

160229 Engineering solutions on in-monolith optics



Update on engineering design of monolith insert

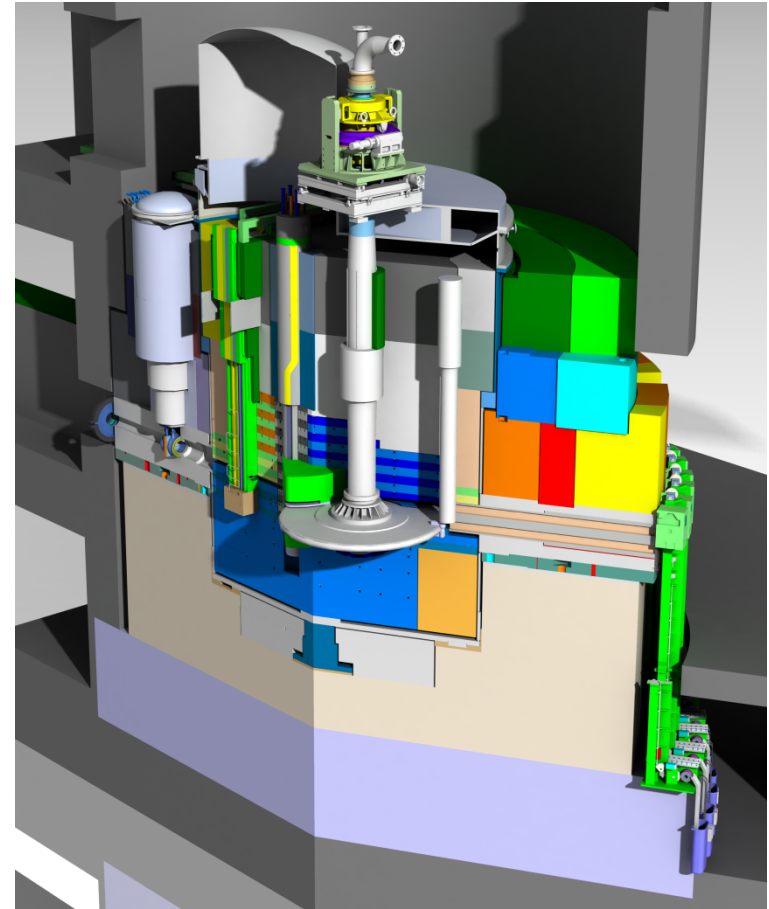
Bengt Jönsson
Mechanical Design

Content

- Monolith Layout
- Components in beam path R0-R6
- Insert (2 in 1)
 - Cooling + Alignment of Guides
- Light Shutter
- Insert Installation/Exchange
- Light Shutter Operation modes

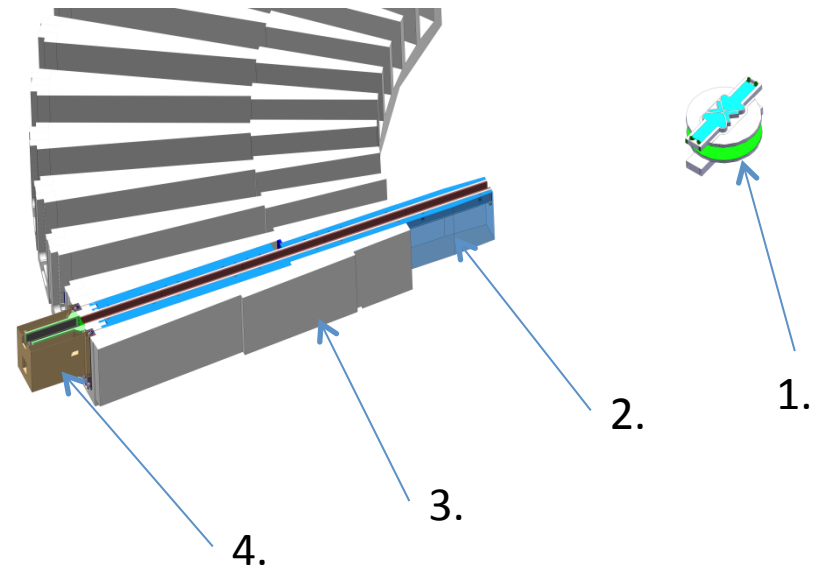
Monolith Layout

- Atmosphere inside monolith
 - He alt. Vacuum (high, 10^{-4} mbar)
 - $<100^{\circ}\text{C}$
 - Water cooling of shielding blocks



Components in beam path R0-R6

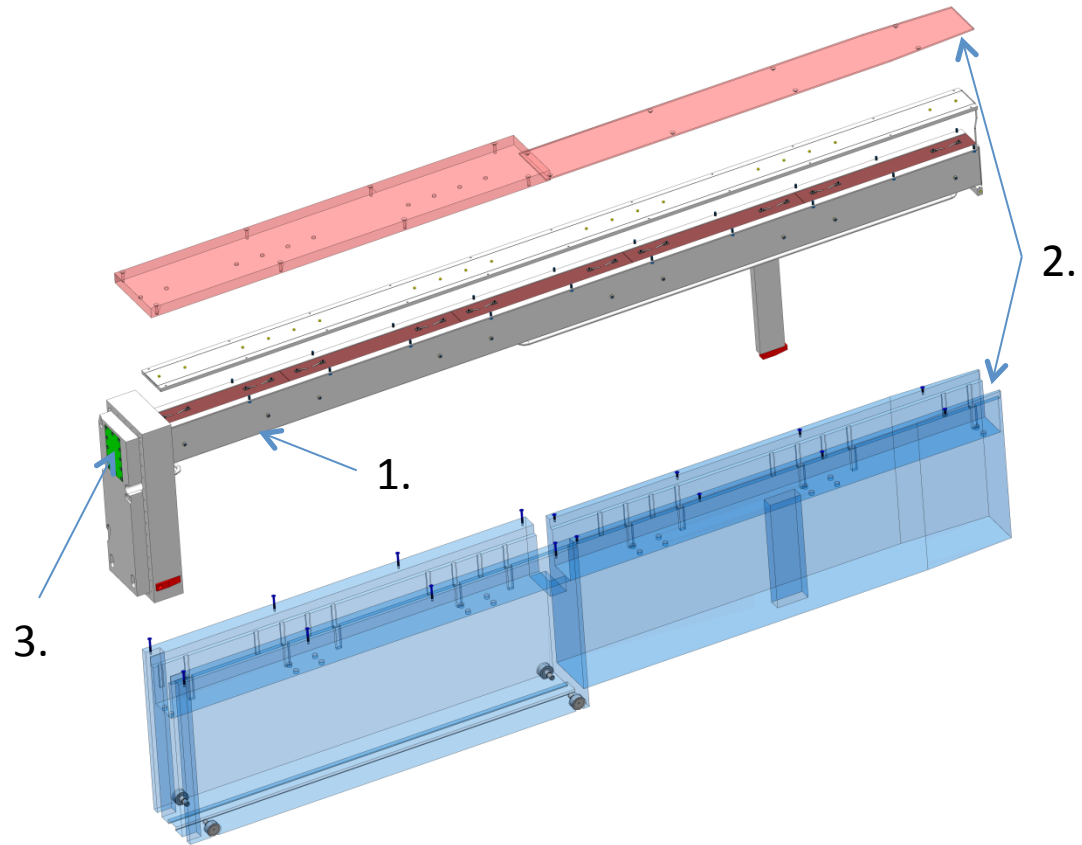
1. Moderator R0
 - TCS Target Coordinat System
2. Insert R2-R5.5
 - Guide
3. Port Block R2.7-R5.5
4. Light Shutter R5.5-R6
 - Guide



2 in 1 Insert

1. Insert Guide [1]
2. Insert Shielding (incl. lid) [2]
3. Neutron Beam Window (Al)

- [2] works as a carrier for [1] when being pushed into monolith. Decouples from each other in operational position.
- Guides have monolith atmosphere

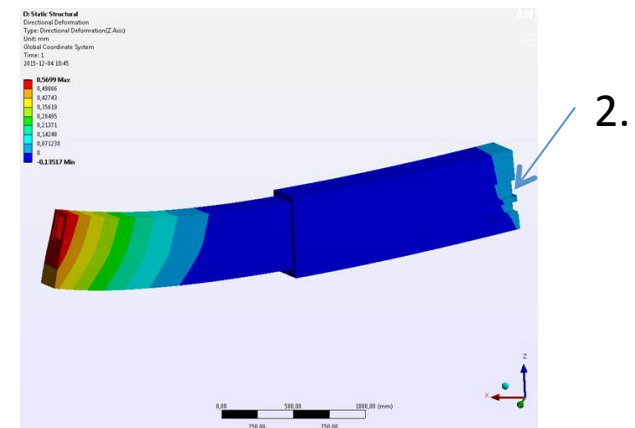
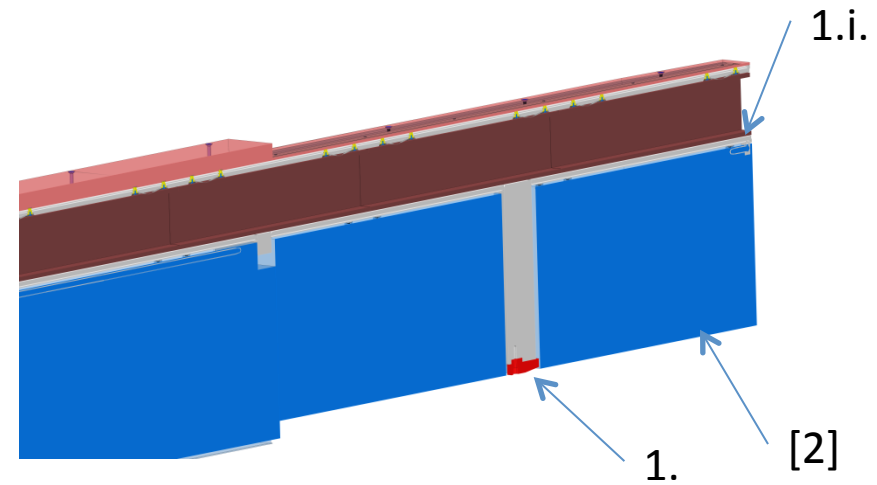


2 in 1 insert, how & why

1. Feets on [1] Insert
Guide gets into contact with port block and lifts it versus [2].

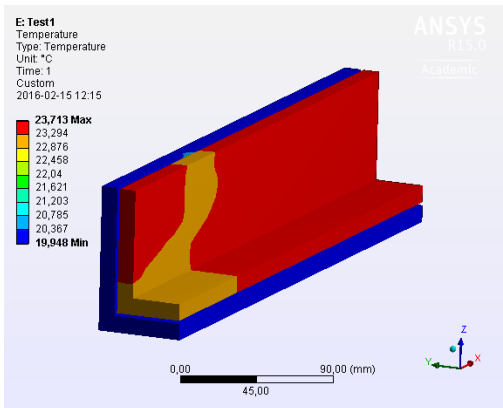
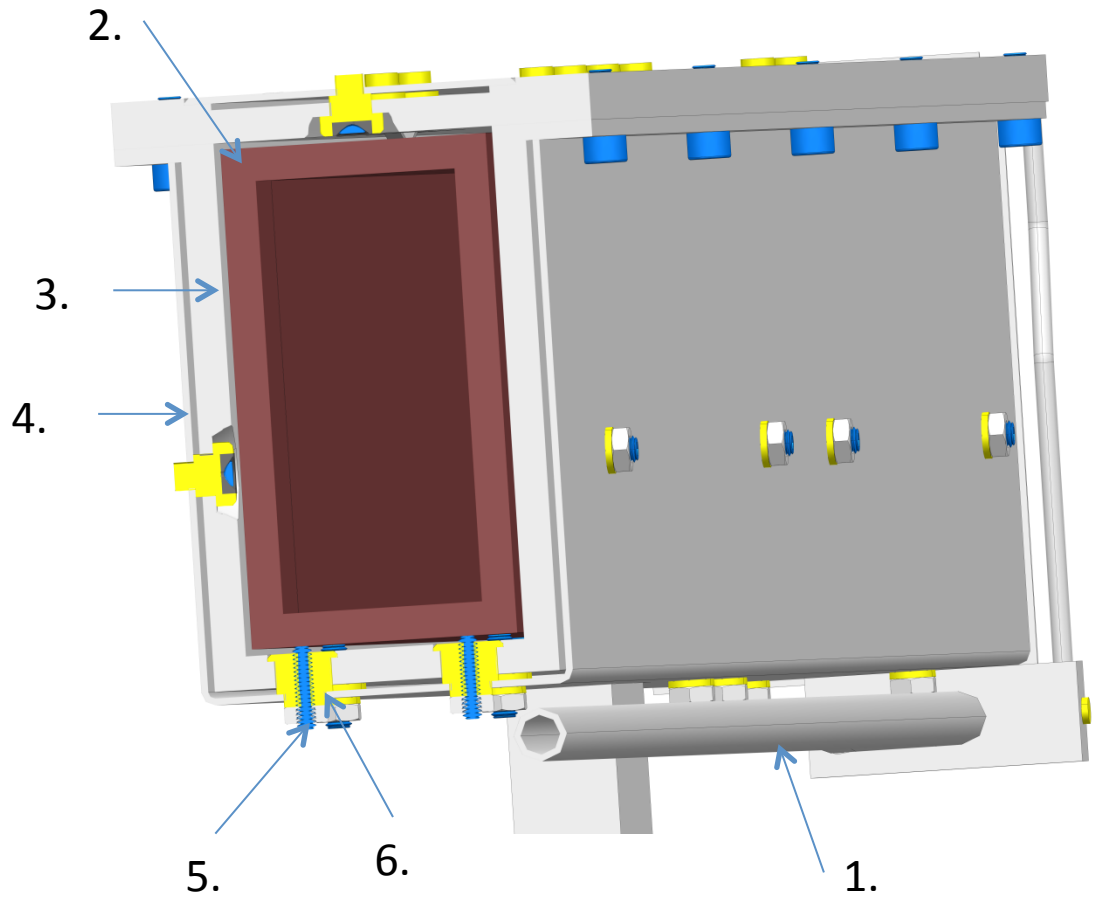
- i. Create a 5mm vertical gap 1.i.
- ii. Horizontal gap is 3mm

2. Deformation due to heat if insert is in one piece. [Anders Olsson]



2 in 1 insert: Cooling + Alignment of guides

1. Water supply. 100g/s 20° 1*)
2. Guide substrate
 - i. 10mm Cu
3. Alignment gap 2mm
4. Cooling gap 2mm
5. Set screw Cu – Cooling point
6. Sleeve
7. Guide substrate temperature [Anders Olsson]



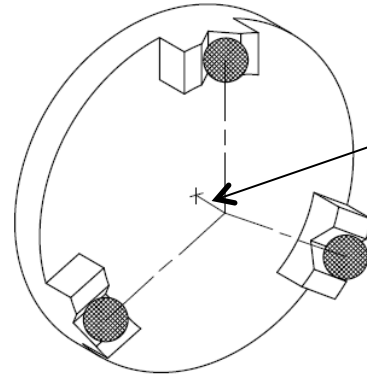
1*) Main part for cooling of Insert Shielding

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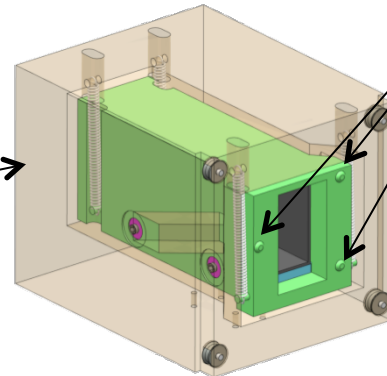
Light Shutter [Jarich Koning]

- Docked onto the Insert
 1. Aligned with kinematic mounts
- Guide internal atmosphere not supported by light shutter
- Three-balls-in-3-V-grooves concept
- Guide mounted in Cradle

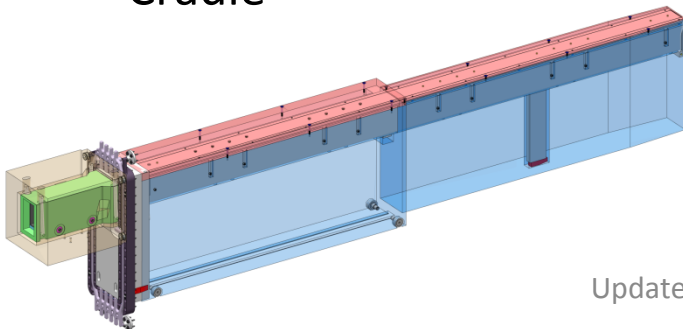
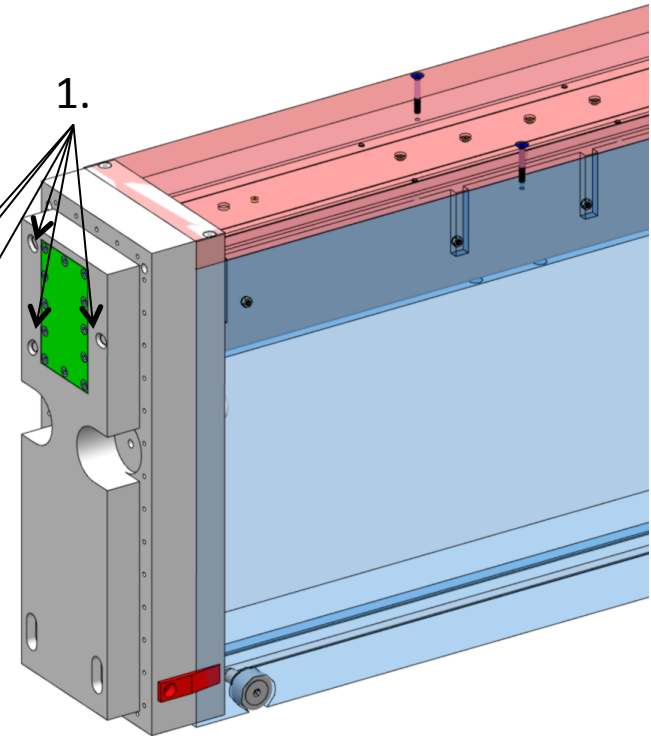
Functional principle of mount



V-grooves define central axis which should be the thermal center of the guide



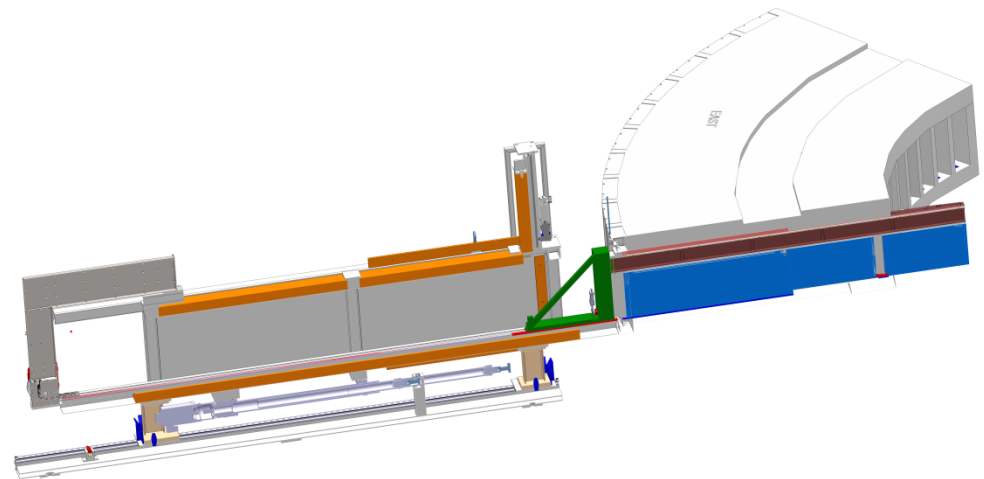
1.



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Insert Installation/Exchange

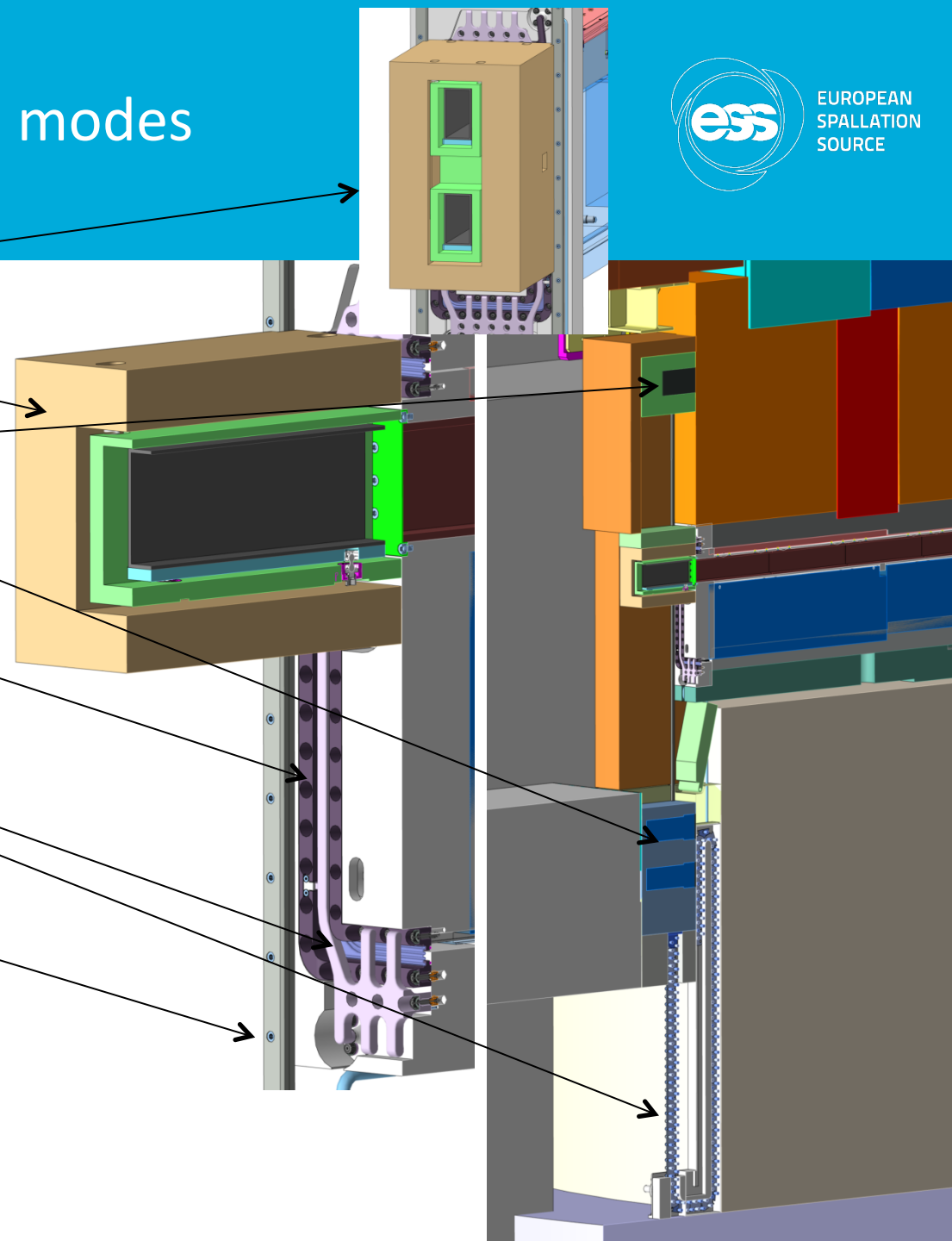
- Insert Exchange Tool
- Pushes/pulls the Insert in/out of the monolith
- Footprint R5.5-R12.5



Light Shutter operation modes

[Jarich Koning]

- Double or single channel in a cradle
- Neutron beam shutter (option)
- Gamma beam shutter (option)
- Sealing, fastening and compression assy (severely restricted in access)
- Actuation from basement
- Guide rails
- Locking blocks and guide engagement by linkage actuated from basement (not shown)



Final Slide in presentation

- Thankyou