

EP R&D Project on Noble Liquid Calorimetry

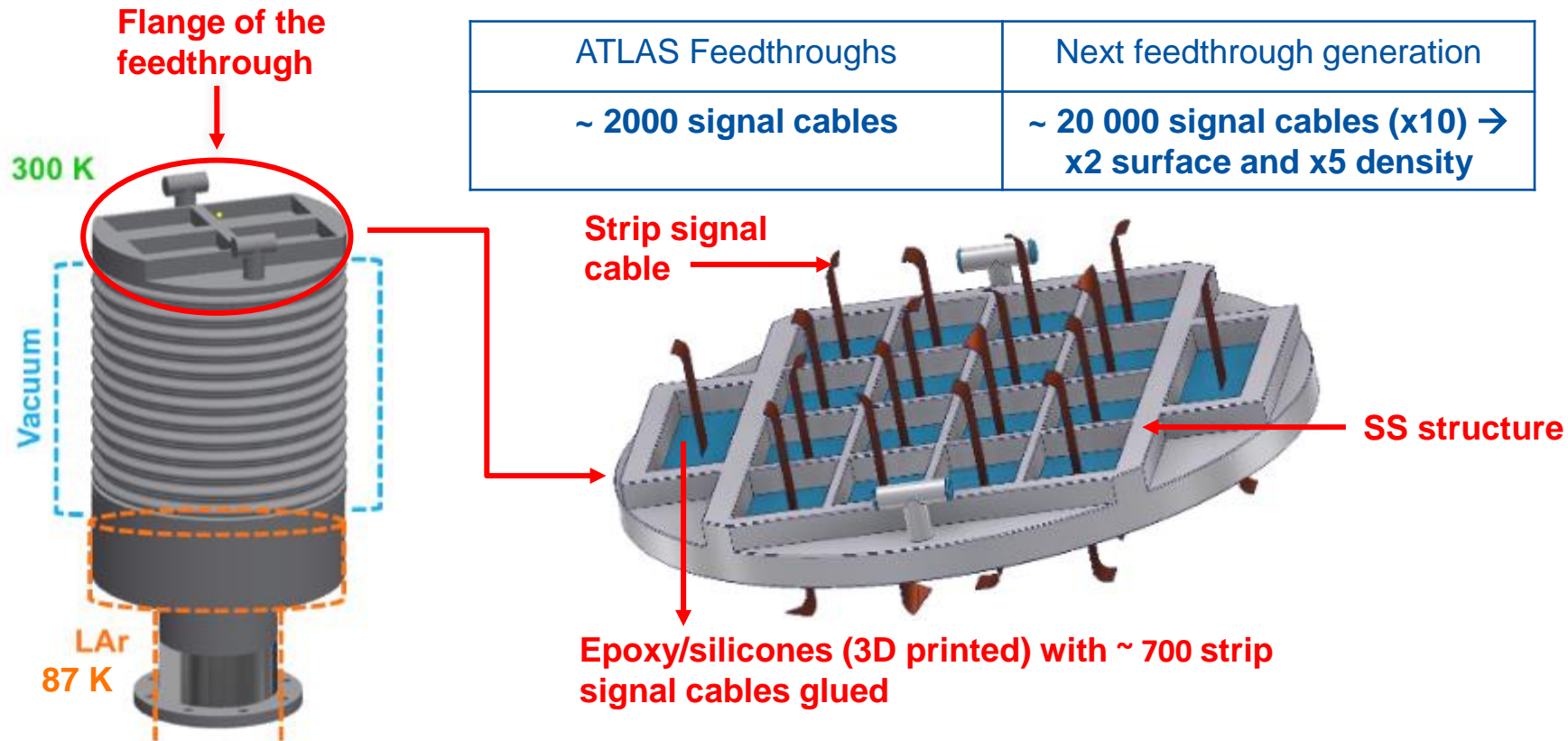
High Density Feedthrough Design

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**Meeting on FCC Noble Liquid Calorimetry
April 1st, 2021**

WP3: Calorimetry and Light-based detectors

- High density flanges → solution developed at CERN



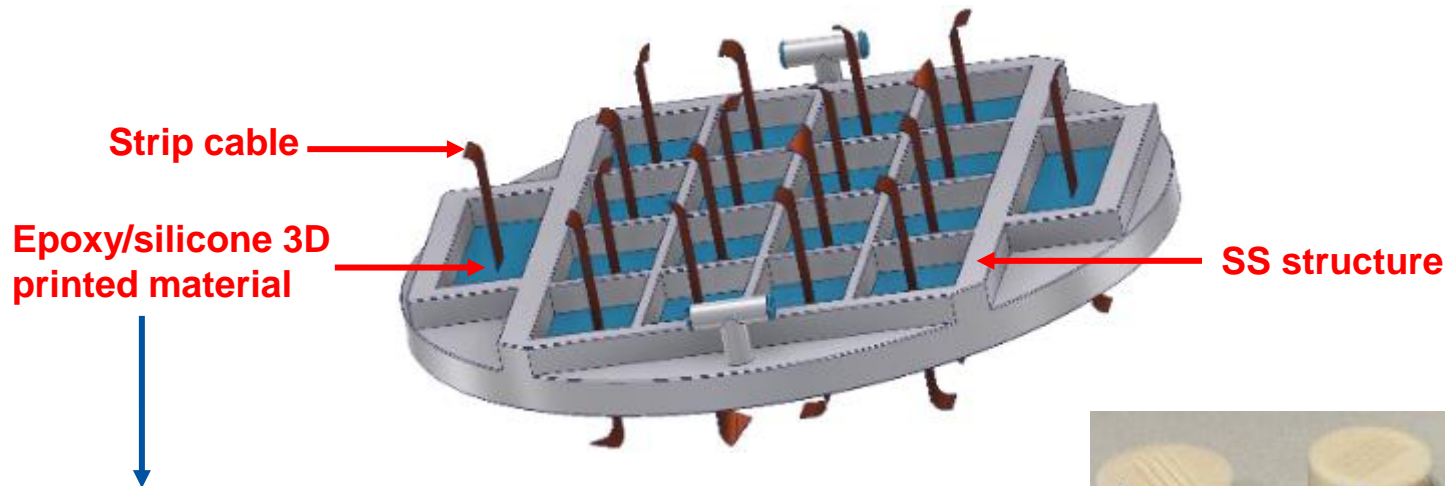
Requirements:

- 1) Leak tightness
- 2) Operating temperature (87 K)
- 3) Max. pressure (3.5 bar)

- Glues and silicones → thermal shocks and leak tests

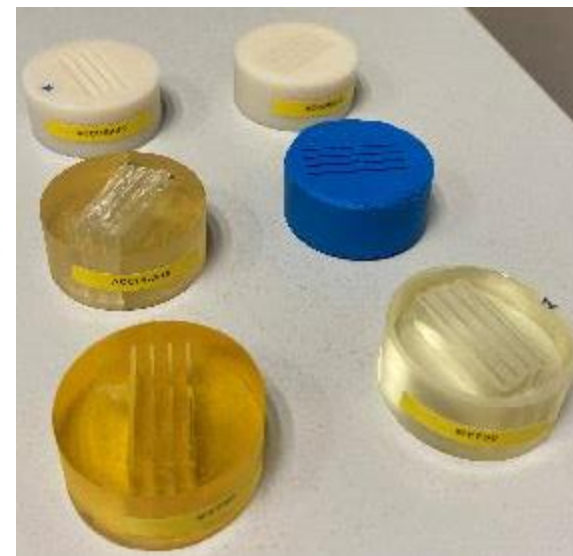
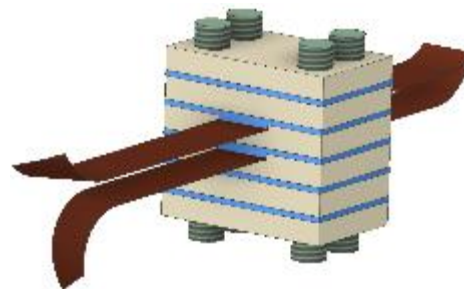
Type of glue/silicone	Leak test before thermal shock	Leak test after thermal shock
Epoxy adhesive DP190	NO LEAK	LEAKS
Loctite Ablestik 286	NO LEAK	NO LEAK
Rhodorsil CAF-4	NO LEAK	NO LEAK
Resinpro	NO LEAK	LEAKS
Epo-tek T7110	NO LEAK	NO LEAK
Araldite 2011 (old AW106)	NO LEAK	NO LEAK
Loctite Stycast 2850FT	NO LEAK	LEAKS

- Structural material → thermal shocks and leak tests



First candidates (collaboration with the Polymers Lab):

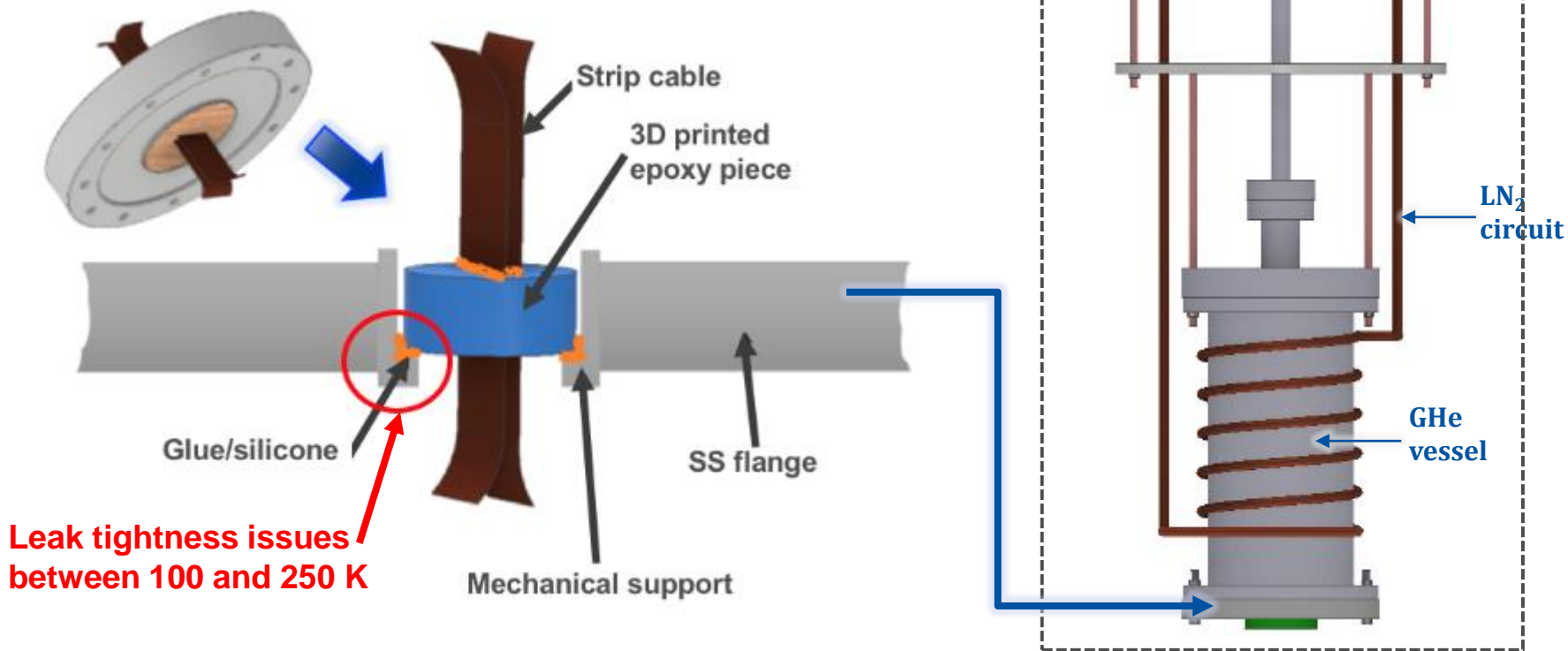
- Accura 25
- ~~Accura 48~~
- ~~SilasticM~~
- MY750
- G10 (prepared at the Cryolab)



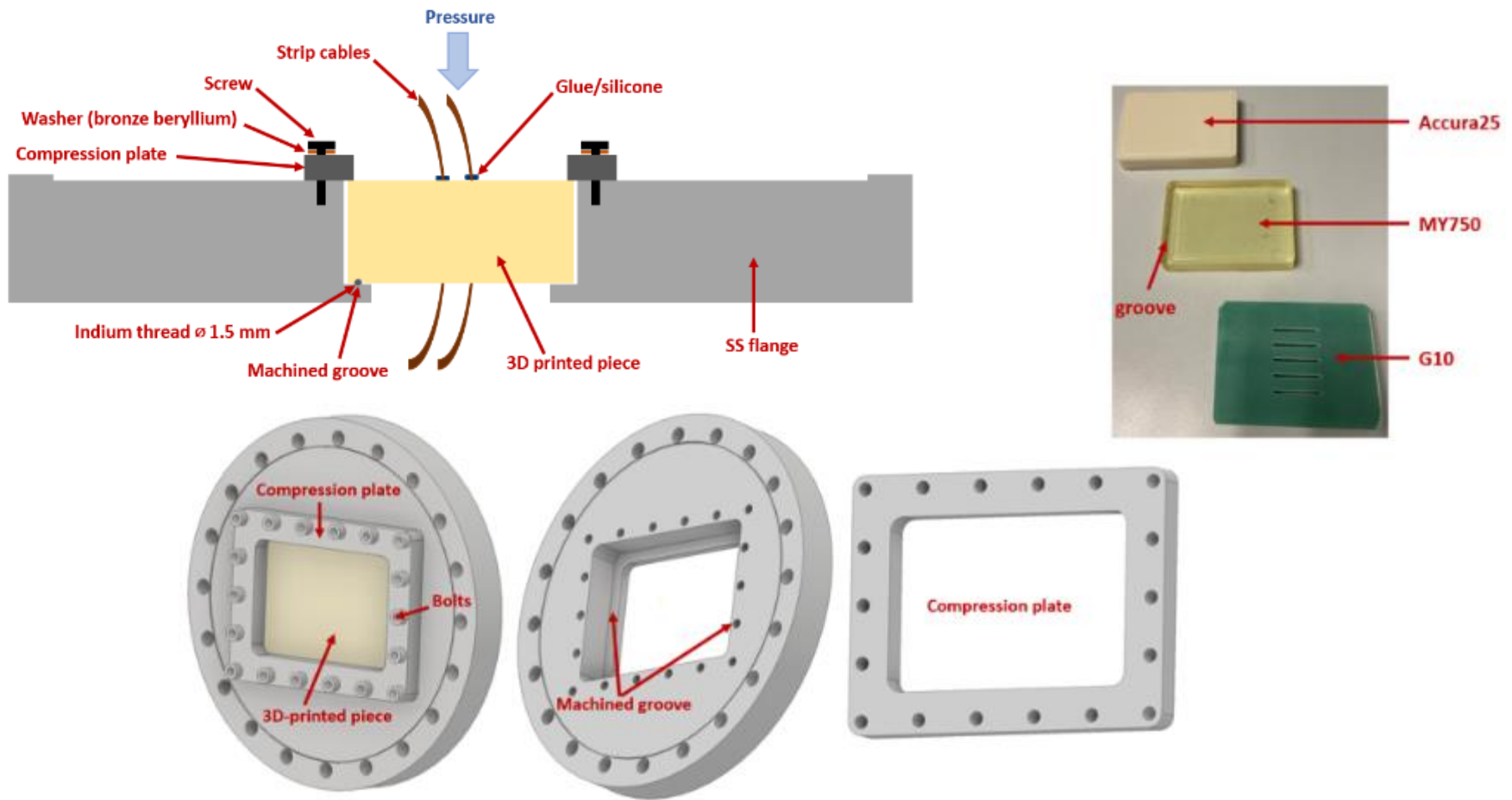
High density signal feedthroughs

Reminder

- Experimental setup
- Type of tests:
 - Pressure and leak test at 300 K
 - Pressure and leak test at 77 K



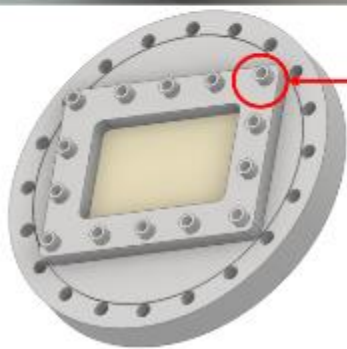
1. At present → working on a square sample with a mechanical sealing solution



High density signal feedthroughs

At present

1. At present → working on a square sample with a mechanical sealing solution → Indium seal leak tests



Leak detector connection

Type of bolt	Torque (N.m)	Torque after several hours
M6	11	6.5 - 7
M5	5	4.1
M4	4	1.8 - 2



Indium wire

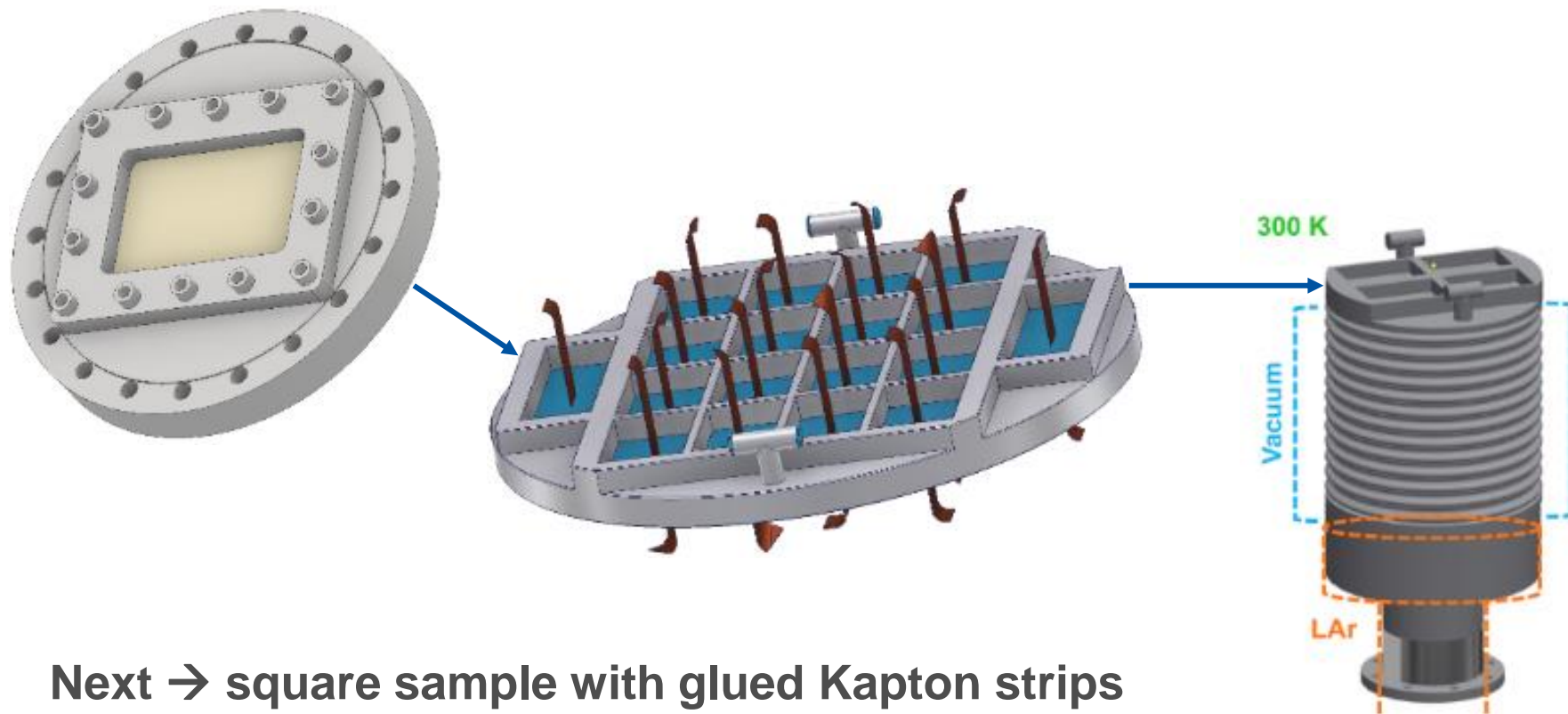


$\varnothing = 1.5 \text{ mm}$



$\epsilon = 0.1 \text{ mm}$

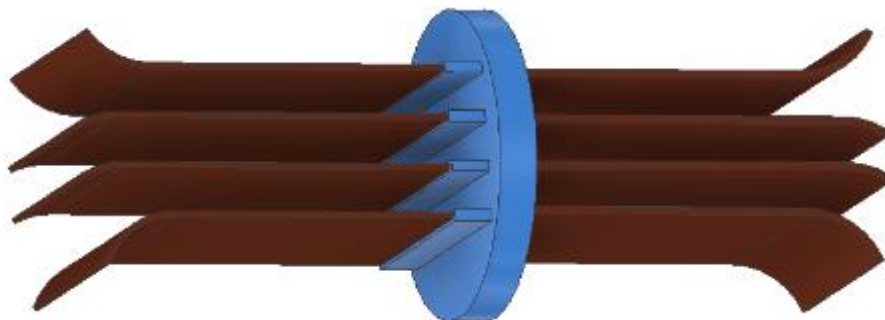
1. At present → working on a square sample with a mechanical sealing solution



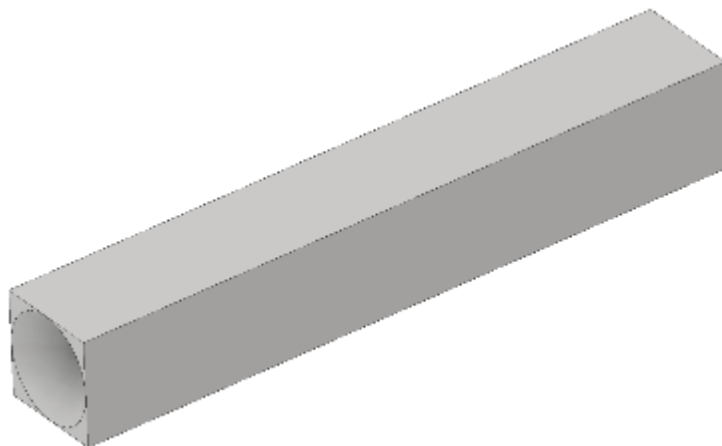
Next → square sample with glued Kapton strips representing the cables

In parallel to this...

2. Design of pieces and protocols for industrial gluing procedures...



3. CTE and thermal conductivity measurements → samples under construction



Materials:

- Accura 25
- MY750

(Between 4.2 and 300 K?)

Thank you for your attention!

Questions?



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