



ITS3 activities in Bari



Super-ALPIDE mockup assembly

➔ Next assembly V3

- Material

- FPCs → **AVAILABLE**
- Dummy-Super-ALPIDE → **AVAILABLE**
- Exoskeleton (Accura25) (x2) → **AVAILABLE**
- Support structures (Accura25) (x2) → **AVAILABLE**

- Schedule

- **Week16**

1. exoskeleton and support structures metrology → **DONE**
2. dummy-super-ALPIDE positioning on mandrel (following alignment/bending procedure) → **DONE**

- **Week 17**

3. edge-FPC wire-bonding → **DONE**
 - (i) bonding encapsulation (Sylgard) → **Today**
4. support structures gluing → **Today** (start)
5. exo-FPC gluing
6. metrology

- **Week 18:**

7. exoskeleton gluing on support structures
8. wire-bonding

➔ Available material for mockup assembly

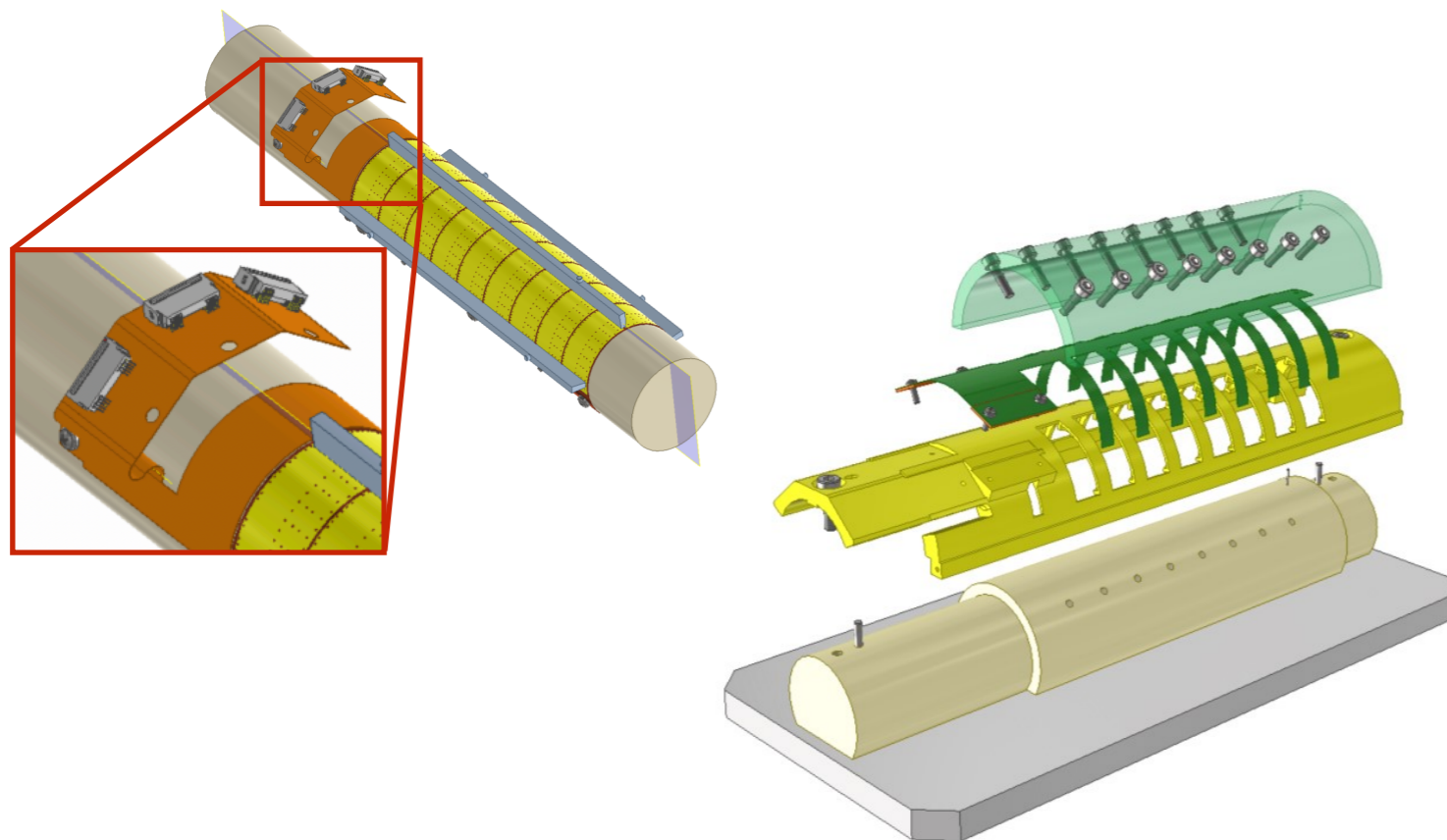
- **edge-FPC = 4** (of which: 1 for V3, 1 for Strasbourg)
 - Connectors present, decoupling missing
 - Electrical characterisation to be arranged (to be discussed with G. De Robertis) → before next production
- **exo-FPC = 5** (of which: 1 for V3, 1 for Strasbourg, 1 for CERN)
 - Connectors present, decoupling missing
 - Electrical characterisation to be arranged (agreed with Alperen) → before next production
- **Dummy-Super-ALPIDE = 4** (of which: 1 for V3, 1 for Strasbourg (1 already provided))
- Exoskeleton = 2 (of which: 1 for V3)
- Support structures = 2 sets (of which: 1 for V3)

➔ Needed material for working assembly

- New production of edge-FPC and exo-FPC
- **Support structures in carbon foam** → **To be discussed with Massimo and CERN colleagues**
 - Material procurement
 - Shaping
- Exoskeleton
- Super-ALPIDE chips

➔ **(Going to start) study for usage of release agent**

- in combination with Sylgard for bonding encapsulation (at the edge-FPC)
- for exo-FPC gluing over exoskeleton to reduce



Setup: two single ALPIDE FPCs bent around a cylinder and placed one in front of the other.

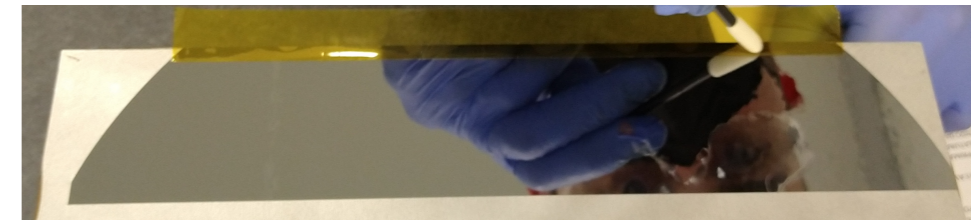
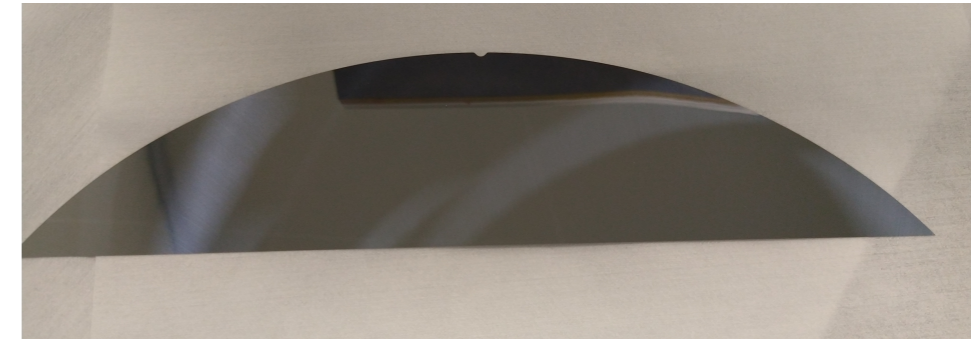




Silicon piece bending

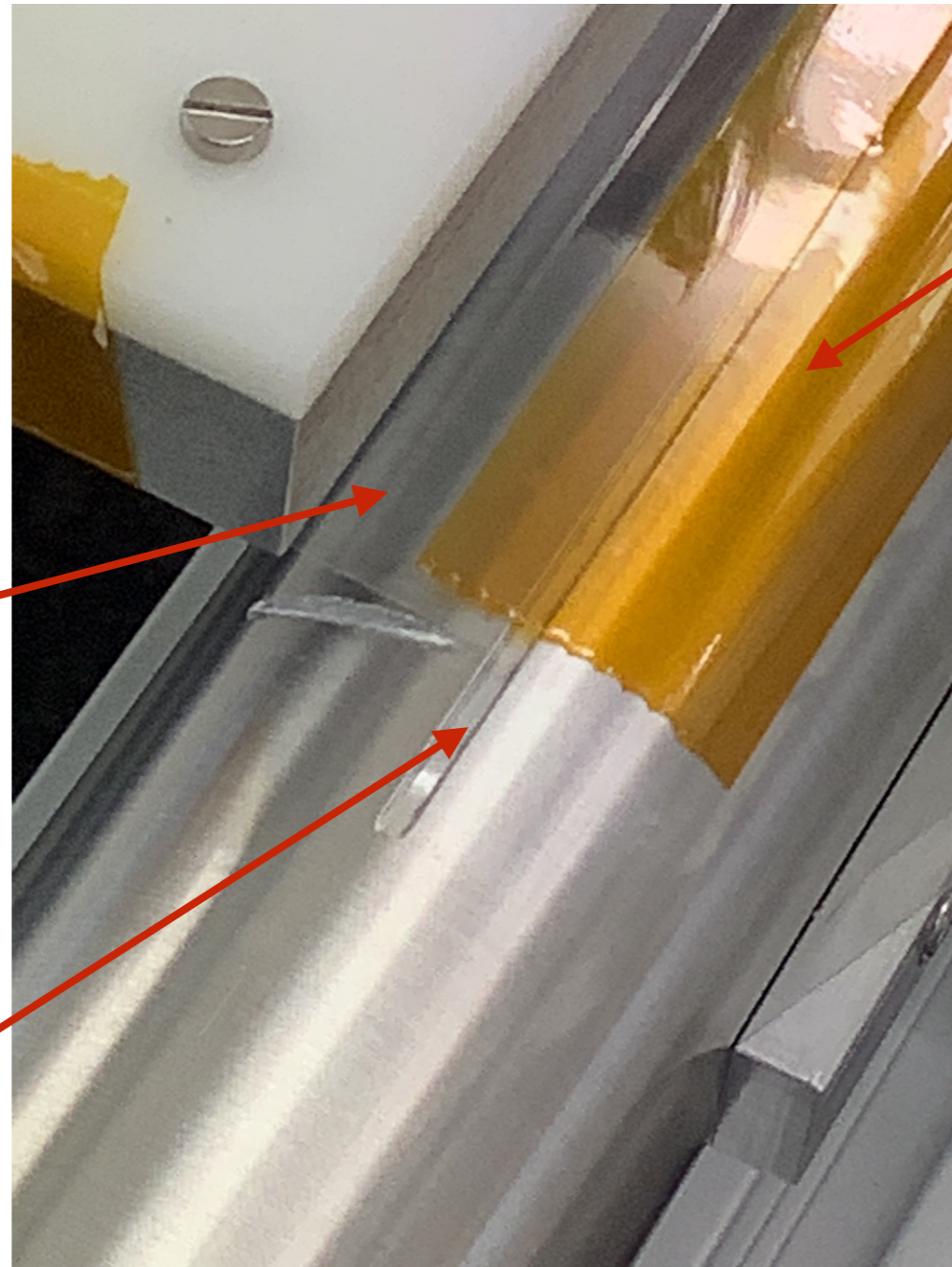
Summary of bending attempts

1. “Moon-piece shape” : **failed** because of excess of adhesive tape on the short side
2. Trapezoidal shape : **success!**
3. Trapezoidal shape : **success!** (during week 16)



Material

1. 3 more pieces arrived from CERN
 - 1 “Moon-piece shape” → for adhesive tape cut study
 - 2 Trapezoidal shape → 1 for Strasbourg team training and 1 for last exercise before bending of working chip



Bent silicon piece
(mylar foil in the picture)

Groove
for alignment and
adhesive tape cut

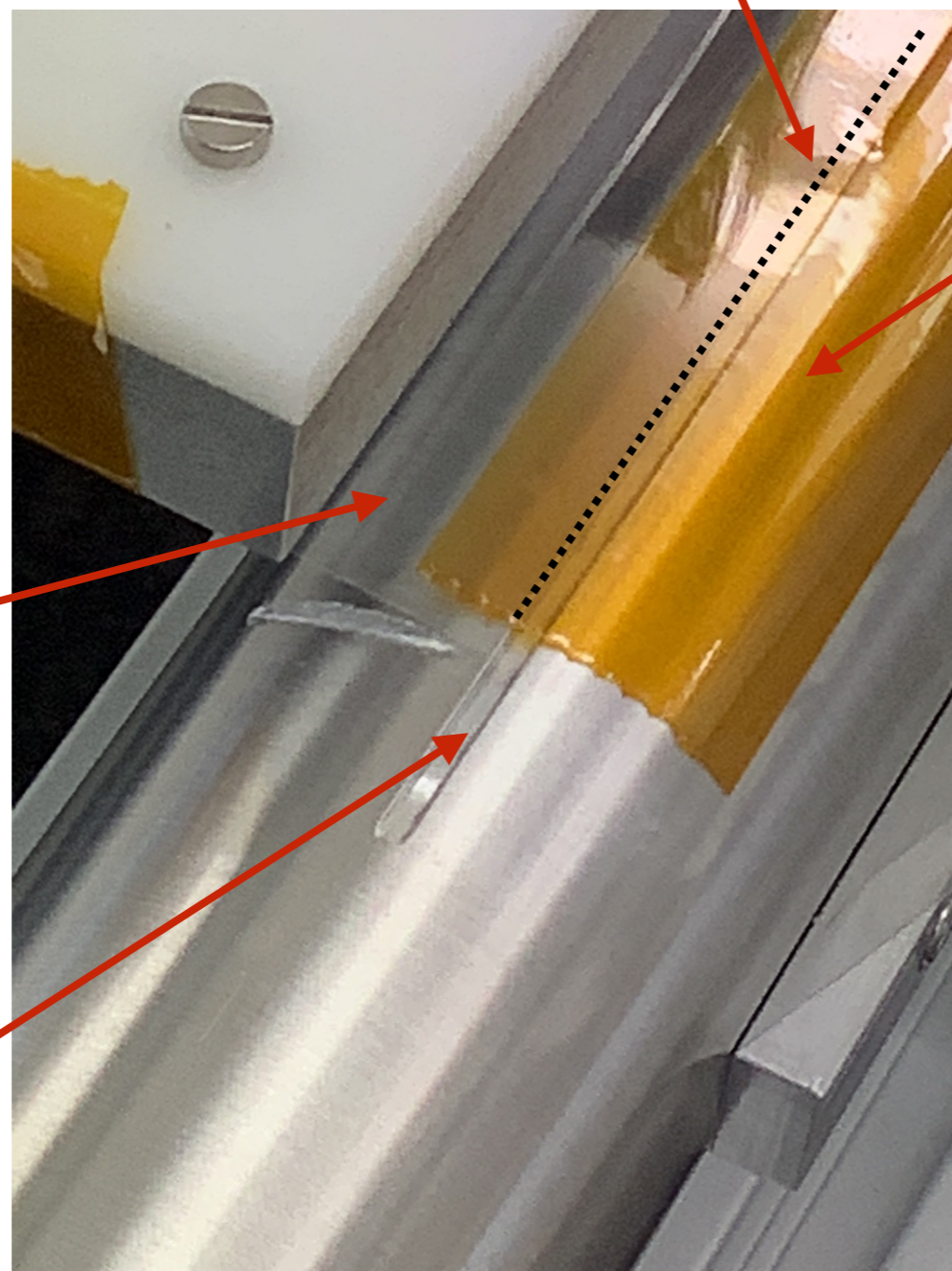
Adhesive tape that keep
the silicon piece in
position after bending

Adhesive tape cut line (edge of the groove)

Adhesive tape that keep the silicon piece in position after bending

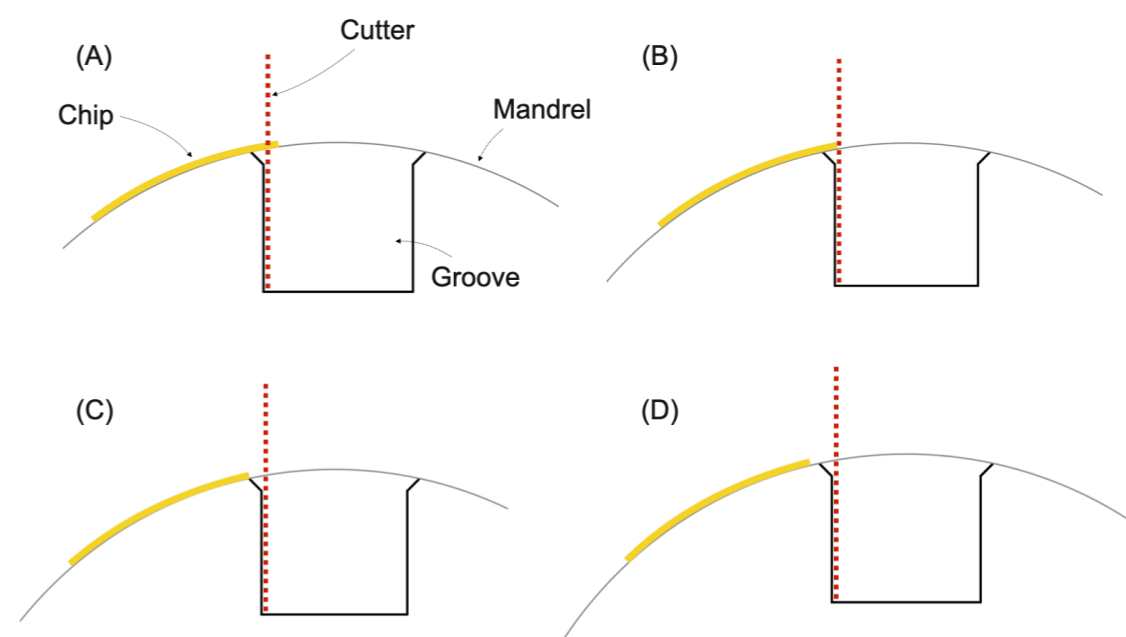
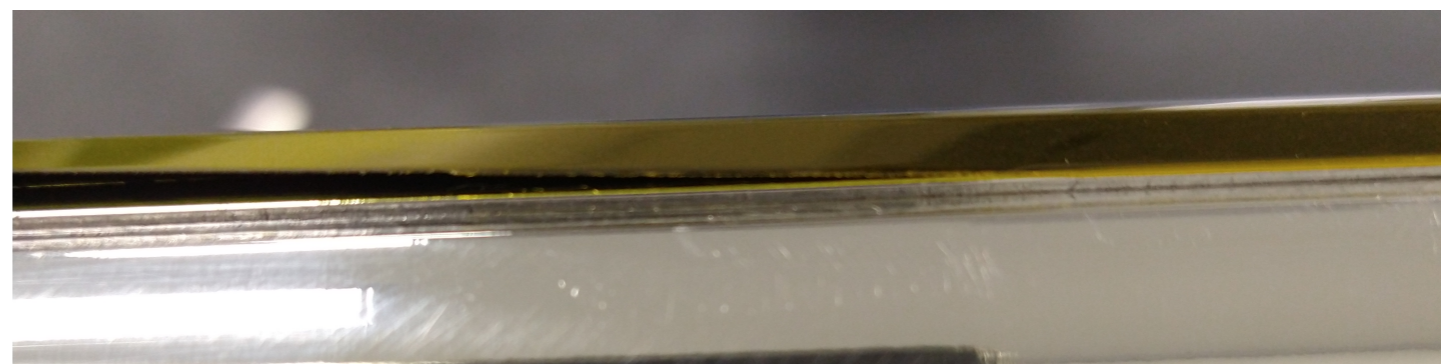
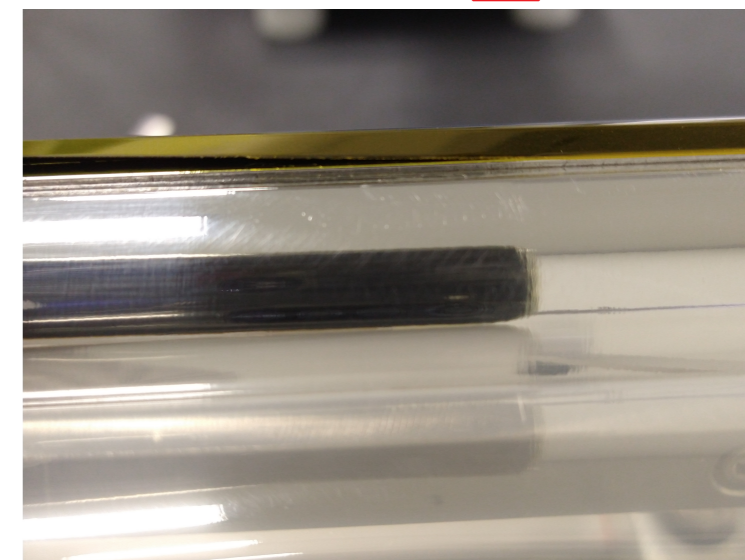
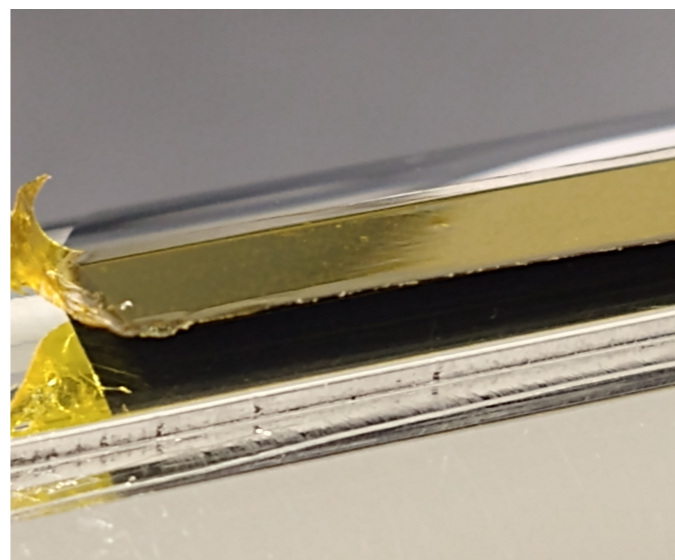
Bent silicon piece (mylar foil in the picture)

Groove for alignment and adhesive tape cut



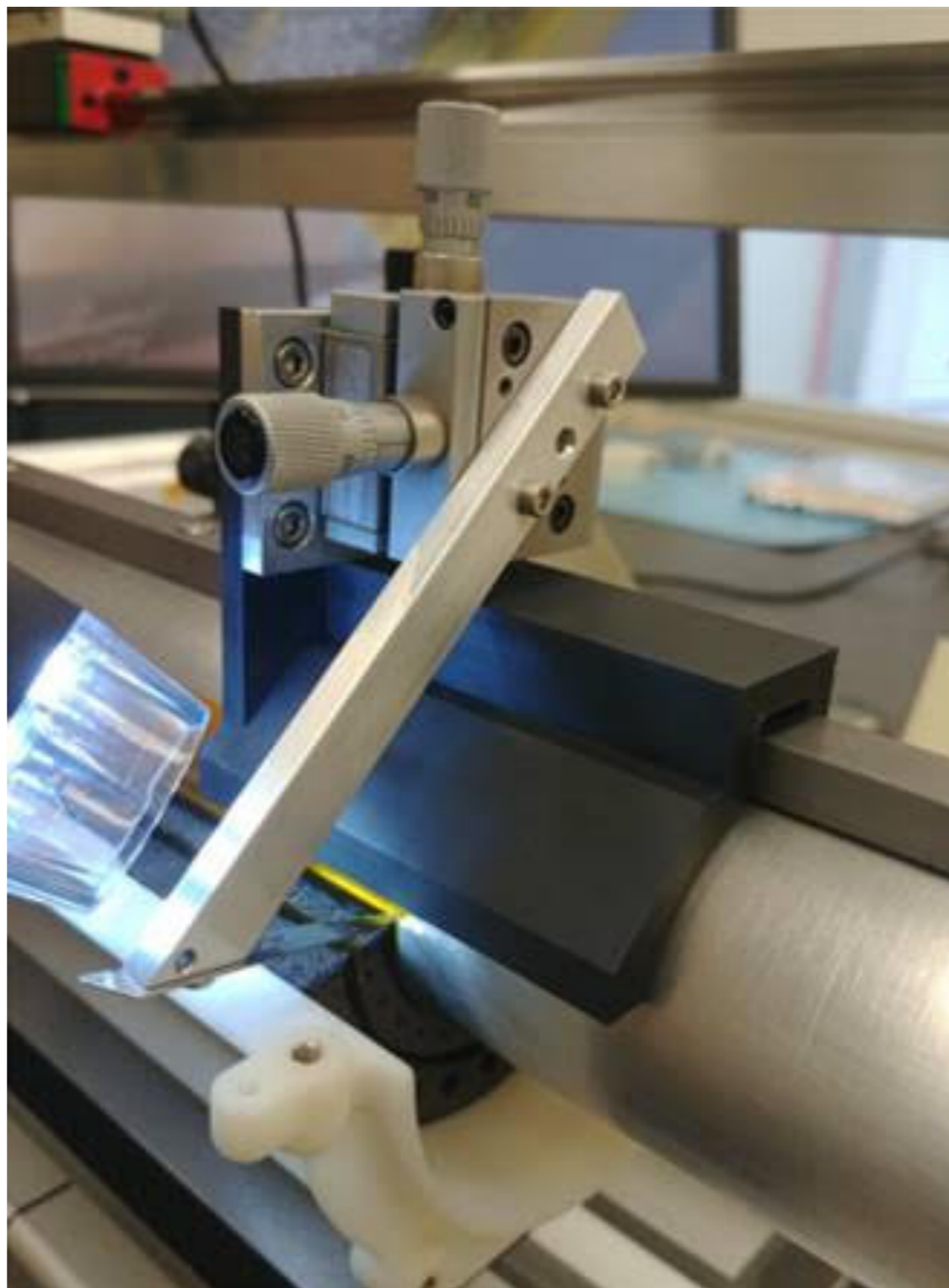


Few 100s μm of adhesive tape attached to the mandrel





Tool assembled by Pieter @CERN

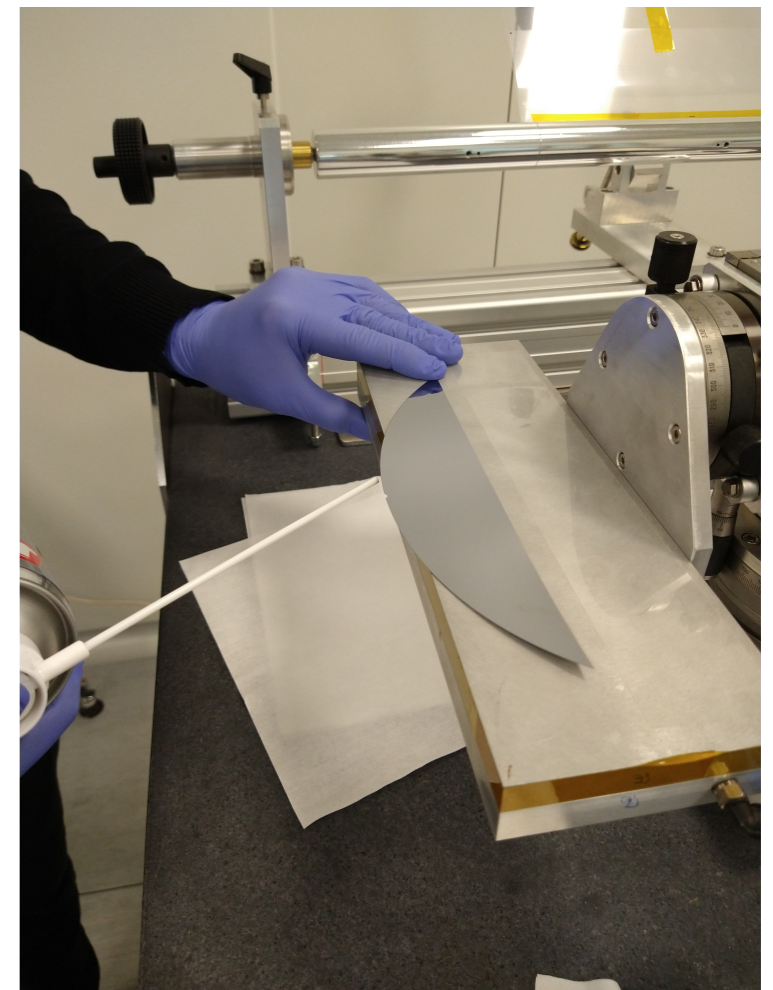
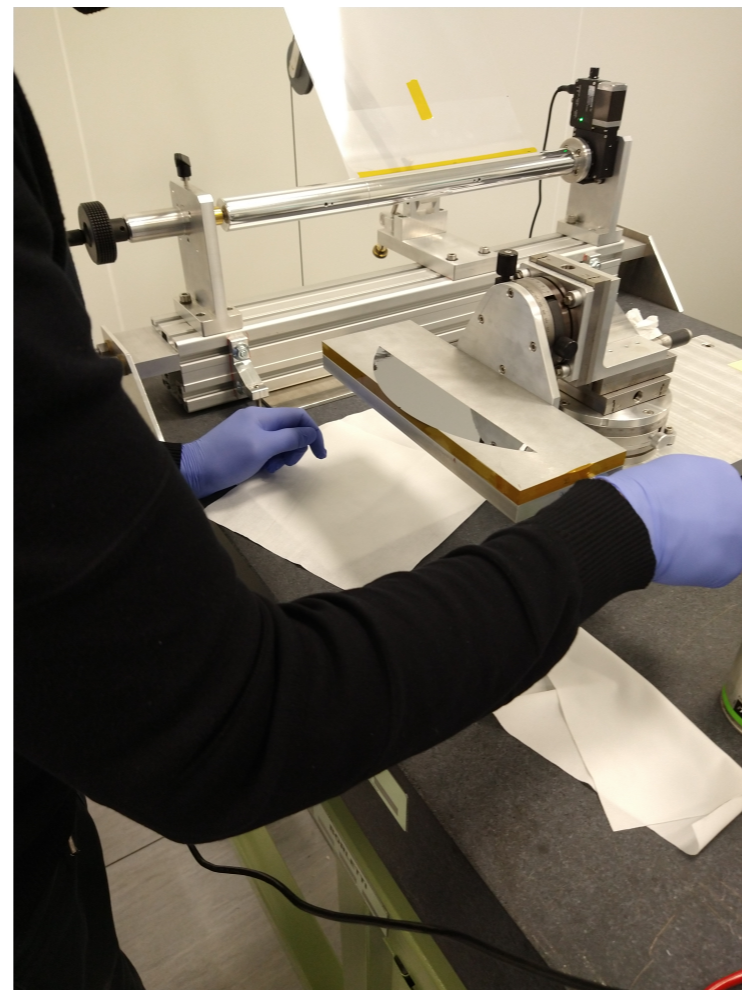
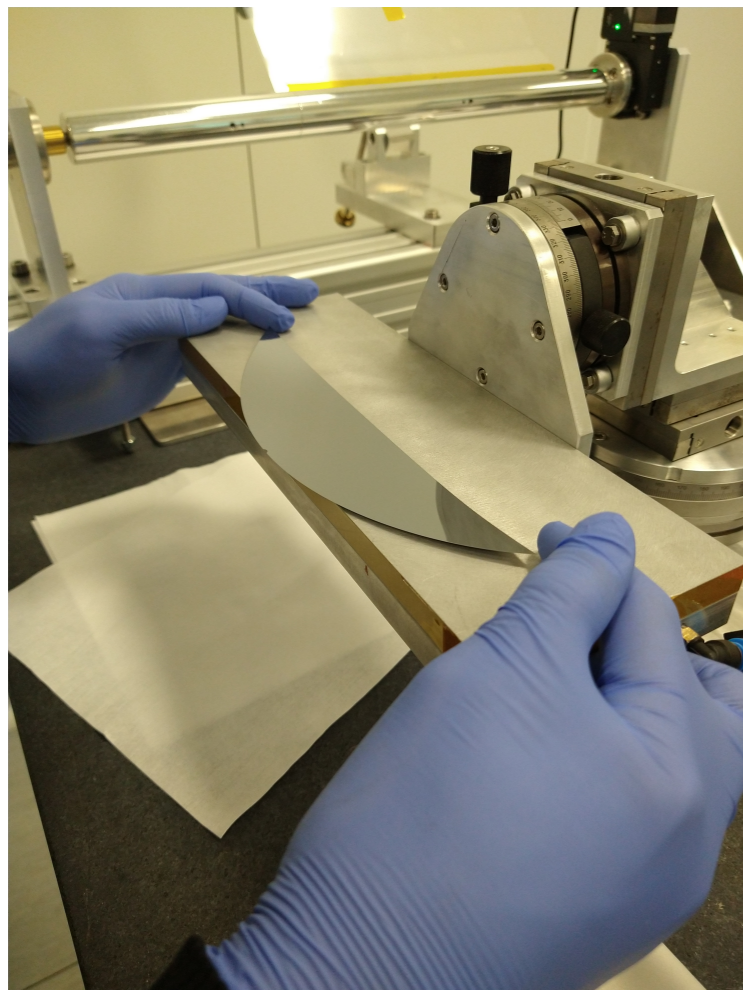


BACKUP

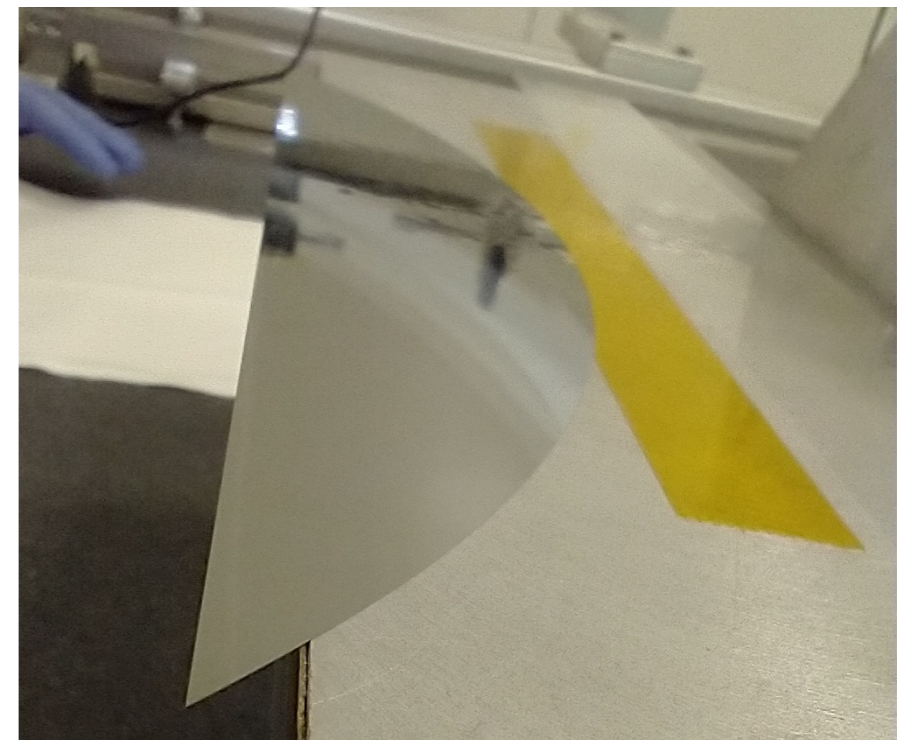
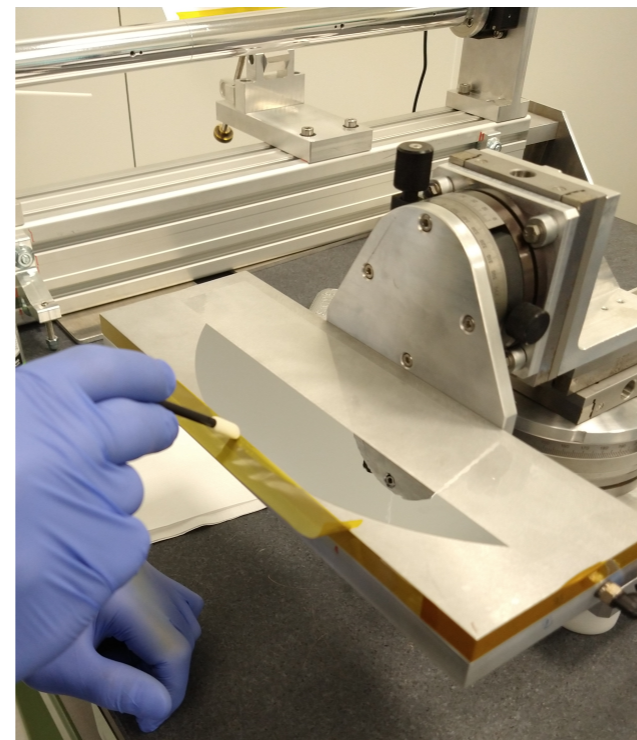
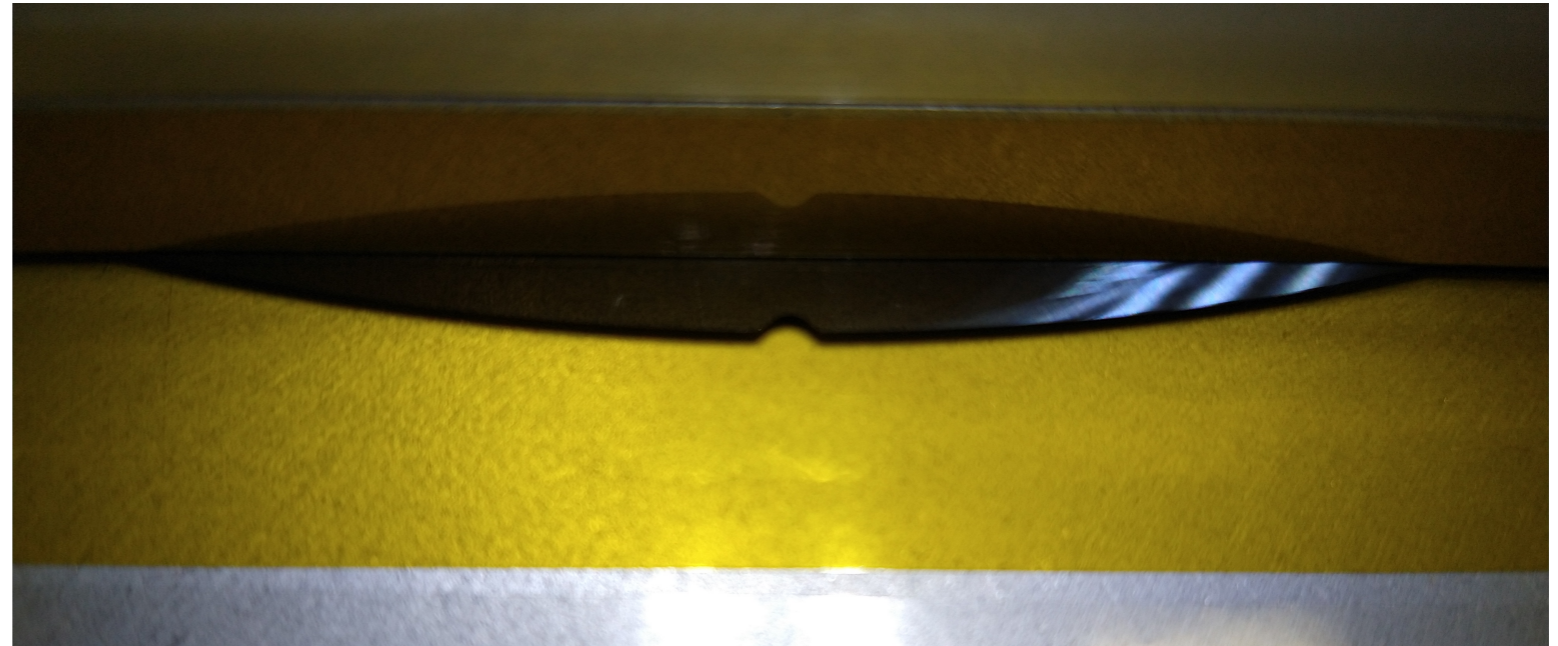
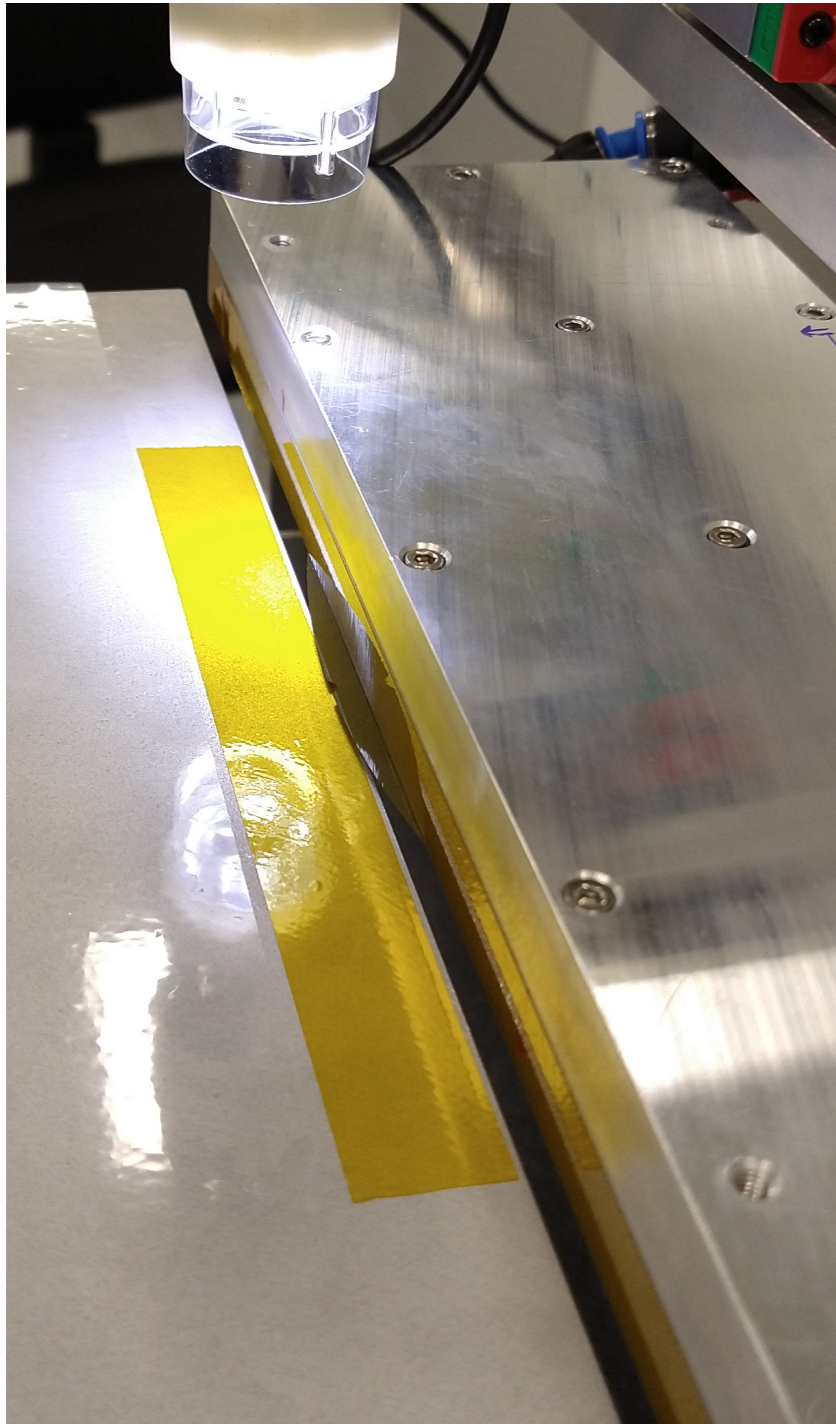


ALICE

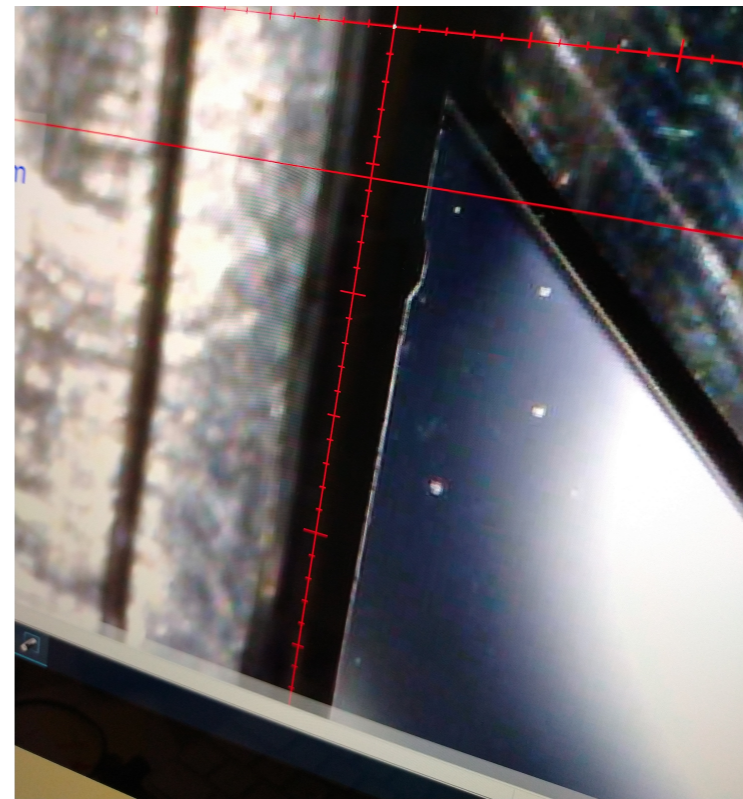
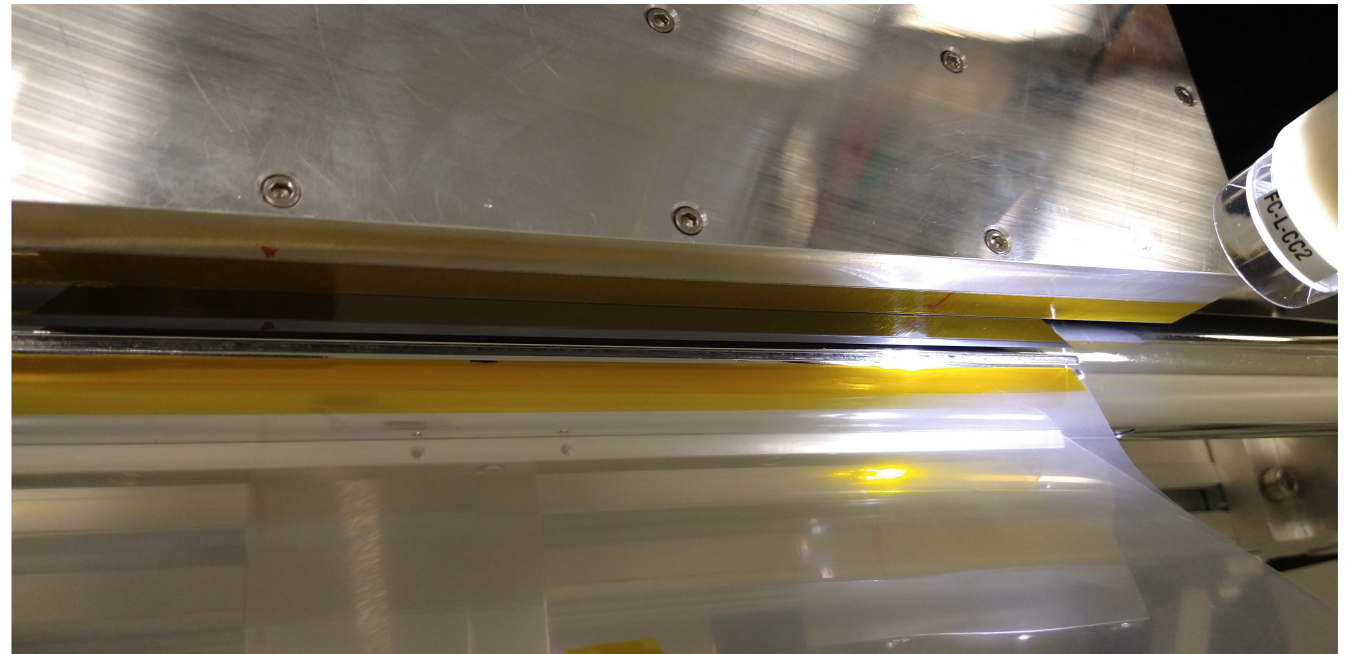
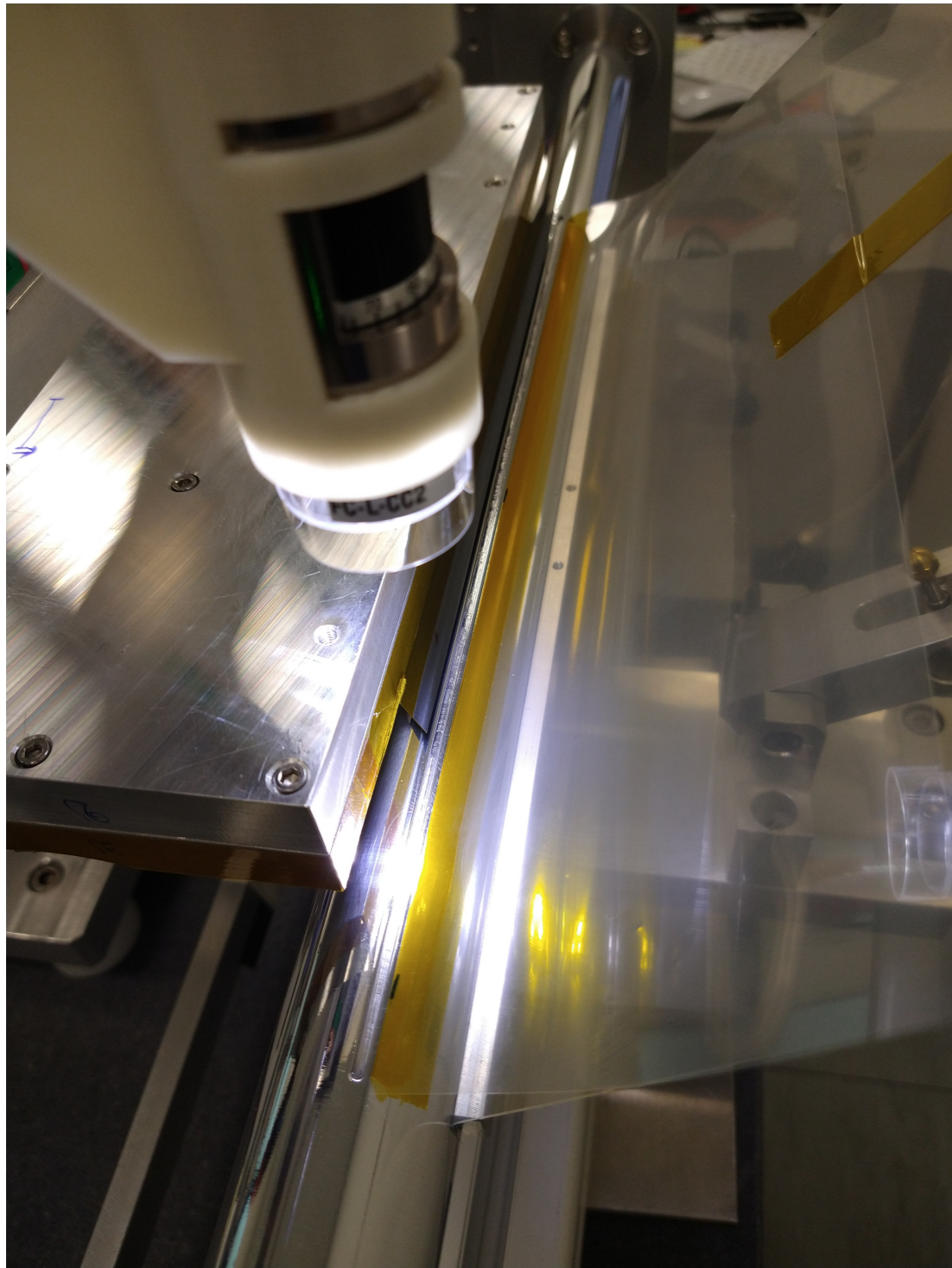
Bending of silicon piece - Attempt 1



Bending of silicon piece - Attempt 1

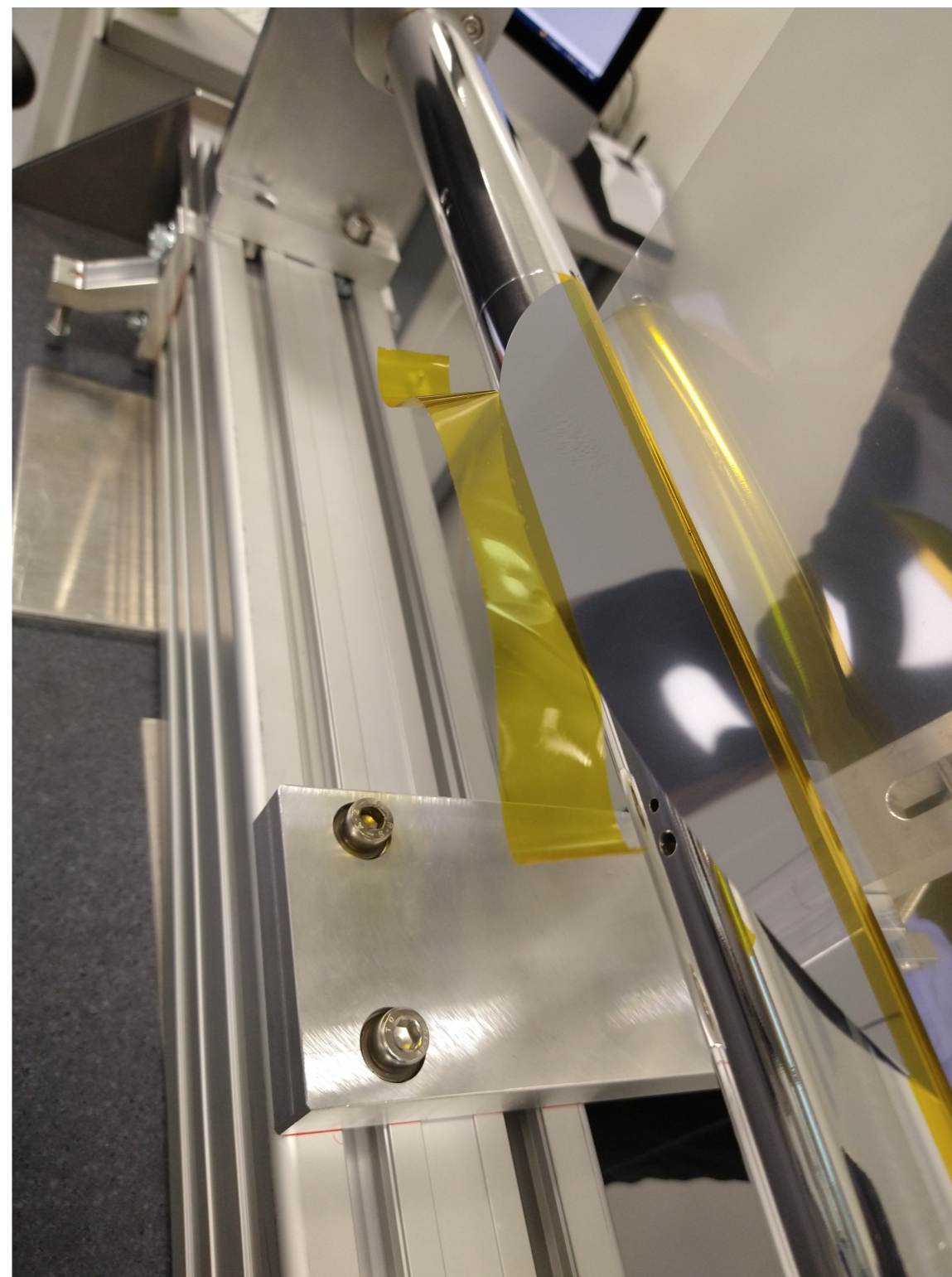
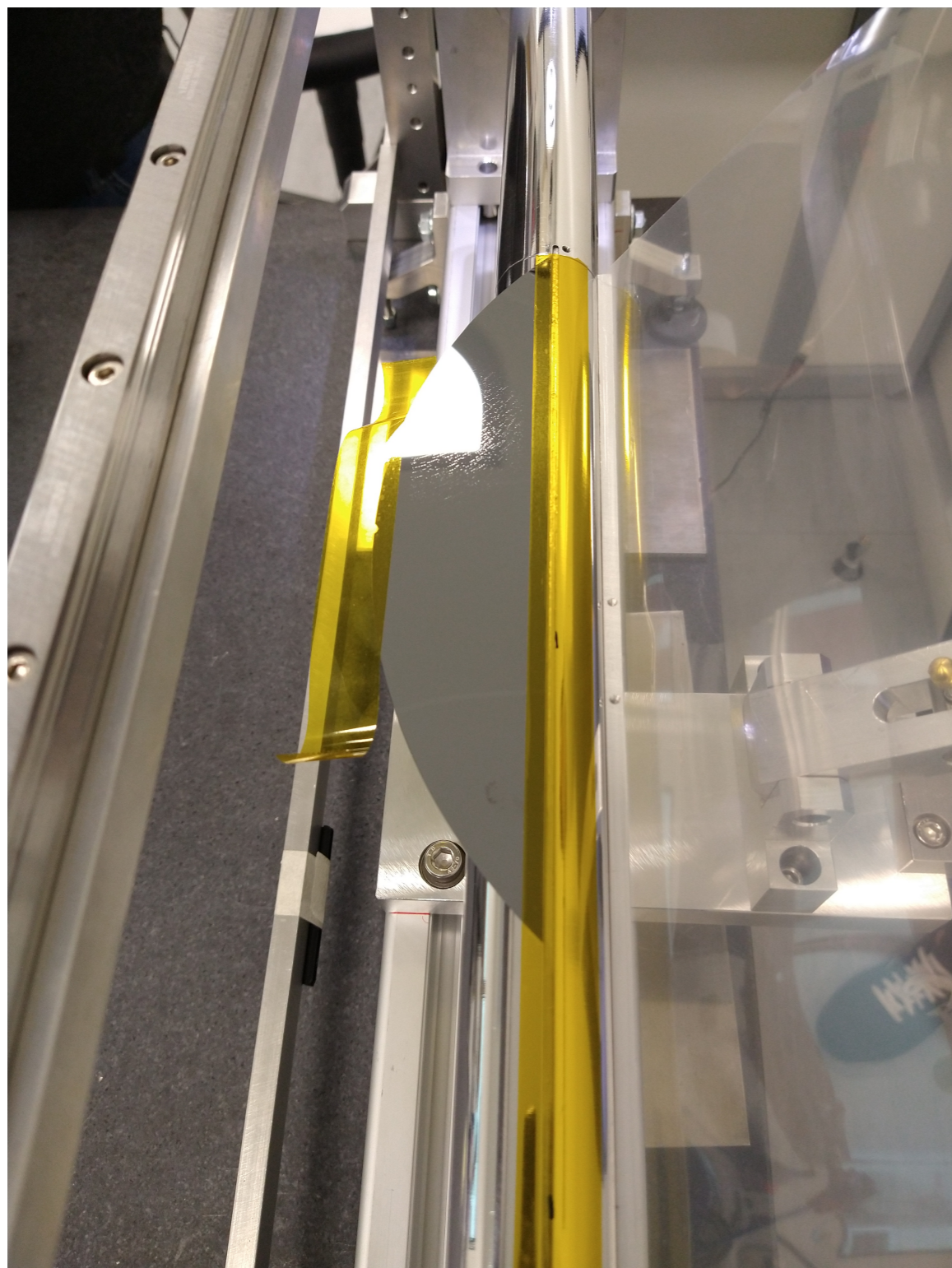


Bending of silicon piece - Attempt 1

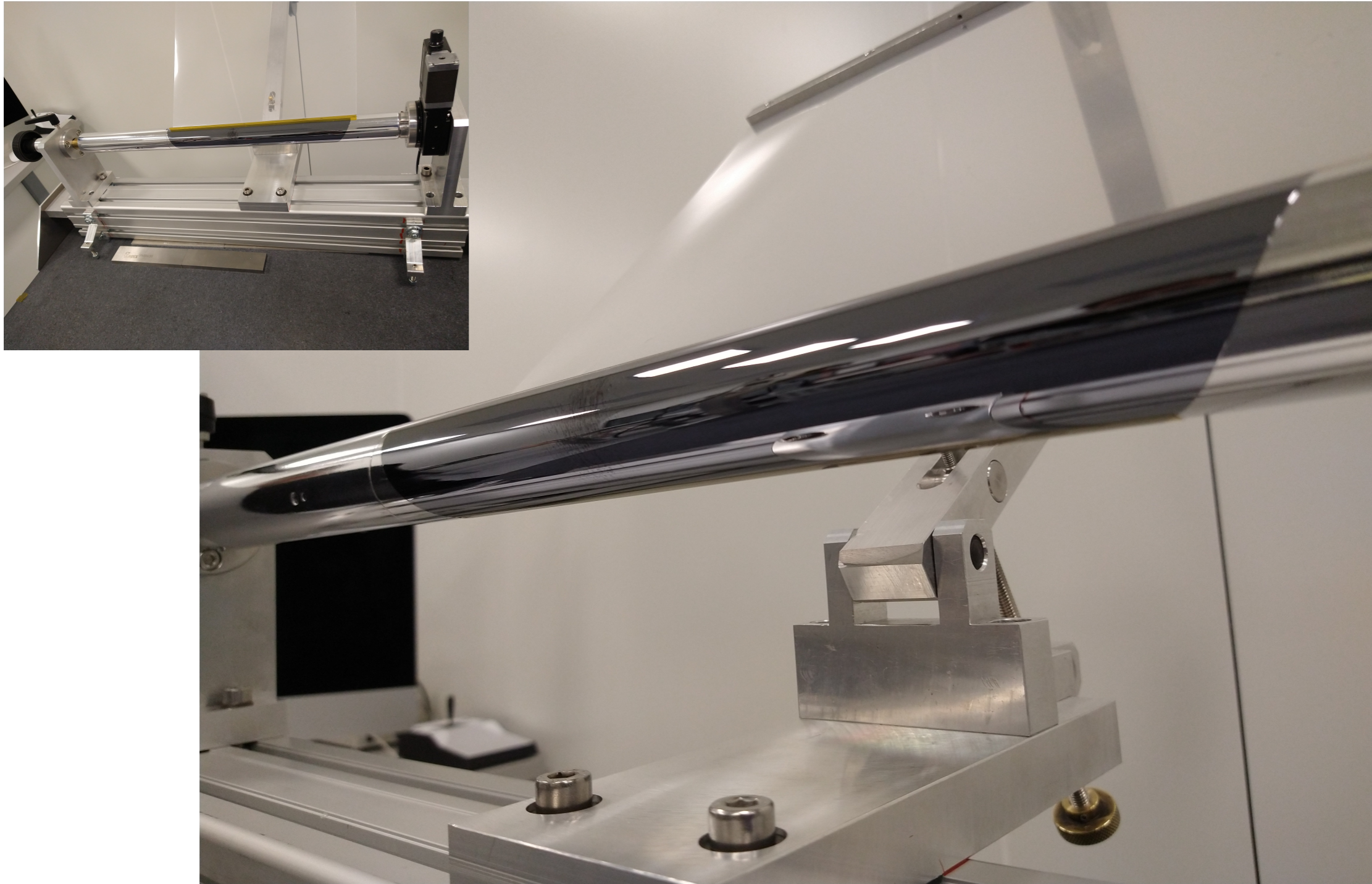




Bending of silicon piece - Attempt 1



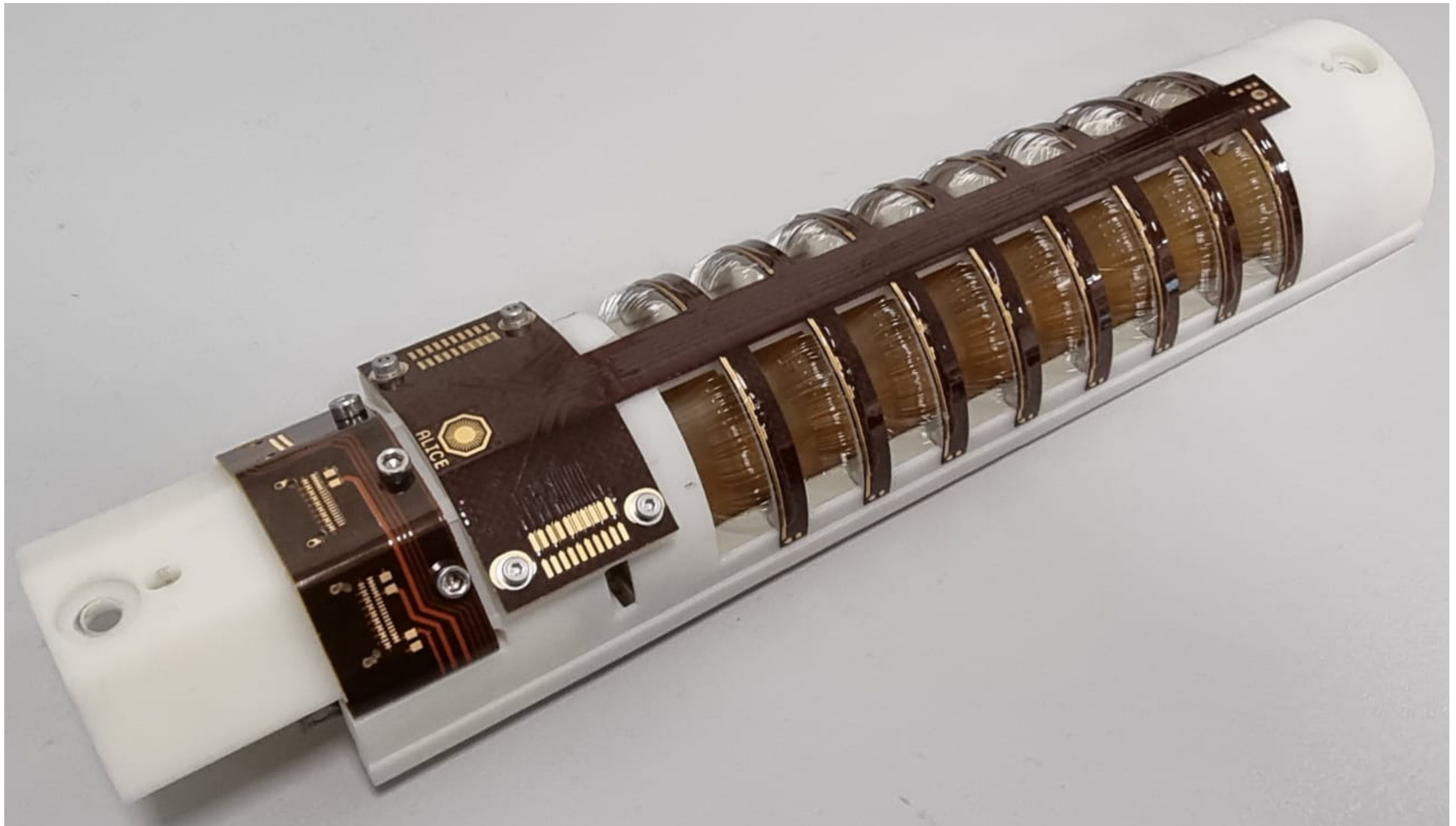
Bending of silicon piece - Attempt 2



Silicon edges verification with camera: <https://cernbox.cern.ch/index.php/s/wLCnYXmdDEoldPb>

Super-ALPIDE mockup assembly - V2

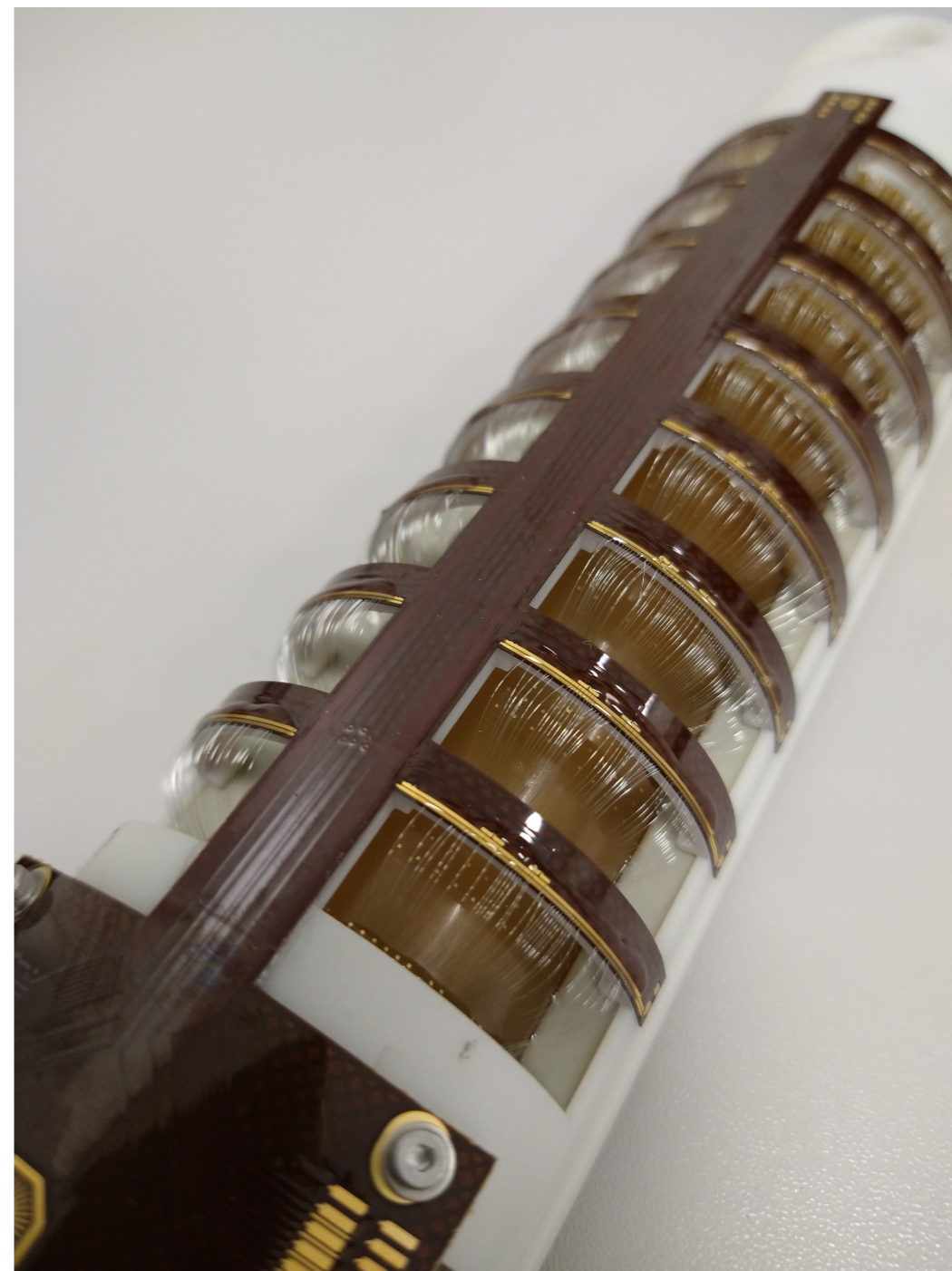
Wire-bonding through exoskeleton





Super-ALPIDE mockup assembly - V2

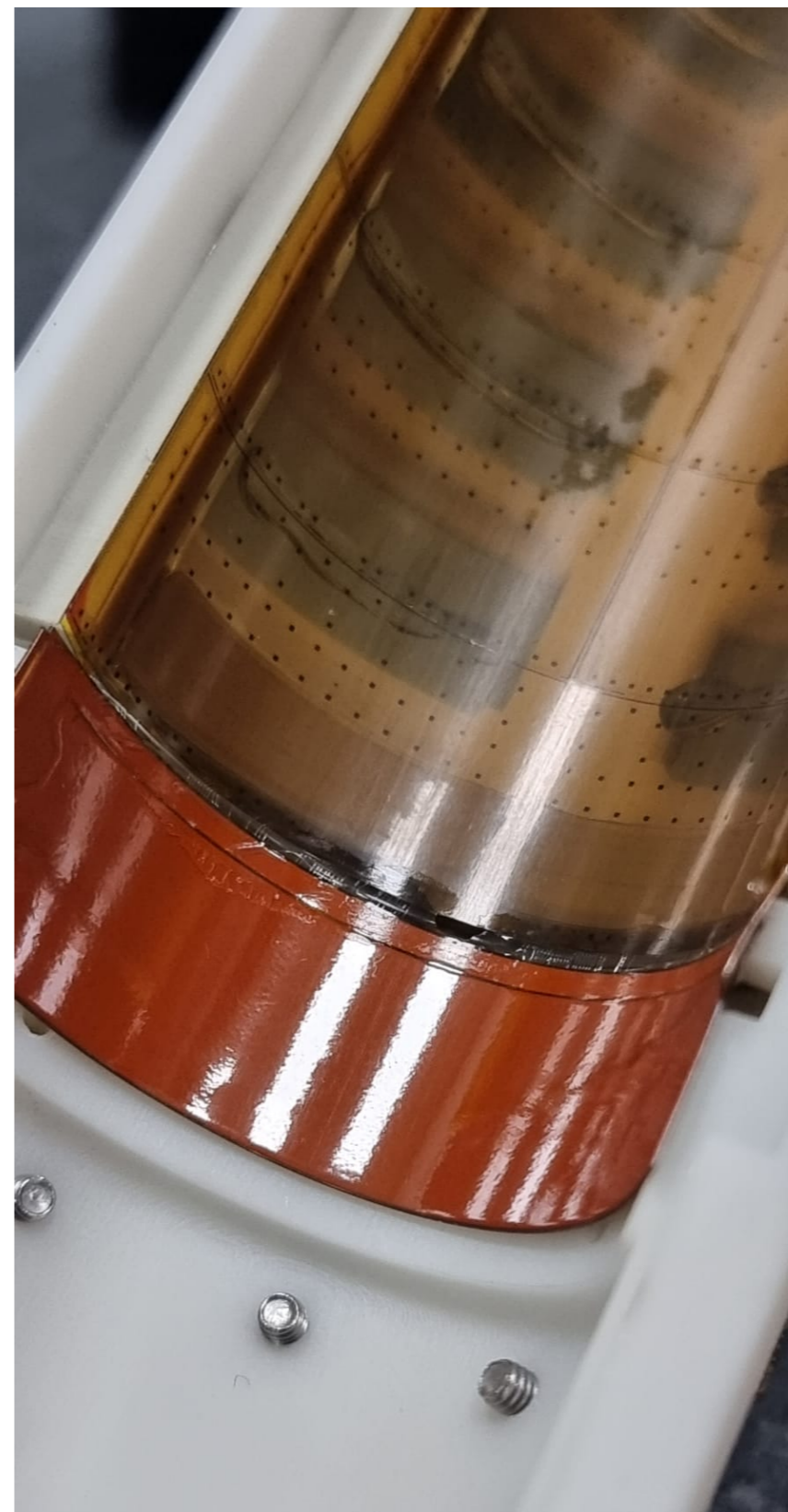
Wire-bonding through exoskeleton





Super-ALPIDE mockup assembly - V2

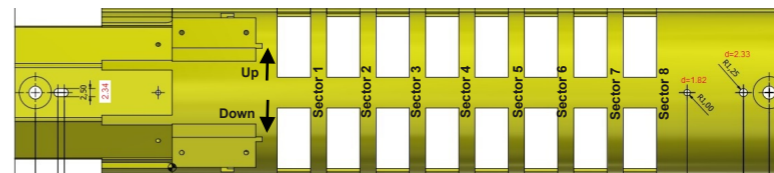
Wire-bonding through exoskeleton





Super-ALPIDE mockup assembly - V2

Wire-bonding through exoskeleton

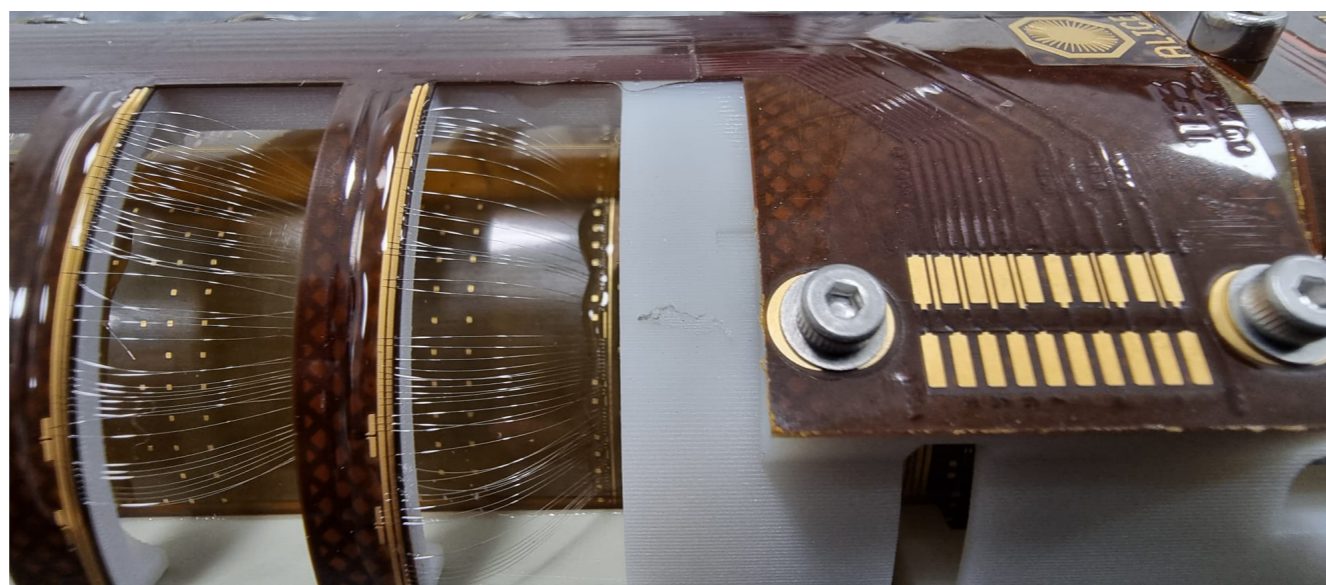


Sector 8 UP

Sector 5 UP

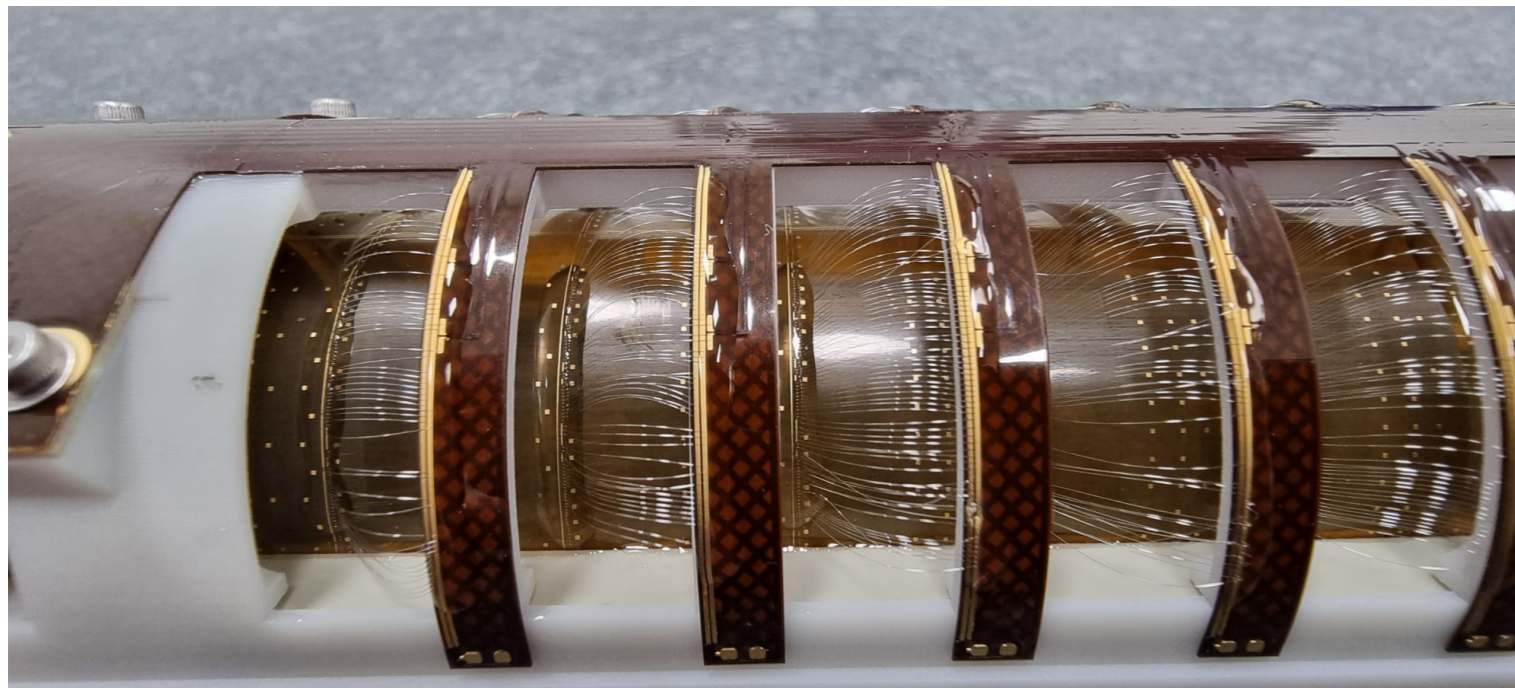
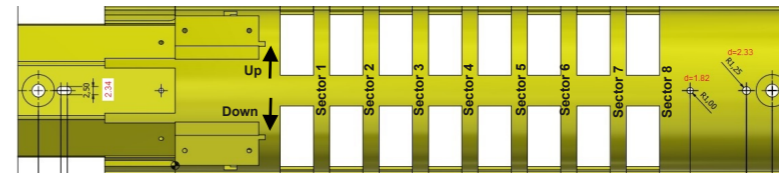


SIDE UP

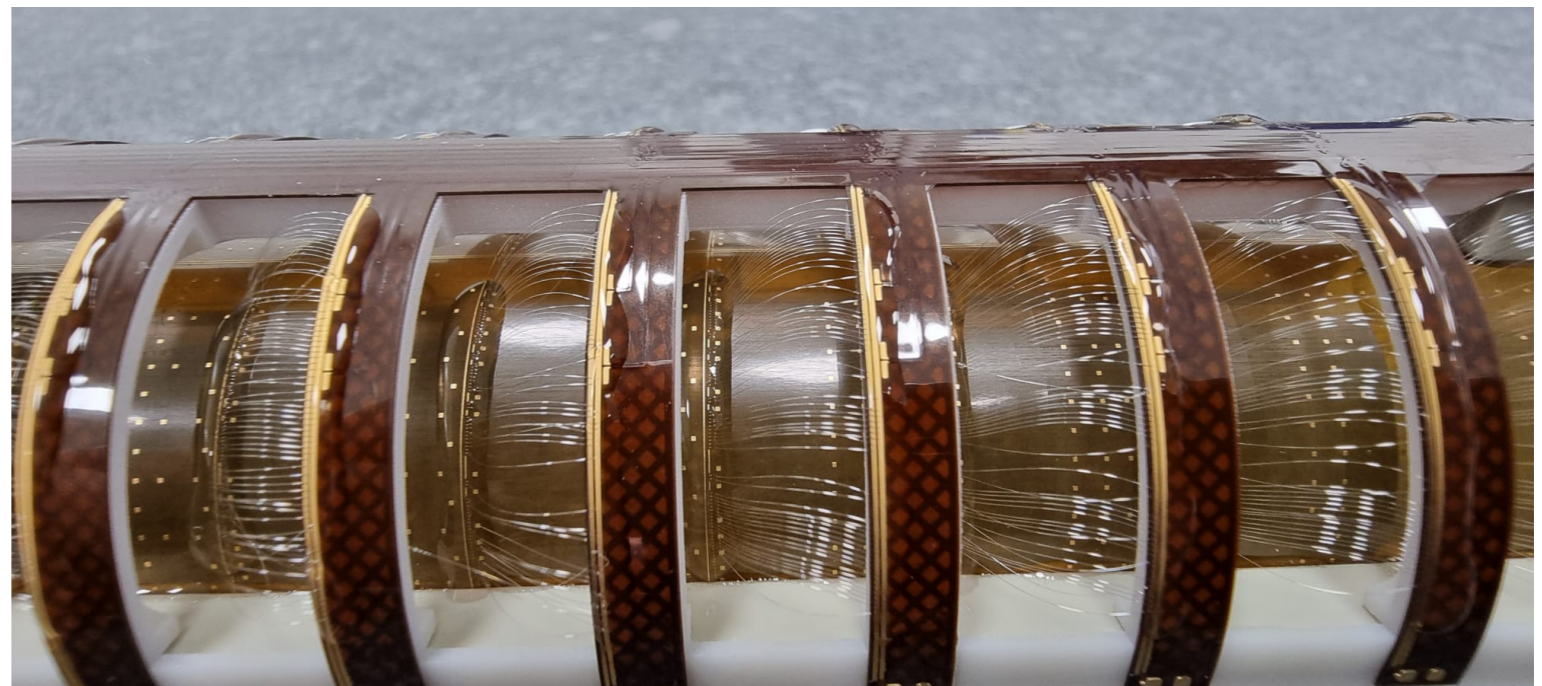


Super-ALPIDE mockup assembly - V2

Wire-bonding through exoskeleton



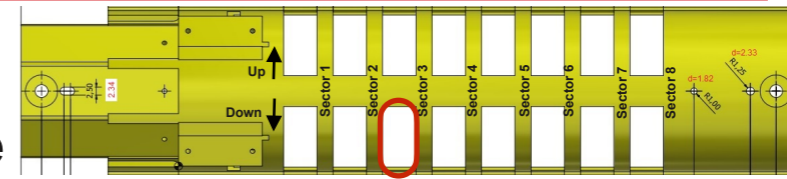
SIDE DOWN



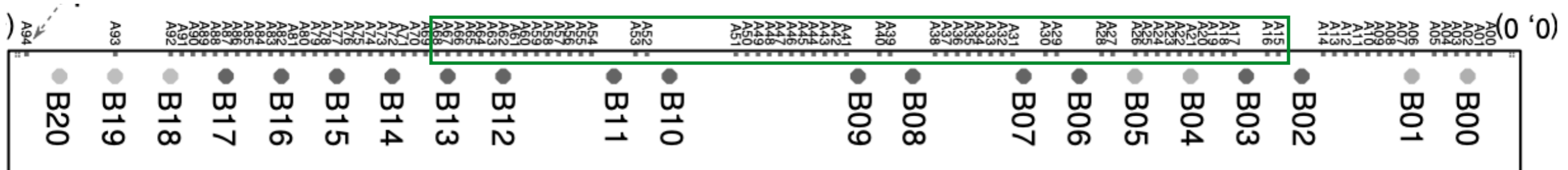
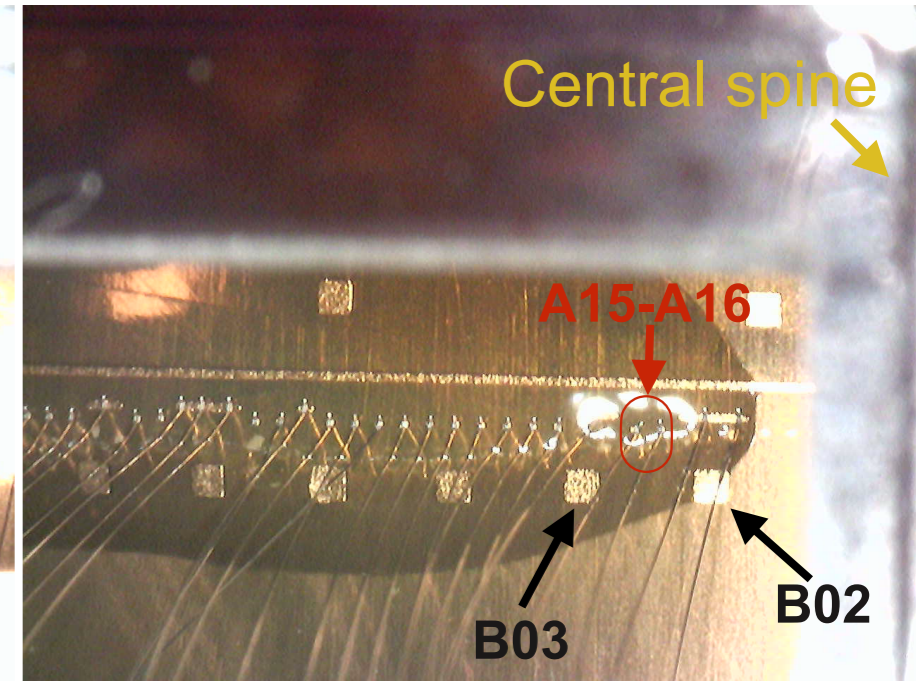
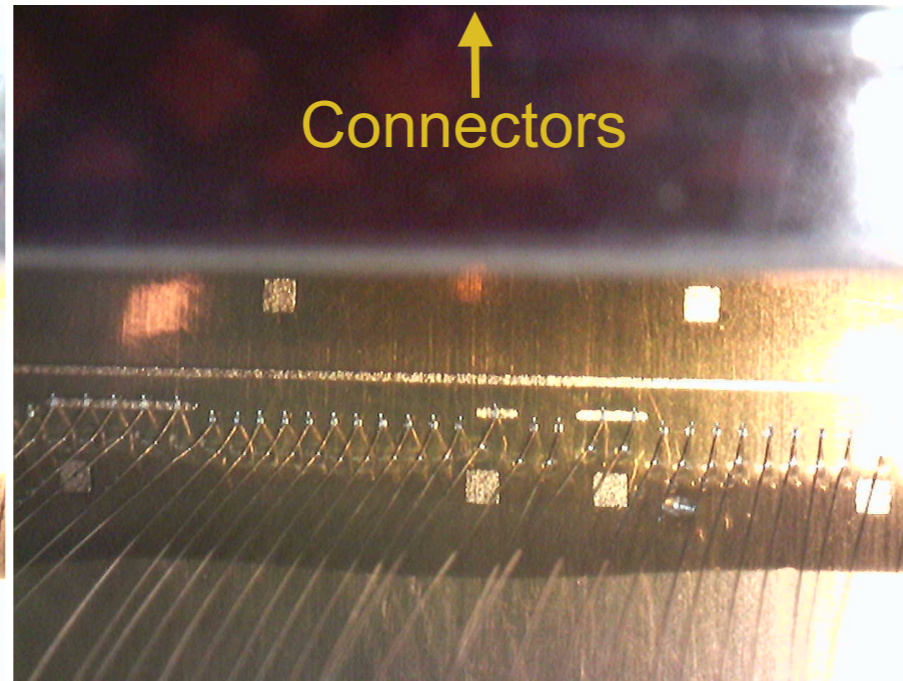
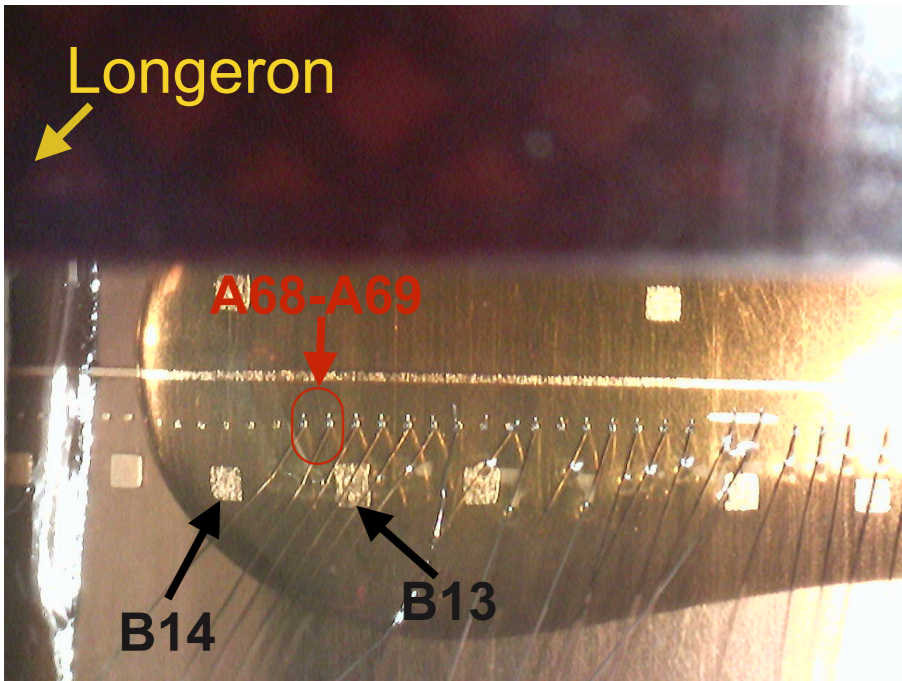


Super-ALPIDE mockup assembly - V2

Wire-bonding through exoskeleton - Bonding scheme



DOWN region (sector 3)

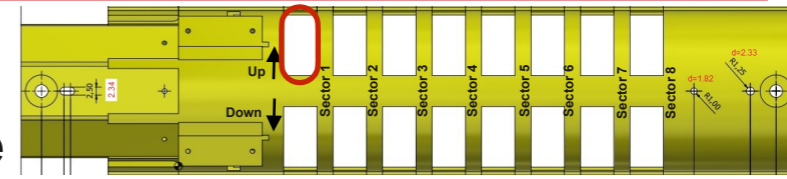


A17 - DVSS	A33 - SUB	A47 - CHIPID[3]	A63 - DVSS
A18 - DVDD	A34 - AVSS	A48 - PVSS	A64 - DVDD
A19 - PWELL	A35 - AVDD	A49 - PVDD	A65 - DVSS
A23 - DVSS	A38 - DVSS	A50 - PVSS	A66 - DVDD
A24 - DVDD	A39 - DCLK_P	A51 - PVDD	A69 - DVSS
A26 - POR_DIS_N	A40 - DCLK_N	A54 - DVDD	A70 - DVDD
A27 - AVSS	A41 - DVDD	A55 - CHIPID[2]	A71 - CHIPID[1]
A28 - AVDD	A42 - PWELL	A56 - DVSS	A74 - DVSS
A29 - DCTRL_P	A43 - DVSS	A58 - AVSS	A75 - DVDD
A30 - DCTRL_N	A44 - DVDD	A59 - AVDD	A76 - DVSS
A31 - DVSS	A45 - AVSS	A60 - DVSS	A88 - CHIPID[0]
A32 - DVDD	A46 - AVDD	A61 - DVDD	

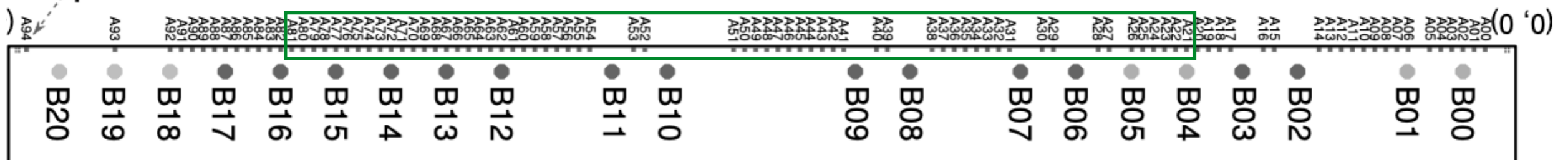
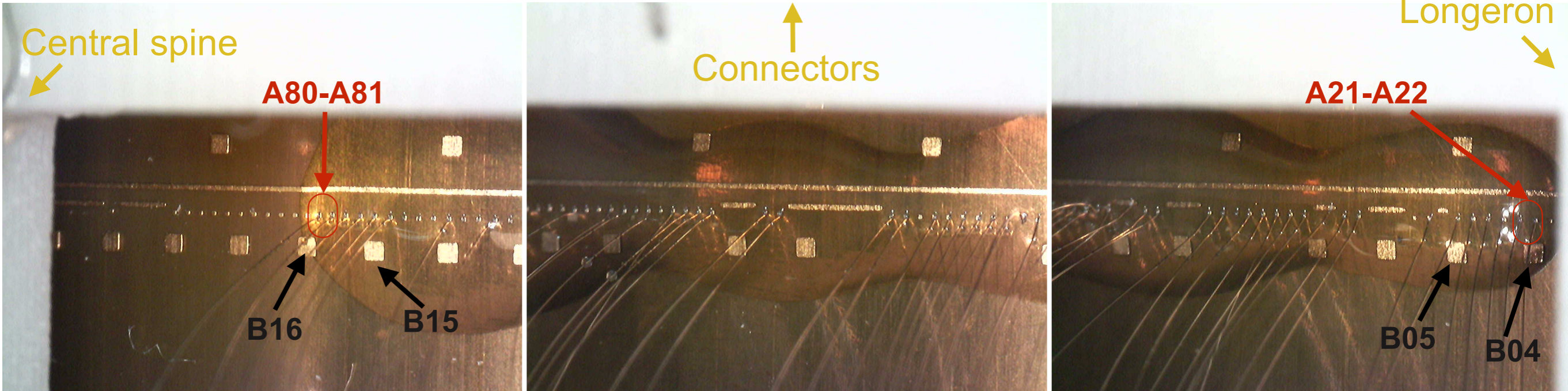
Pasquale could push to A72

Super-ALPIDE mockup assembly - V2

Wire-bonding through exoskeleton - Bonding scheme



UP region (sector 1)



A17 - DVSS	A33 - SUB	A47 - CHIPID[3]	A63 - DVSS
A18 - DVDD	A34 - AVSS	A48 - PVSS	A64 - DVDD
A19 - PWELL	A35 - AVDD	A49 - PVDD	A65 - DVSS
A23 - DVSS	A38 - DVSS	A50 - PVSS	A66 - DVDD
A24 - DVDD	A39 - DCLK_P	A51 - PVDD	A69 - DVSS
A26 - POR_DIS_N	A40 - DCLK_N	A54 - DVDD	A70 - DVDD
A27 - AVSS	A41 - DVDD	A55 - CHIPID[2]	A71 - CHIPID[1]
A28 - AVDD	A42 - PWELL	A56 - DVSS	A74 - DVSS
A29 - DCTRL_P	A43 - DVSS	A58 - AVSS	A75 - DVDD
A30 - DCTRL_N	A44 - DVDD	A59 - AVDD	A76 - DVSS
A31 - DVSS	A45 - AVSS	A60 - DVSS	A88 - CHIPID[0]
A32 - DVDD	A46 - AVDD	A61 - DVDD	

Super-ALPIDE mockup assembly - V2

Wire-bonding through exoskeleton - Bonding scheme

EDGE CHIPS

Chip A - CHIPID[1,2,3] → 0000

Chip B - CHIPID[0,1,2,3] → 0001

EXO CHIPS

Chip C - CHIPID[1,2,3] → 0000

Chip D - CHIPID[1,2,3] → 0000

Chip E - CHIPID[1,2,3] → 0010

Chip F - CHIPID[1,2,3] → 0010

Chip G - CHIPID[1,2,3] → 0100

Chip H - CHIPID[1,2,3] → 0100

Chip I - CHIPID[1,2,3] → 0110

Chip J - CHIPID[1,2,3] → 0110

Chip K - CHIPID[1,2,3] → 1000

Chip L - CHIPID[1,2,3] → 1000

Chip M - CHIPID[1,2,3] → 1010

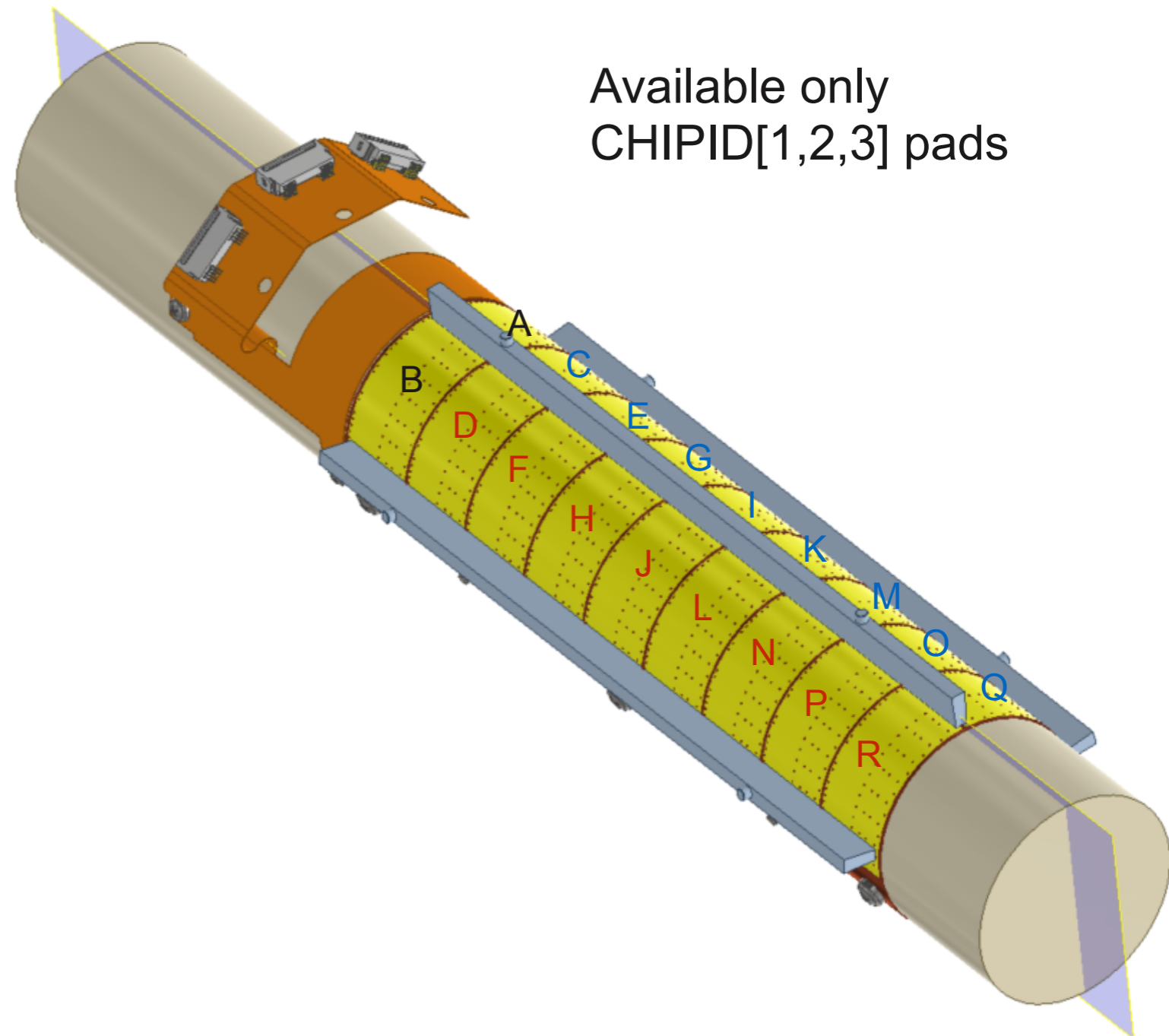
Chip N - CHIPID[1,2,3] → 1010

Chip O - CHIPID[1,2,3] → 1100

Chip P - CHIPID[1,2,3] → 1100

Chip Q - CHIPID[1,2,3] → 1110

Chip R - CHIPID[1,2,3] → 1110



Available only
CHIPID[1,2,3] pads



Super-ALPIDE mockup assembly - V2

Sylgard usage

