's and load it a given weight.
- Pick-and-place head with planarity compensation gives wanted and reproducible results
- Work-flow established and training has been successful
- Glue thickness with spheres is uniform, without sphere there is a systematic tilt that can be corrected (done for prototype I)



Glue with spheres



Glue with spheres and no planarity compensation along gauge

Next

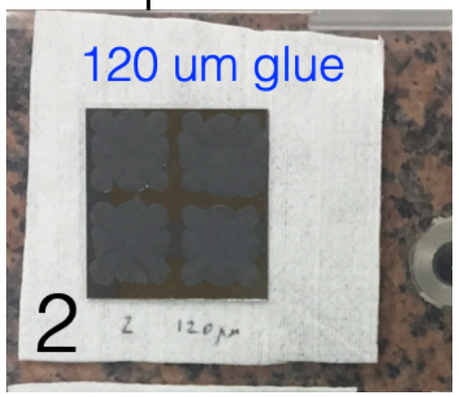
- Load silicon tiles on perspex inner half ring has benchmark performance
- Glue a digital-quad and two RD43a module in a old stile outer half ring

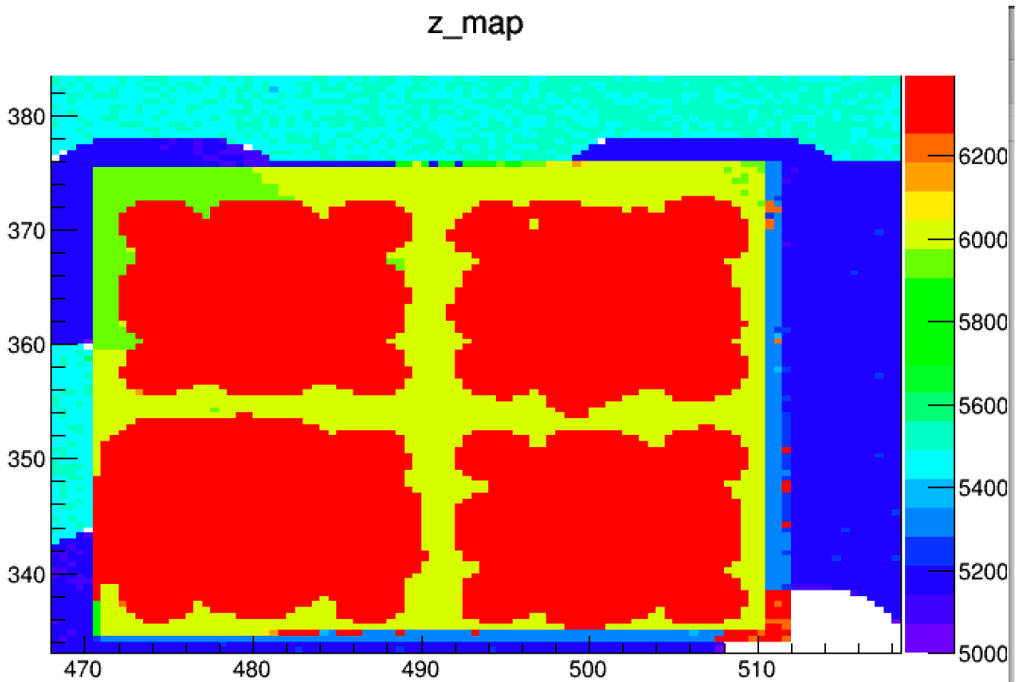
What missing

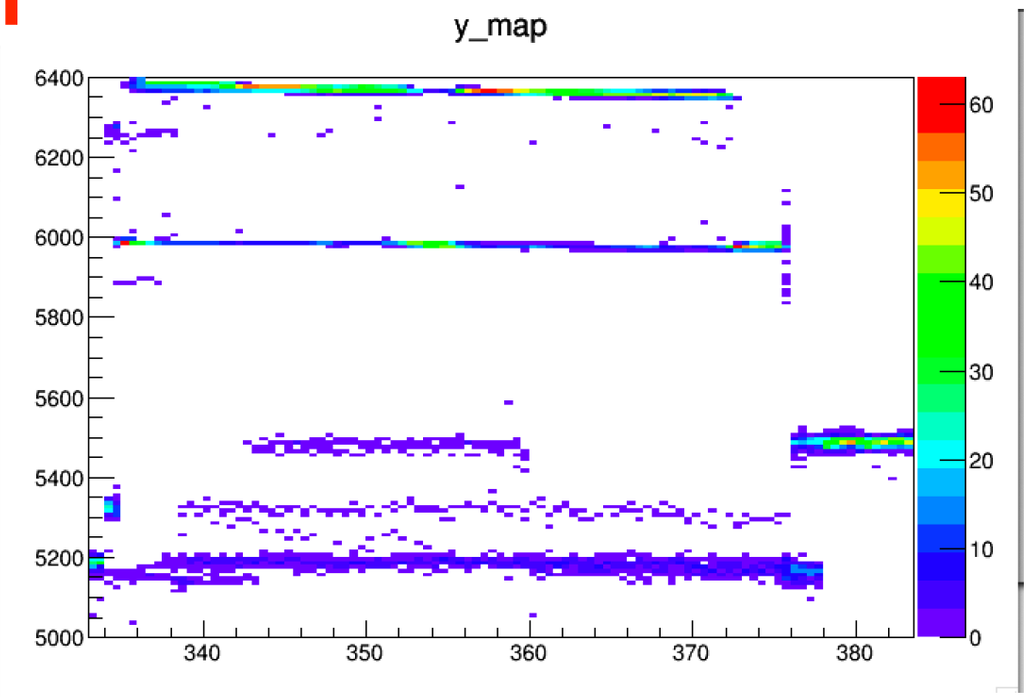
- Software cable to handle full and real half ring geometry but use of native code must be eliminated (dangerous for new operators) in favour of full tabview.
- Calibrate the Gantry along the xy plane in the working area with Machine Calibration Plate - 60.96 cm x 71.12 cm

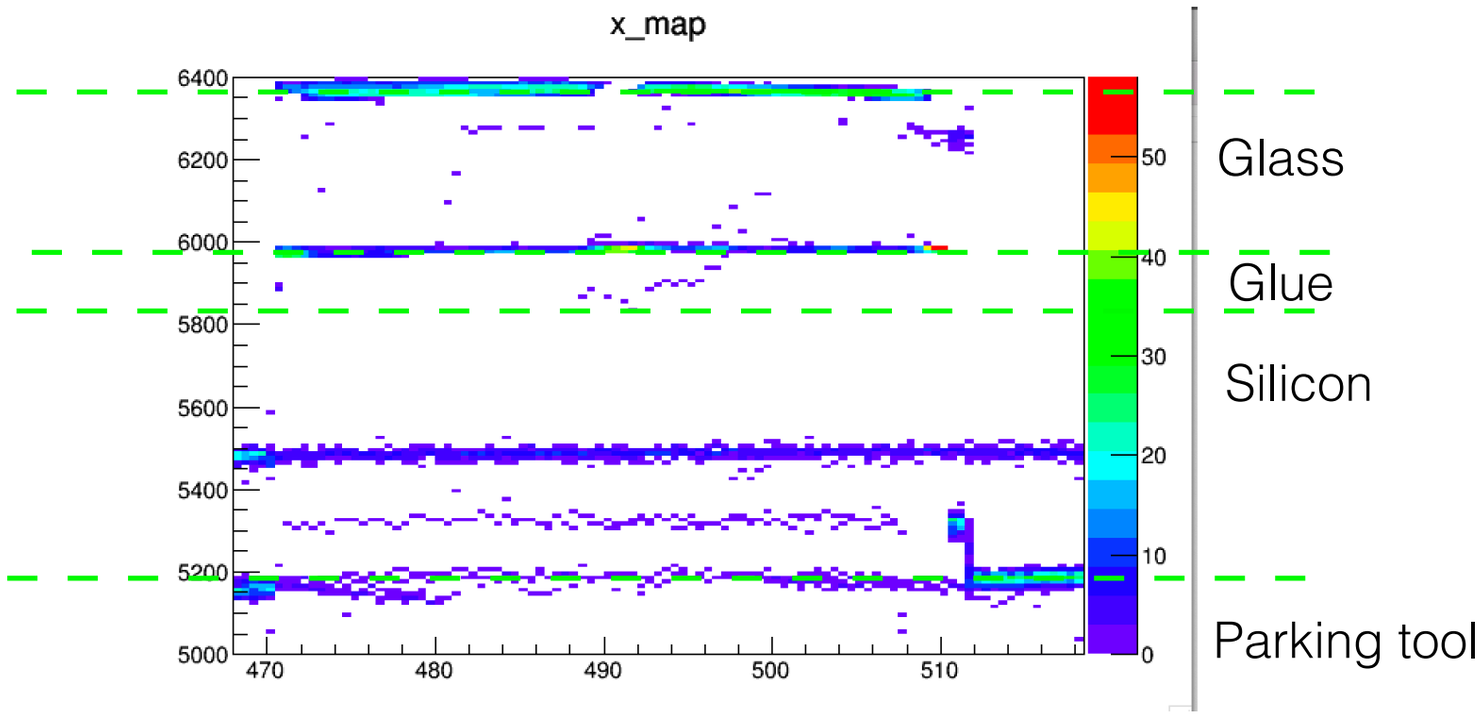
Back-up

Glue with spheres

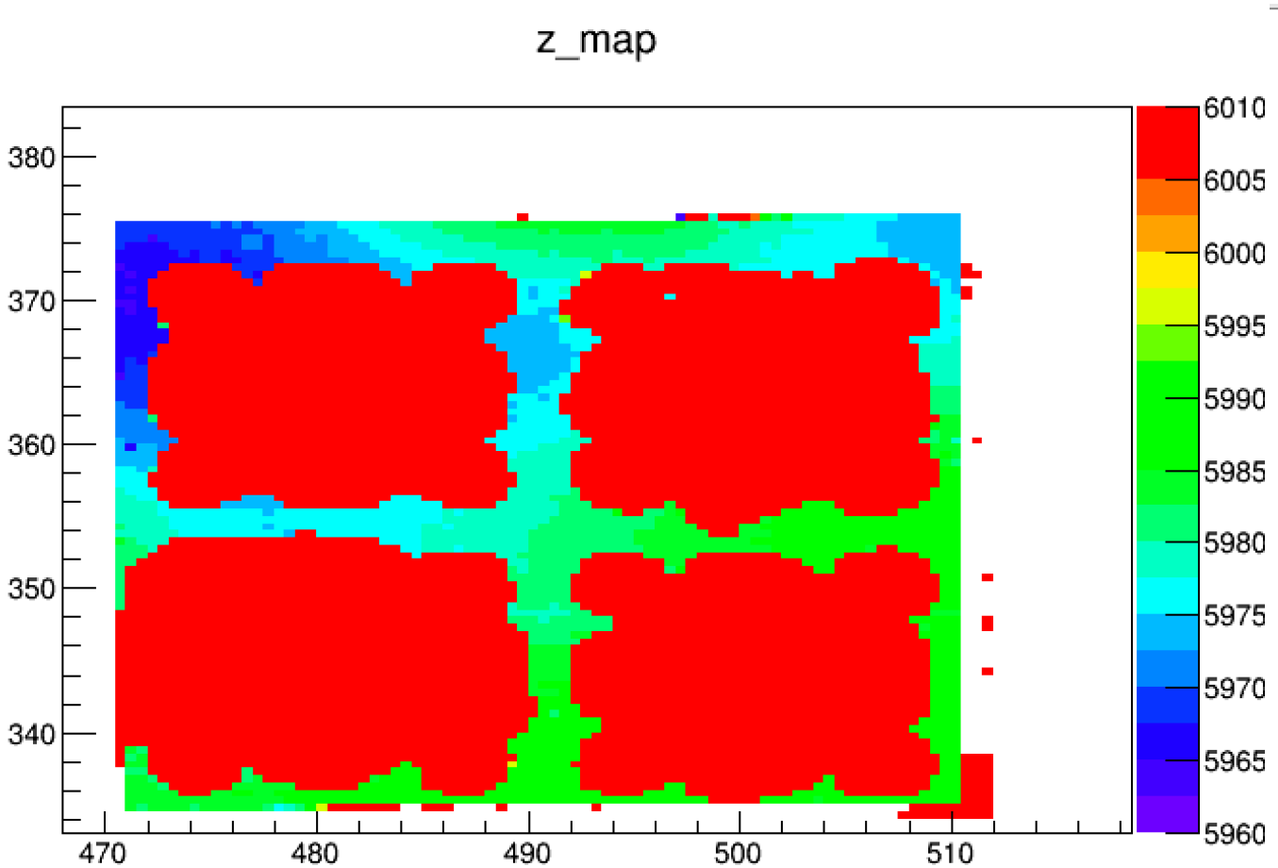




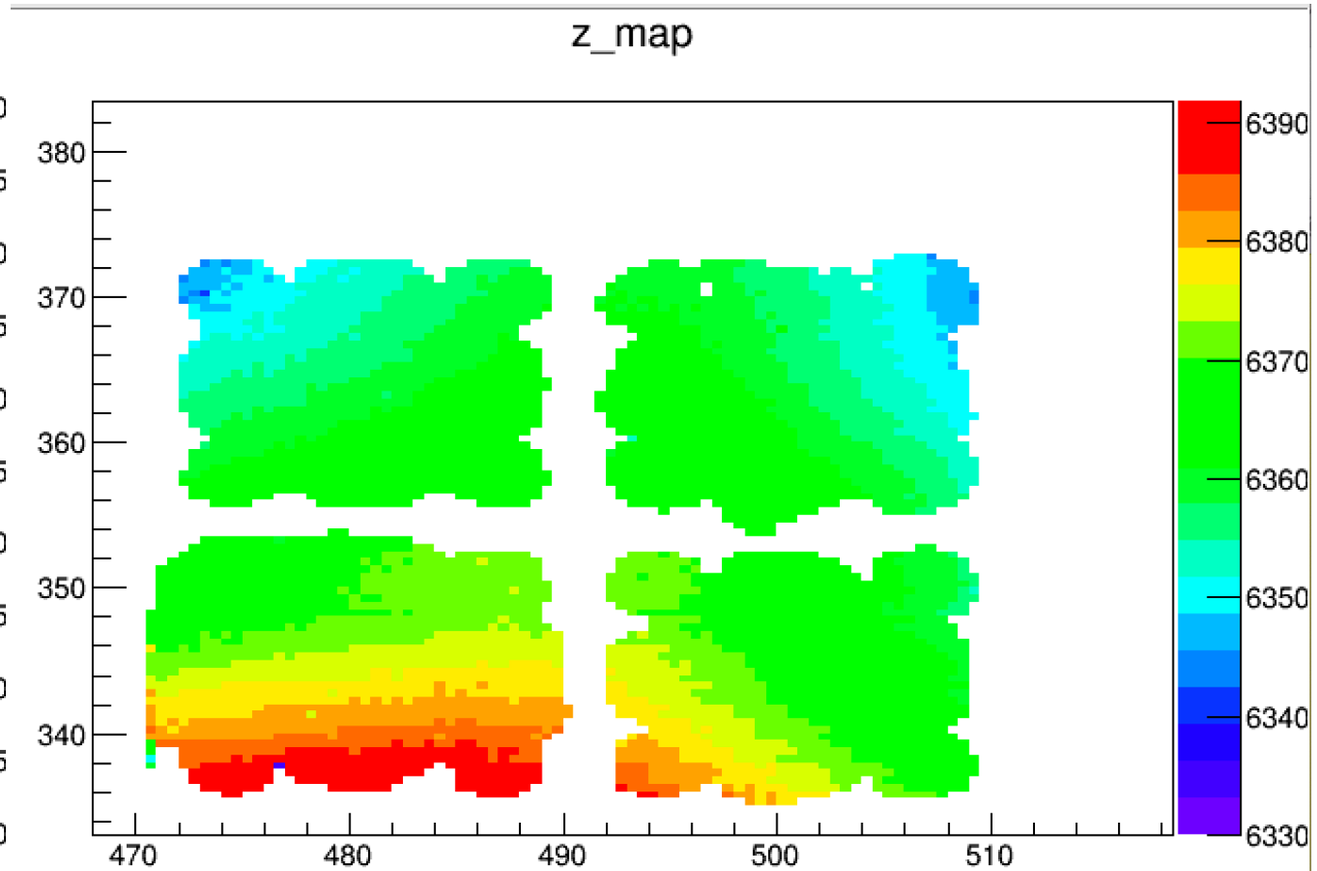




Back-up



Bottom Glass Surface



Top Glass Surface