News from Mechanics

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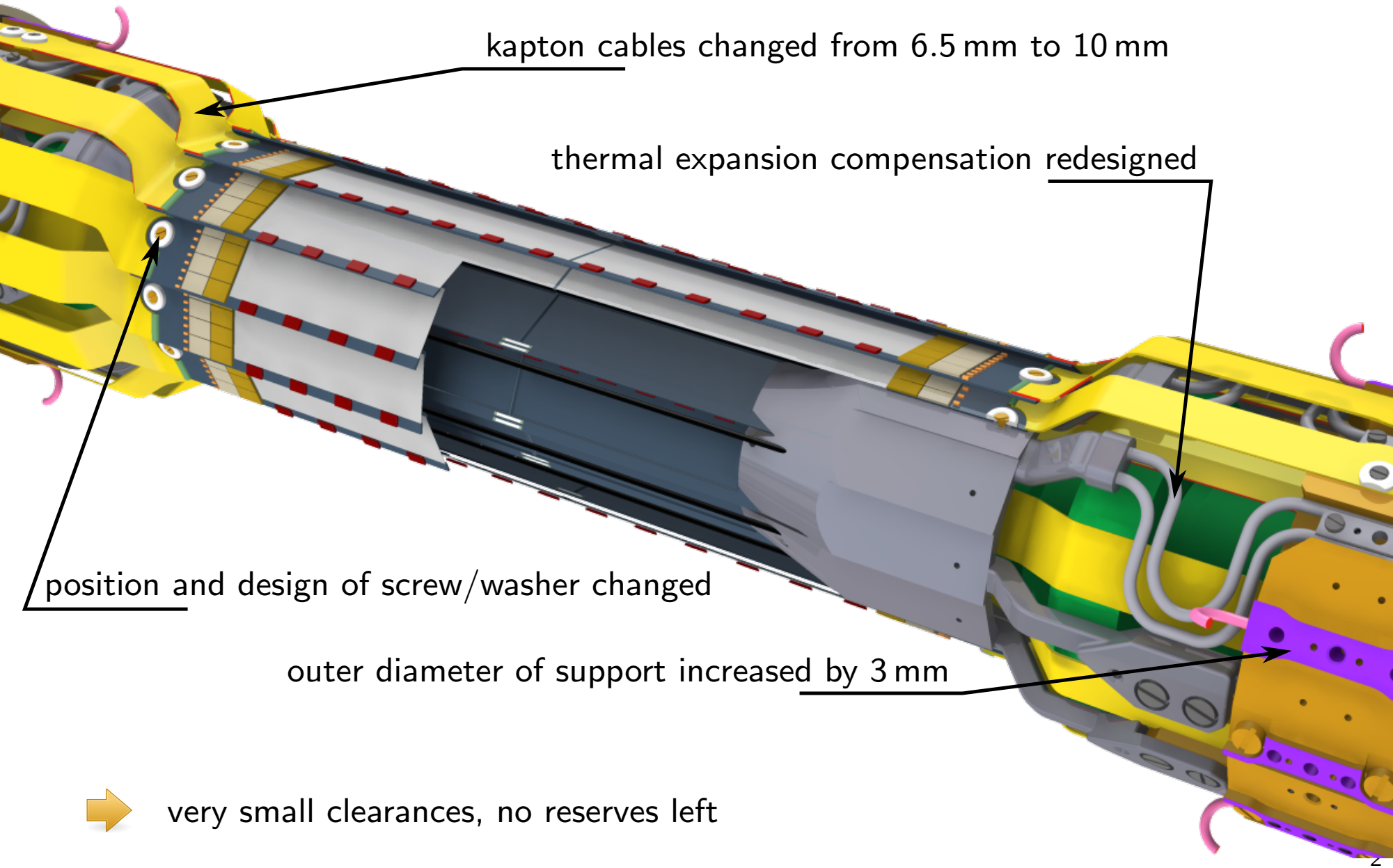
Max-Planck-Institut für Physik
(Werner-Heisenberg-Institut)

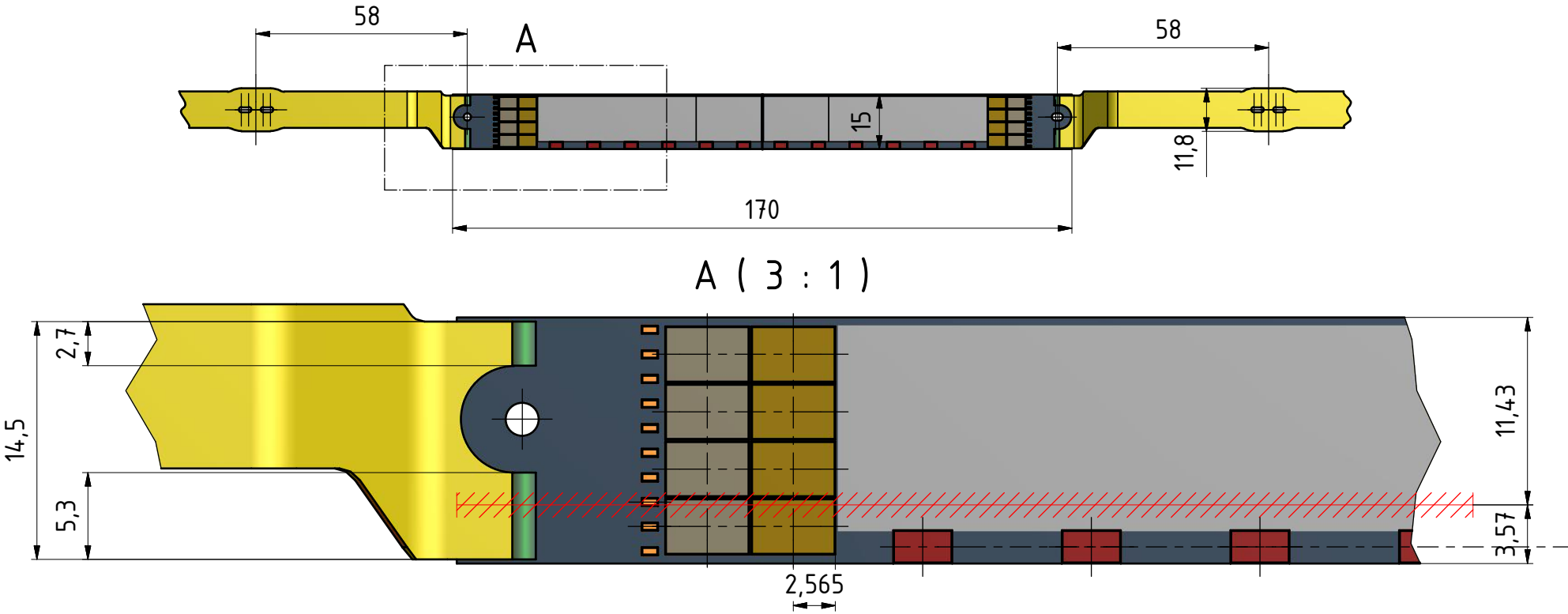
PXD V11a complete



- very small clearances, no reserves left

Cables

Kapton cables were enlarged to 10 mm usable width everywhere



- cables for the inner layer will slightly touch each other
- stress relief also redesigned
- length from module to stress relief ≤ 84.1 mm

➡ design files for cables were already given to Andreas Sailer (LMU)

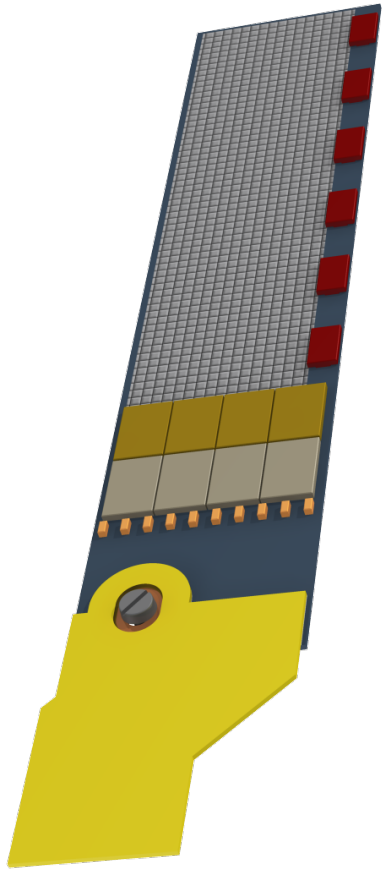
Screwing of Modules

In Bonn we presented a new washer design to reduce height of screw (needed for clearance to beampipe)

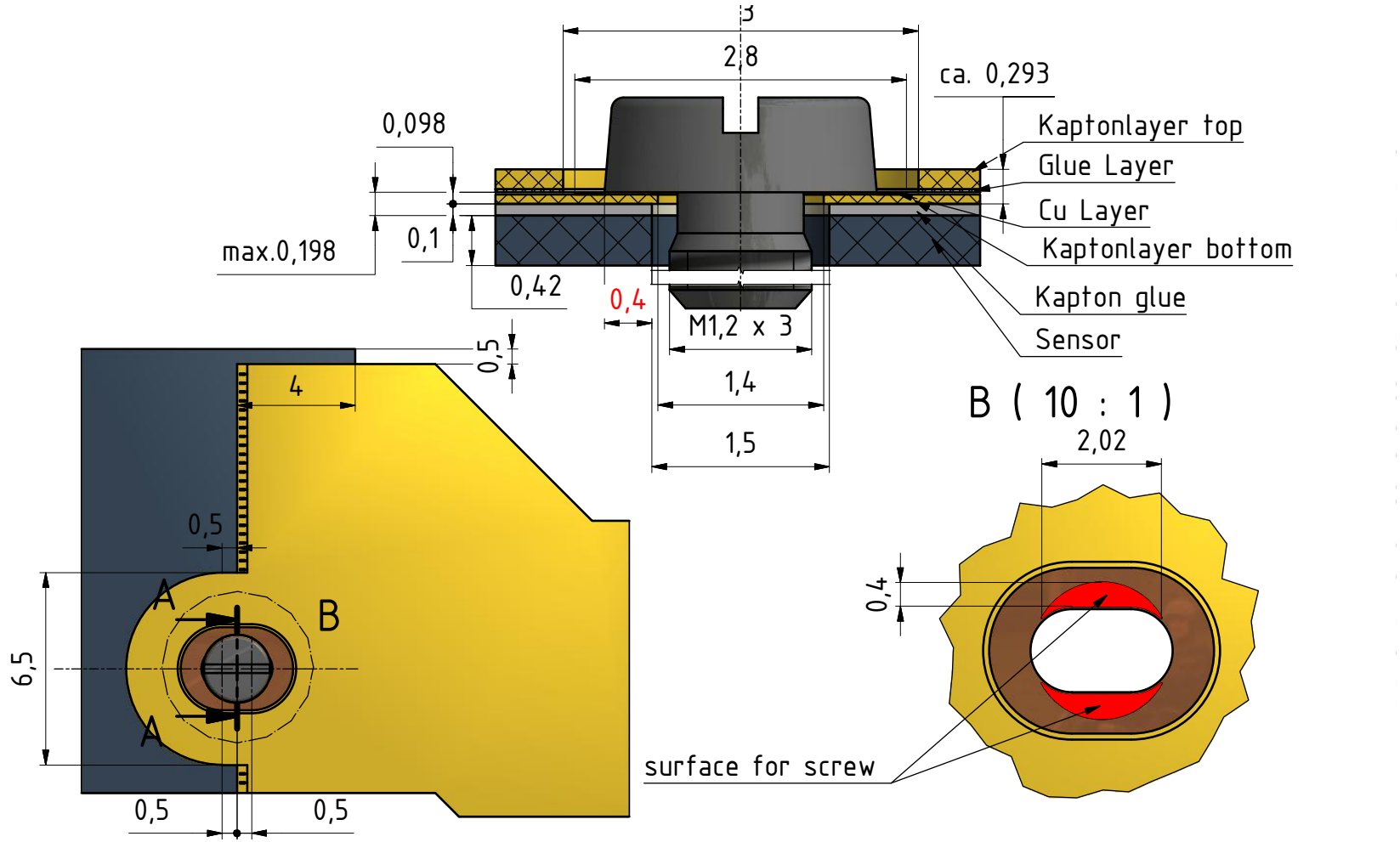
- washer became larger, reducing the avaiable EoS space
- holes in Silicon increased to 3.5 mm

We tried to find an alternative solution by screwing directly on the kapton cable to get rid of the washer

- to fullfill max. height requirement, only 100 μm kapton below screw
- elongated hole: very small kapton surface available for screw



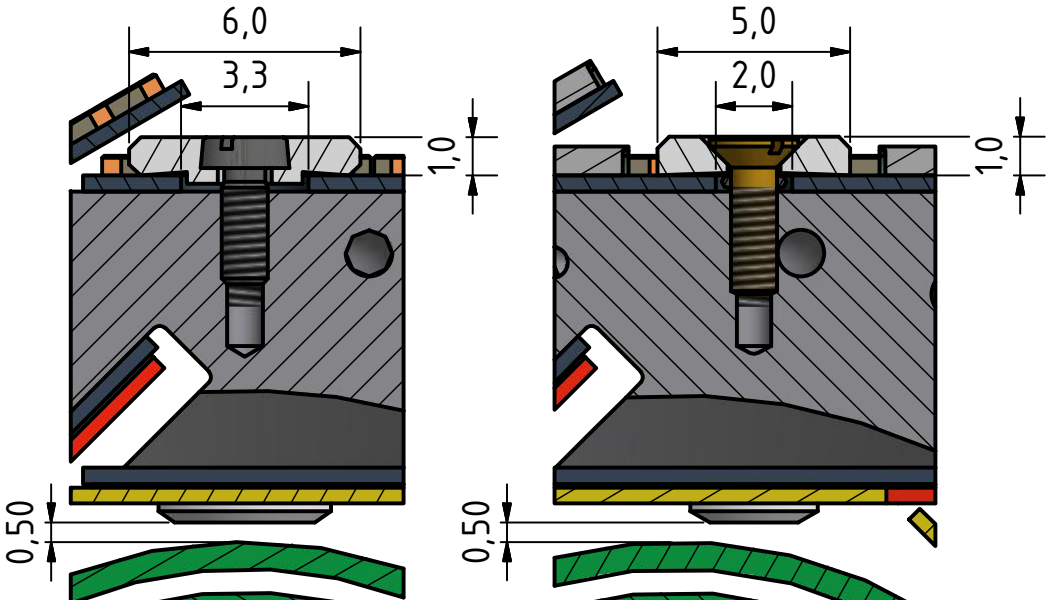
Screwing on Kapton

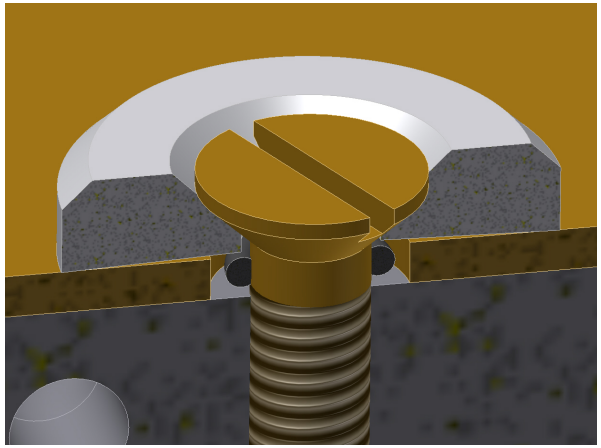


- very little kapton below screw to reach height limit
- small surface for screw due to elongated hole
- kapton and screw no longer independent: screwing will cause torque on the kapton

New Washer Design

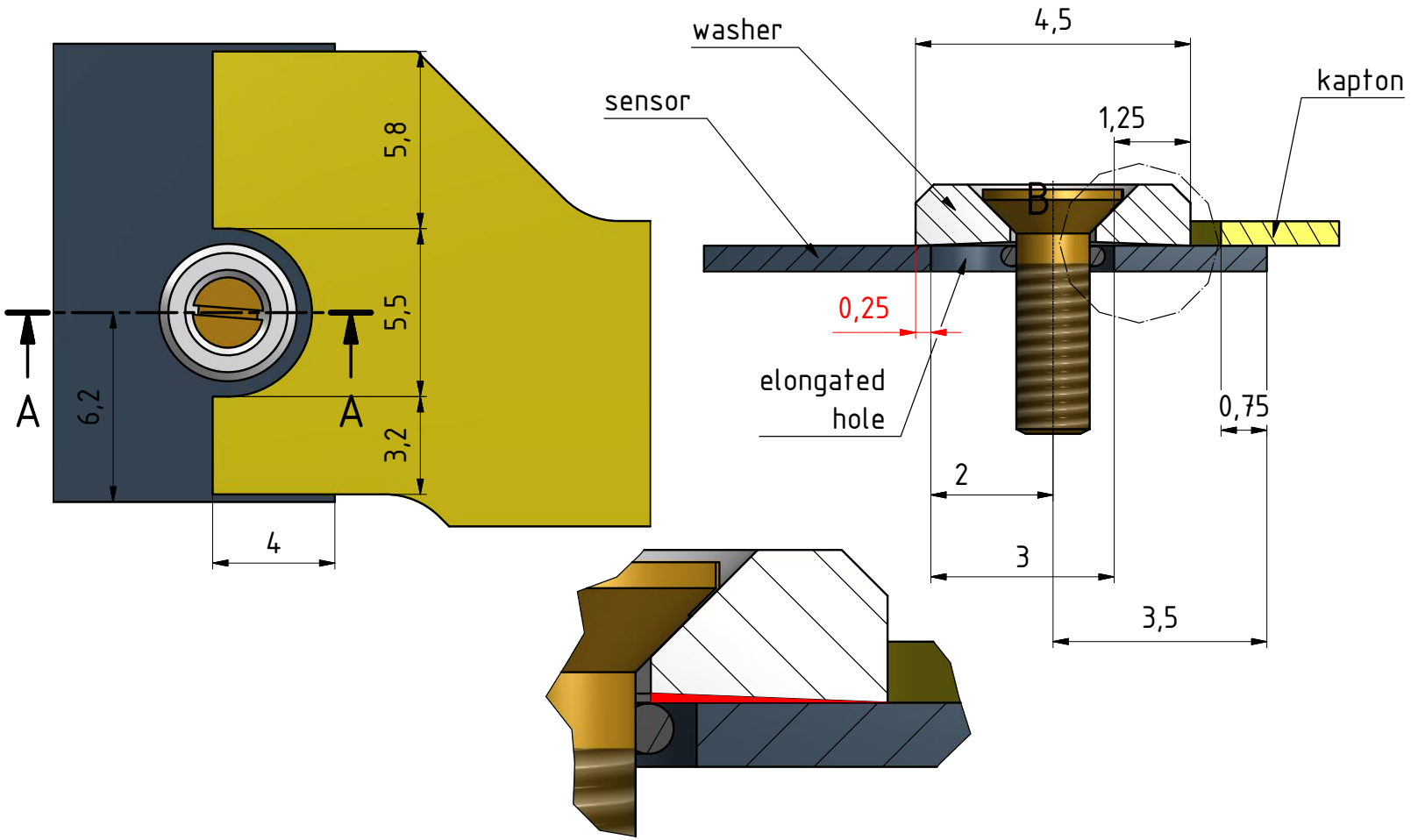
New idea: change screw from normal to countersunk and redesign washer





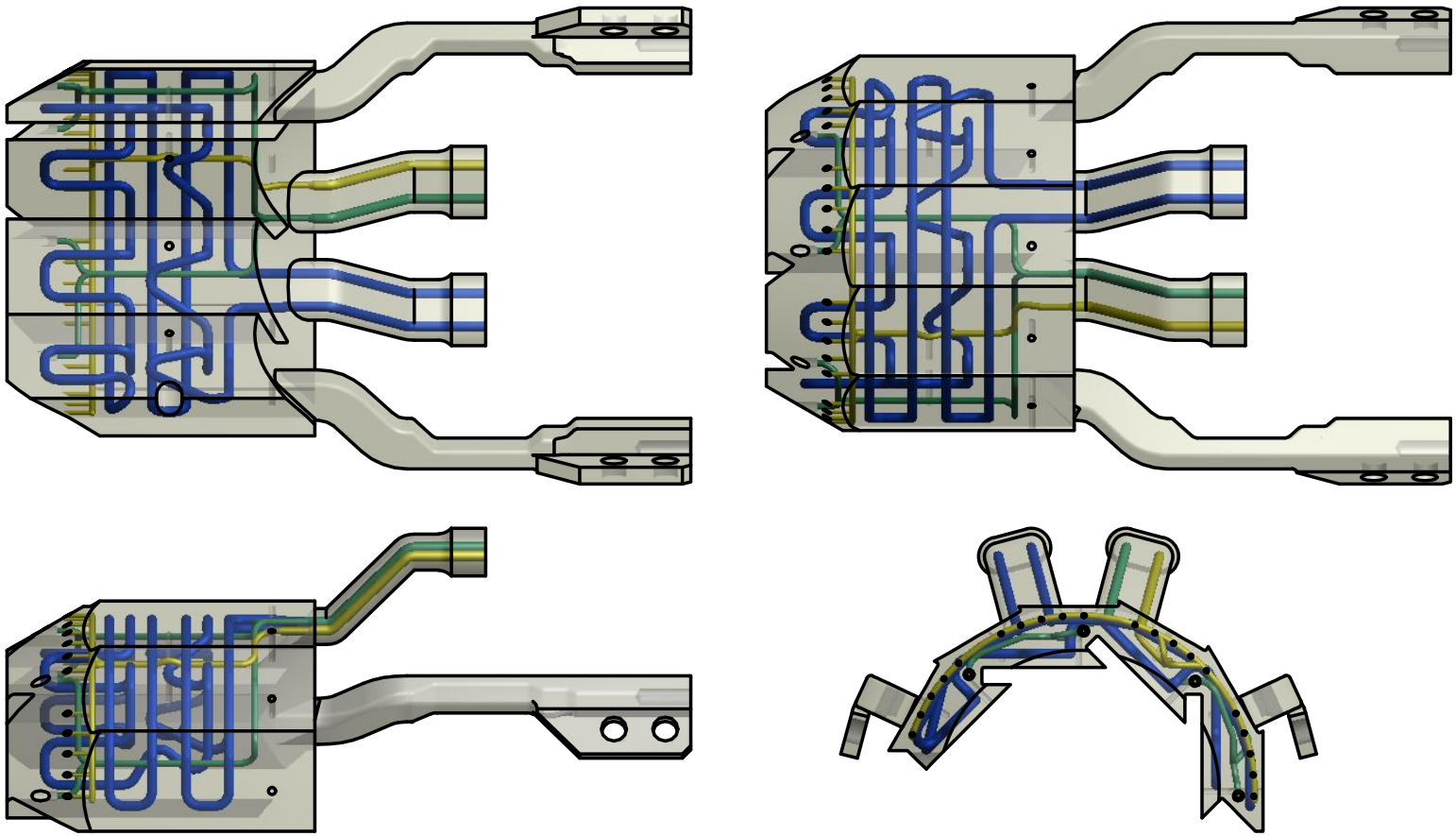
- washer/hole diameter of old solution while keeping total height to 1 mm
- O-ring solution: Added O-ring to electrically isolate Module from support, increasing hole diameter to 2 mm
- in addition, screw position was moved by 2 mm to the center

Minimal washer size



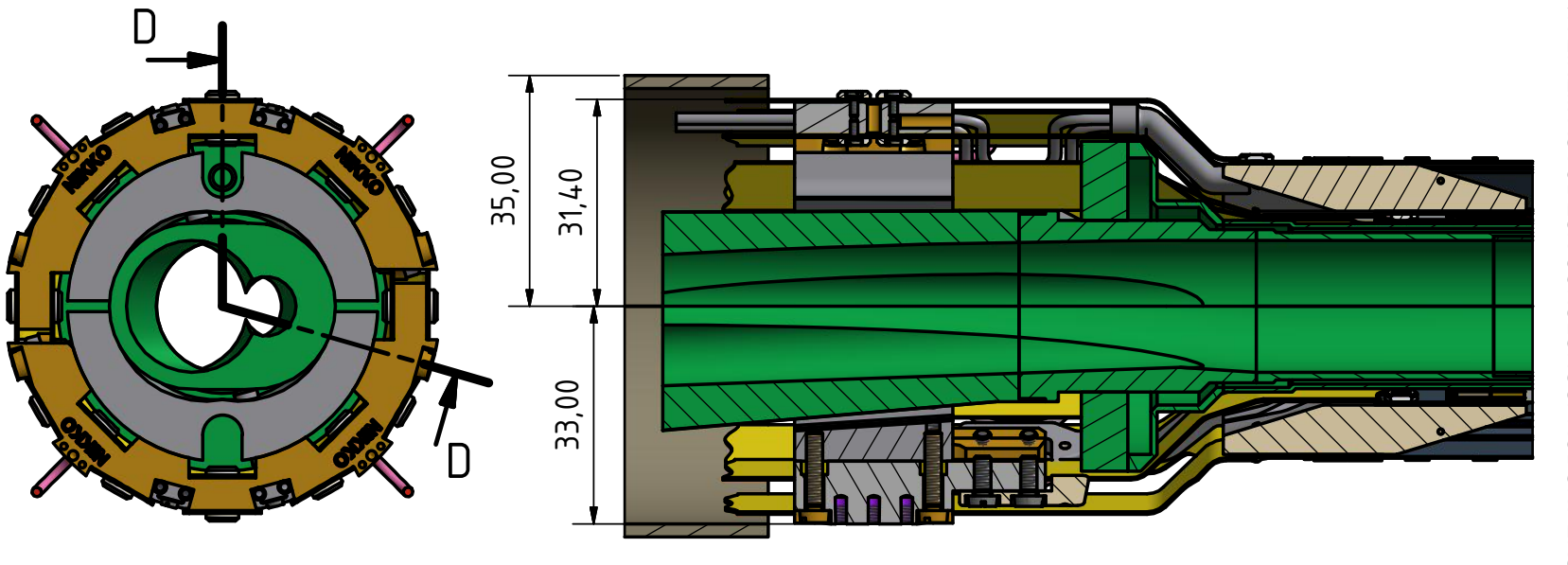
- elongated hole has a length of 3 mm
- washer always has to cover the complete whole and press on the silicon everywhere
- elliptical washer would rotate on screwing and press against kapton

Longitudinal Position of screw



- positioning of the screw closer to chips would be a major problem due to all the cooling channels.
- tests show that the channels are sufficient for cooling, so we are reluctant to completely redesign them

Outer Envelope



Due to the wider cables we could not keep the outer envelope.

- outer diameter increased by 3 mm to 33 mm
- carbon holding structure for SVD had to be modified to accommodate new design
- Possibilty to add cover for PXD if needed or for the SVD to attach the inner layer

Conclusions

- design with wider cables is finally implemented
- screwing directly on kapton does not seem favourable due to max. height constraingt
- we were able to redesign washer to go down to 4.5 mm in diameter
- outer diameter of PXD had to be increased by 3 mm

Clarification on touching modules

After having a close look at the current tolerances yesterday evening:

- due to tolerances there is an uncertainty of 0.2 mm on the edge of the sensor
- sensor to next sensitive area is about 0.8 mm
- sensor to asic/kapton of next sensor is about 0.3 mm

⇨ sensitive area is save, but it is possible (yet unlikely) that one module touches asics/cable of the next module

Thank you
for your attention

Possibility: Wirebonds behind screw