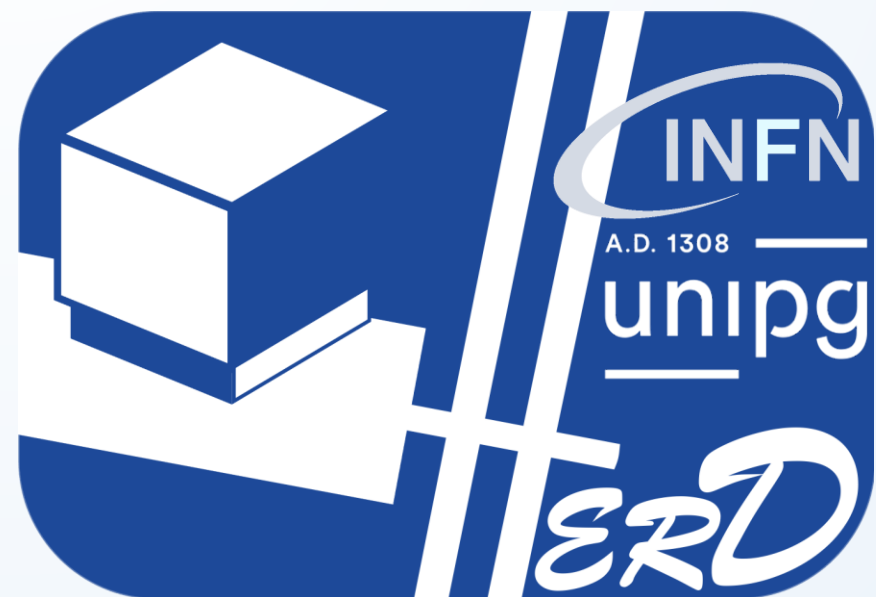




SCD progress
meeting

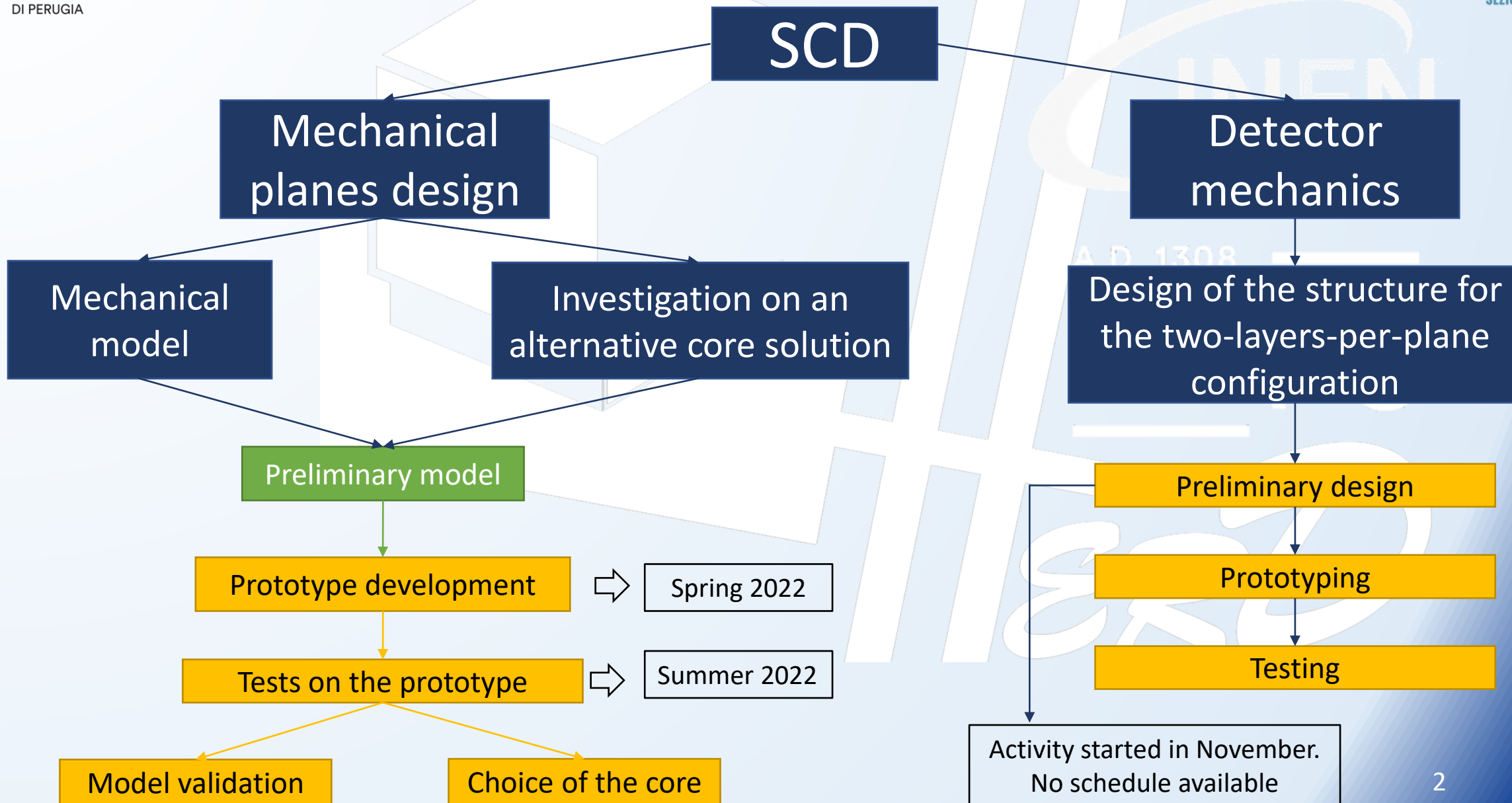
December 6th, 2021

Status and prospects of the SCD mechanics

Mechanical team
Perugia

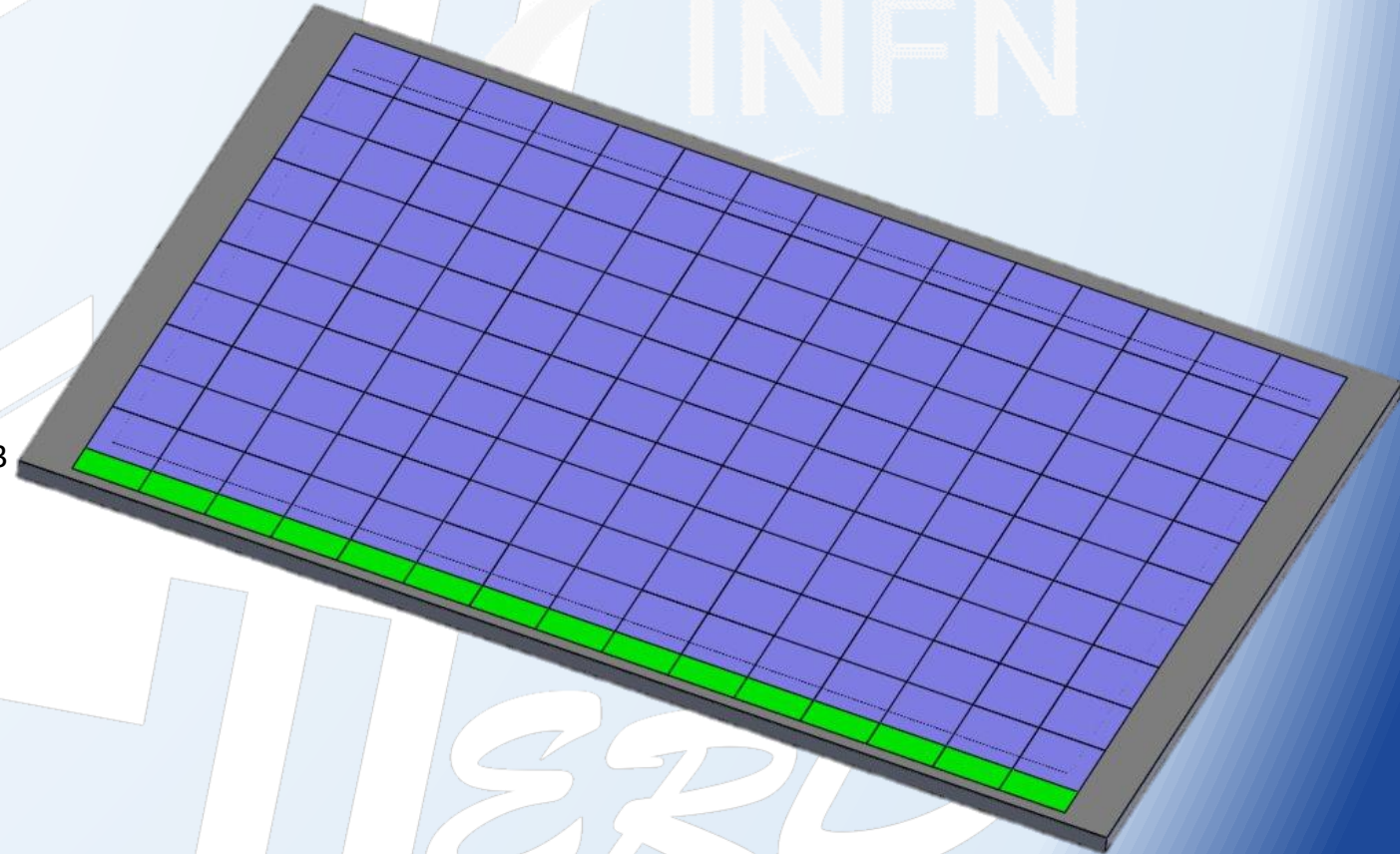
L. Mussolin, E. Mancini

Activities of the mechanical team

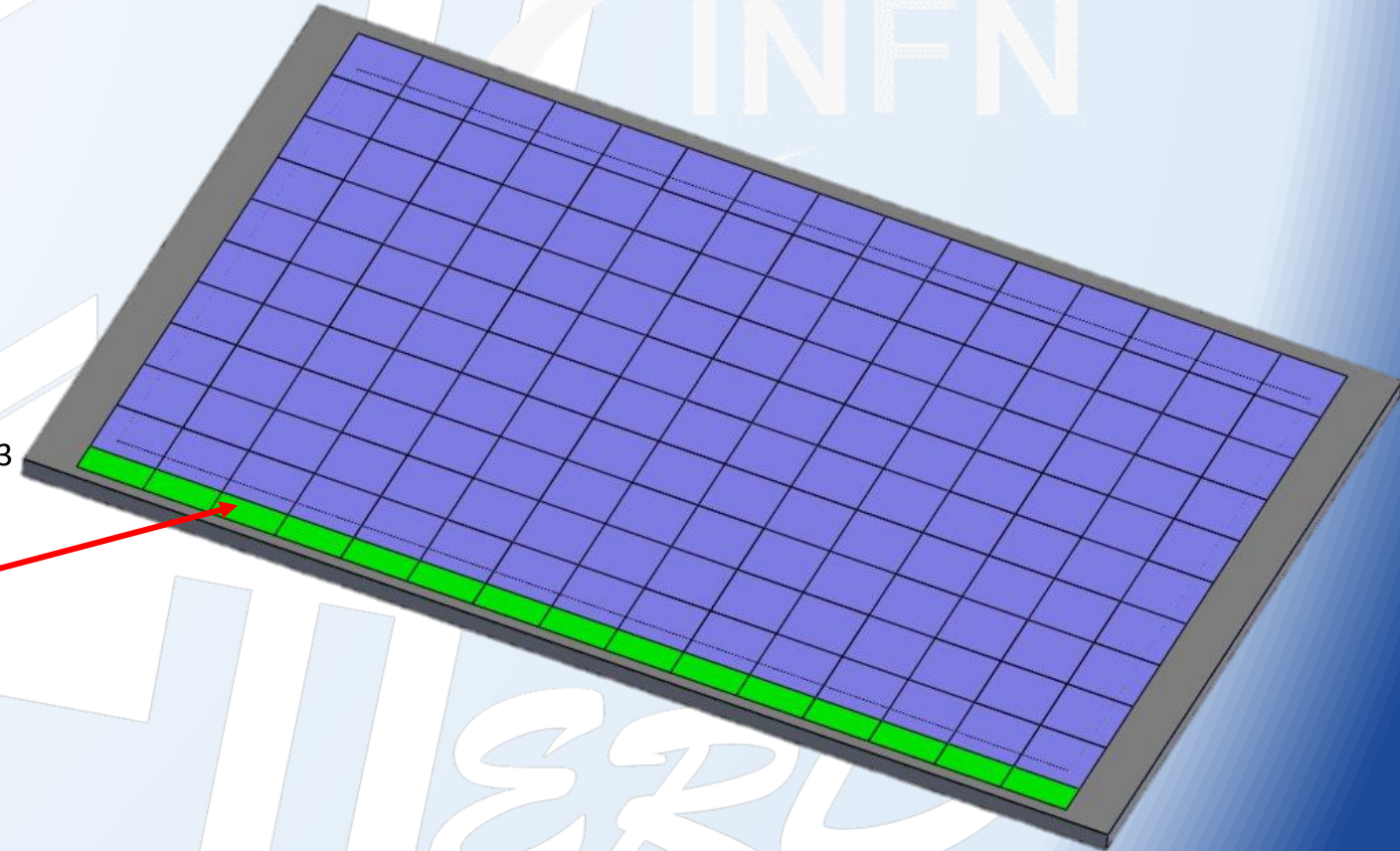


HERD SCD - Mechanical planes

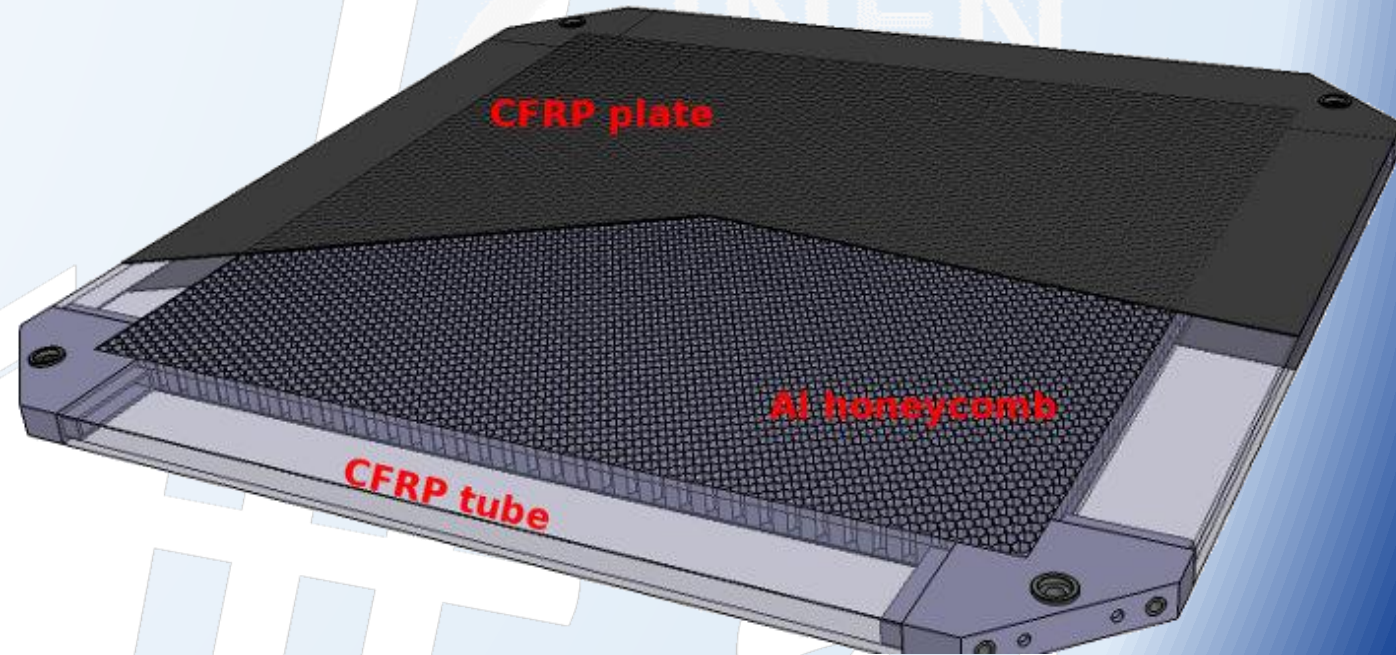
- Two kinds of planes: “**side**” and “**top**”
- **Side:** dimensions 1600 x 1100 x 40 mm³
- **Top:**
 - **Outside config.:** dimensions 1800 x 1800 x 40 mm³
 - **Inside config.:** dimensions 1400 x 1400 x 40 mm³



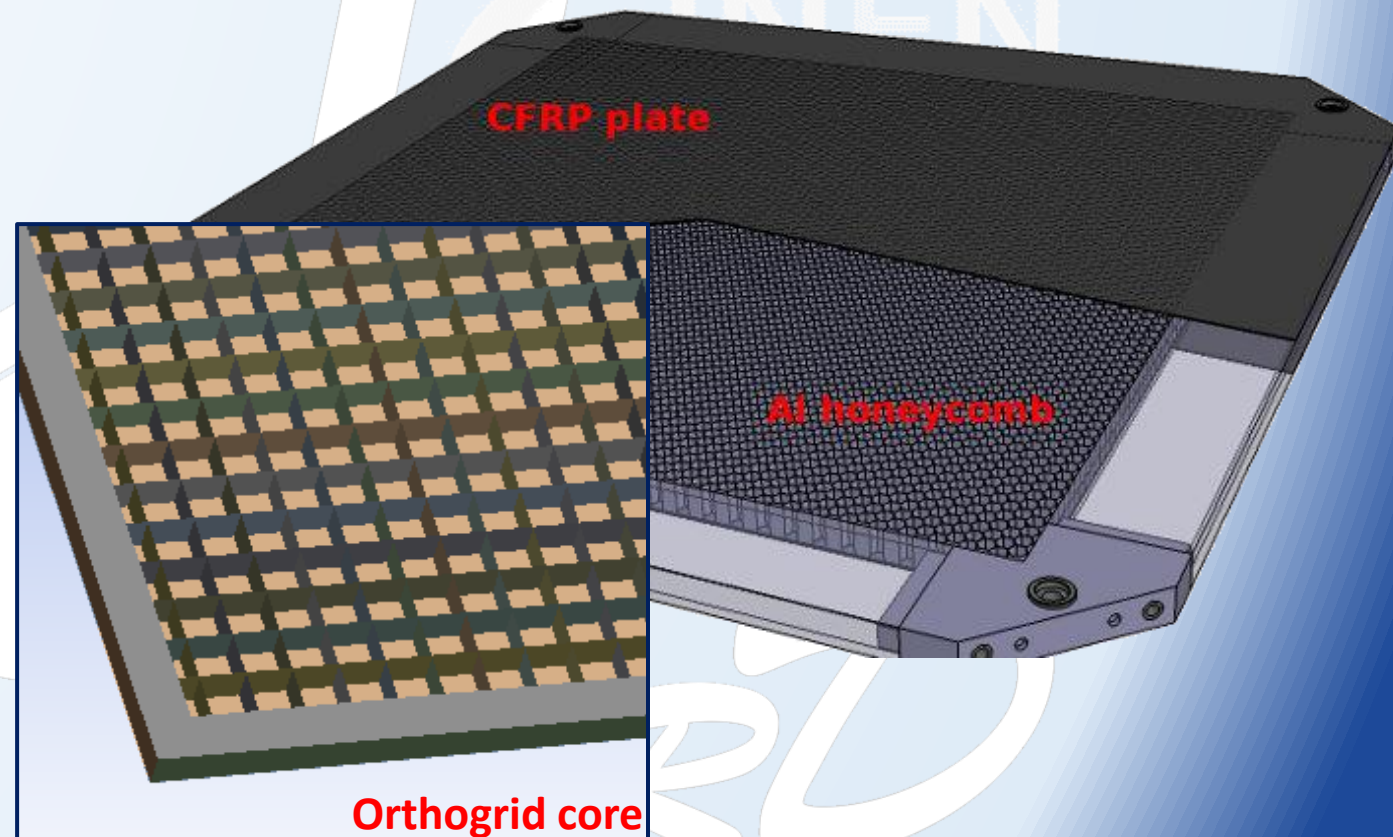
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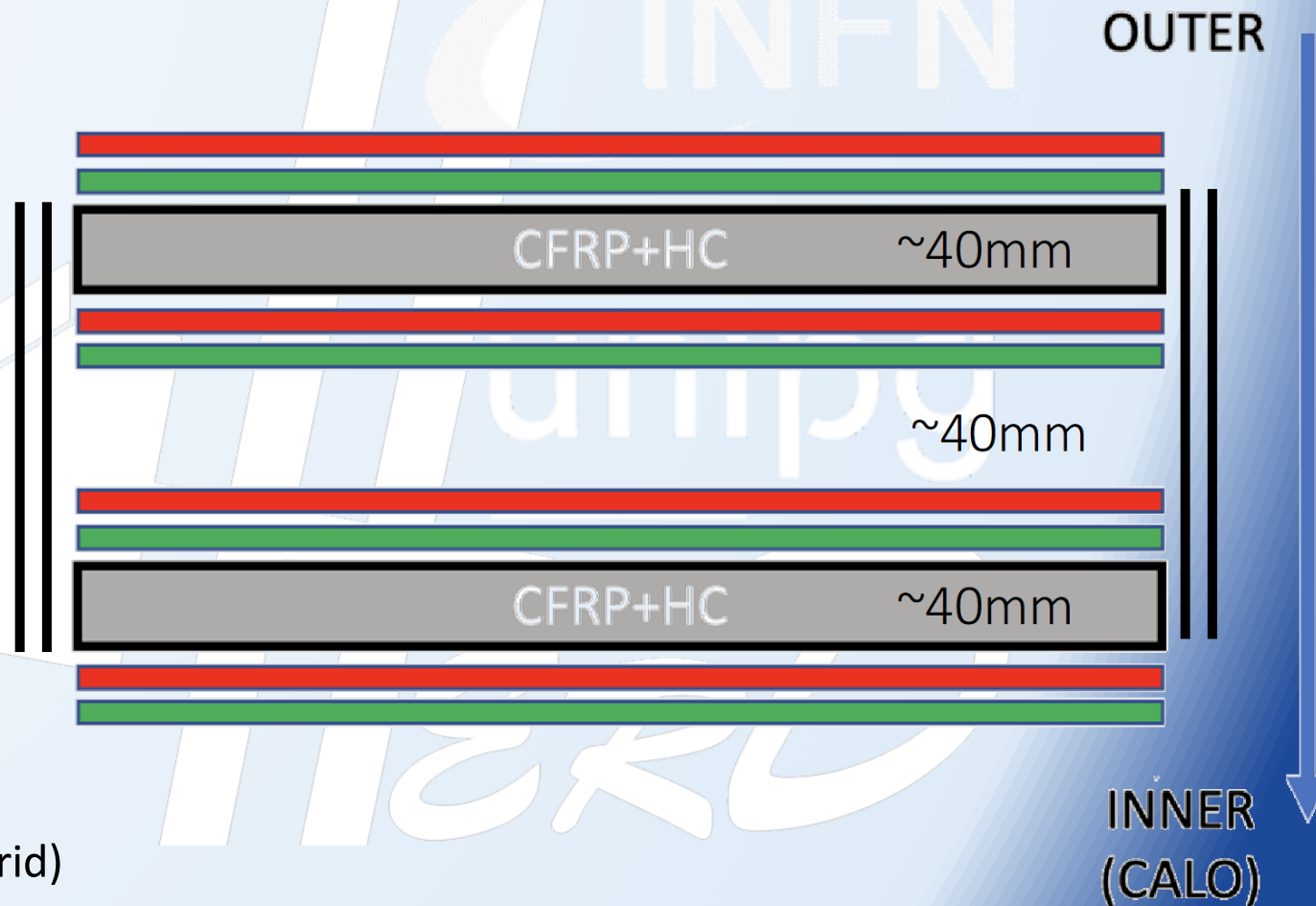


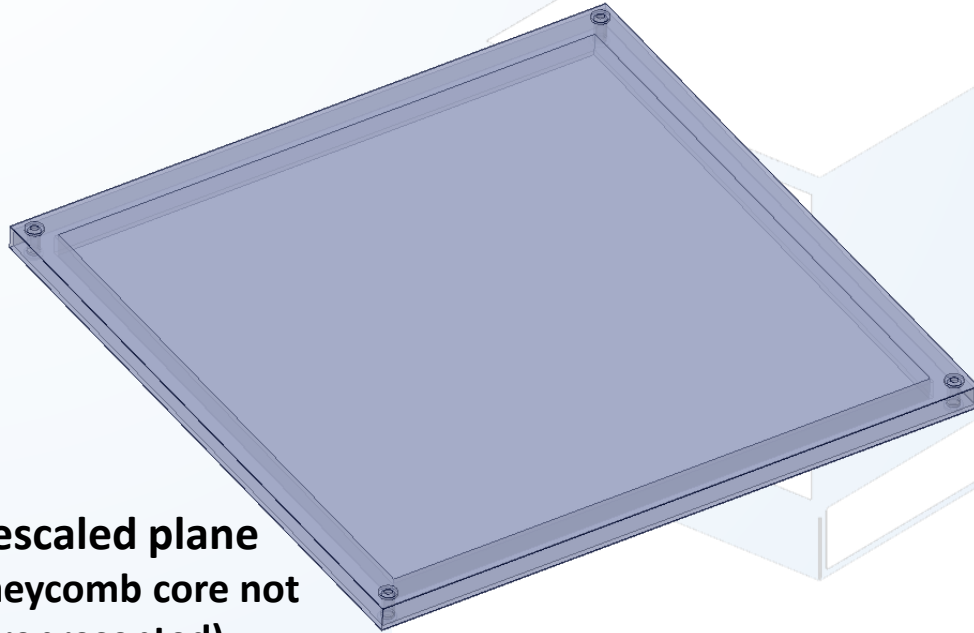
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 - Less massive core (sandwich replaced by orthogrid)



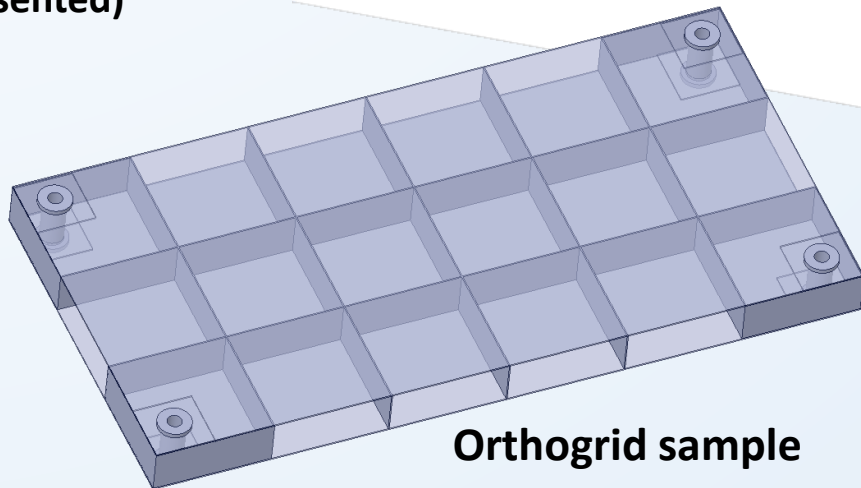
HERD SCD - Mechanical planes

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 - Two-layers per side (4 layers per plane): CFRP - layer – spacer - layer





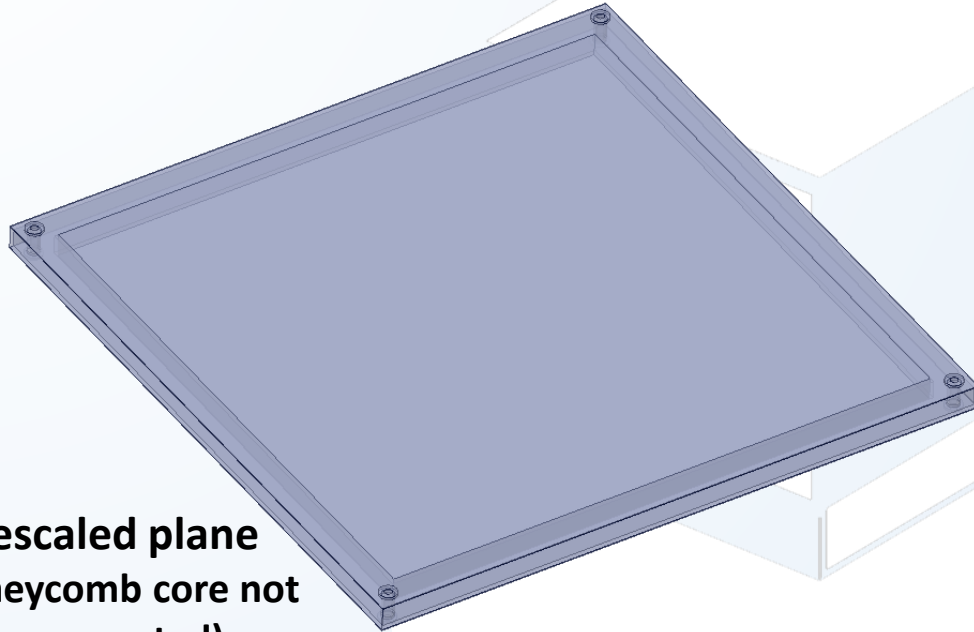
Rescaled plane
(honeycomb core not represented)



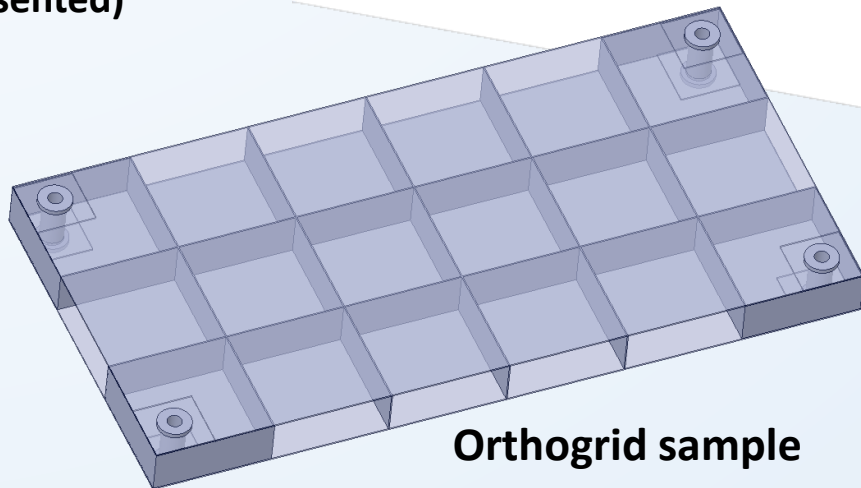
Orthogrid sample

Prototypes ordered:

- **A rescaled complete mechanical plane 500 x 500 mm²**
 - Objective 1: model validation
- **Sample of the components**
 - Objective 2: mechanical characterization (needed for objective 1)
 - Objective 3: investigation on the orthogrid core



Rescaled plane
(honeycomb core not represented)



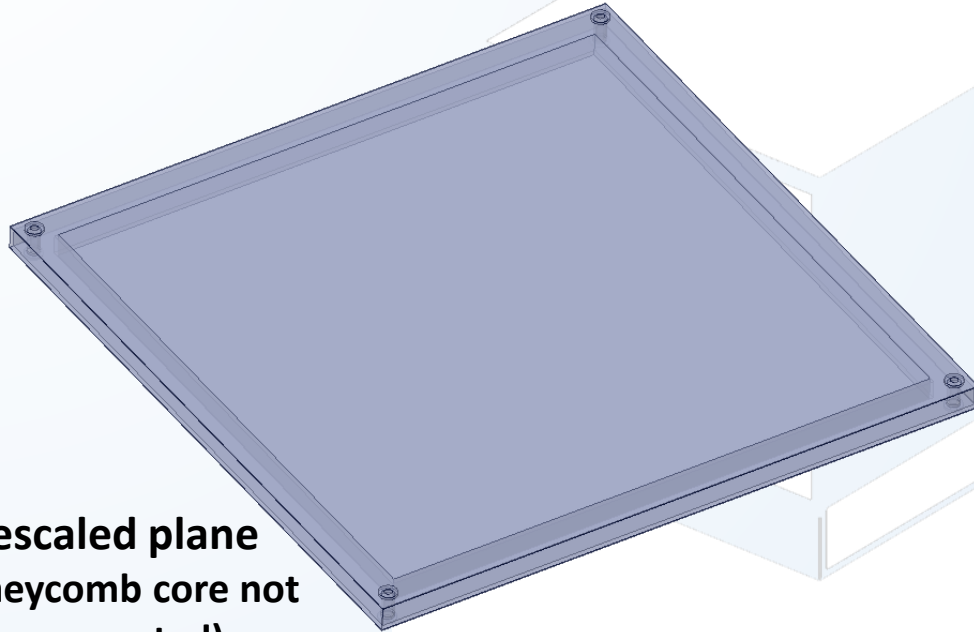
Orthogrid sample

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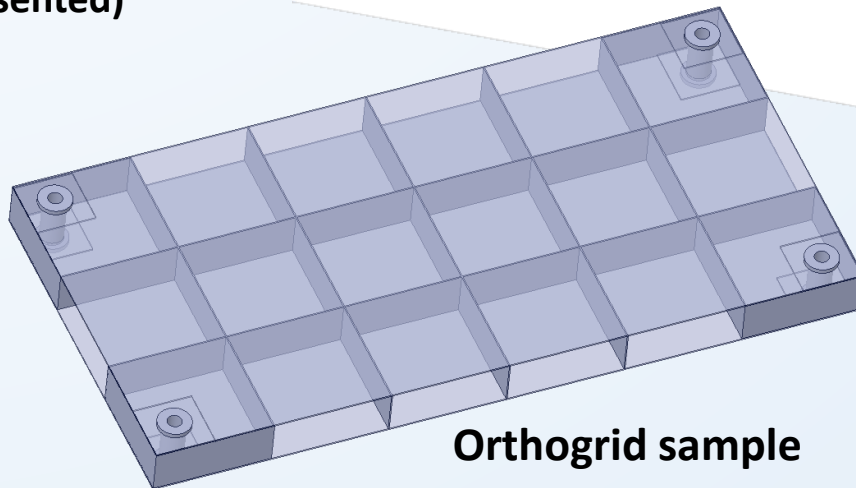
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Foreseen tests:

- **Rescaled plane: Vibration and thermovacuum**
- **Samples: 4-point bending and/or static pull (classical) and vibration**



Rescaled plane
(honeycomb core not represented)



Orthogrid sample

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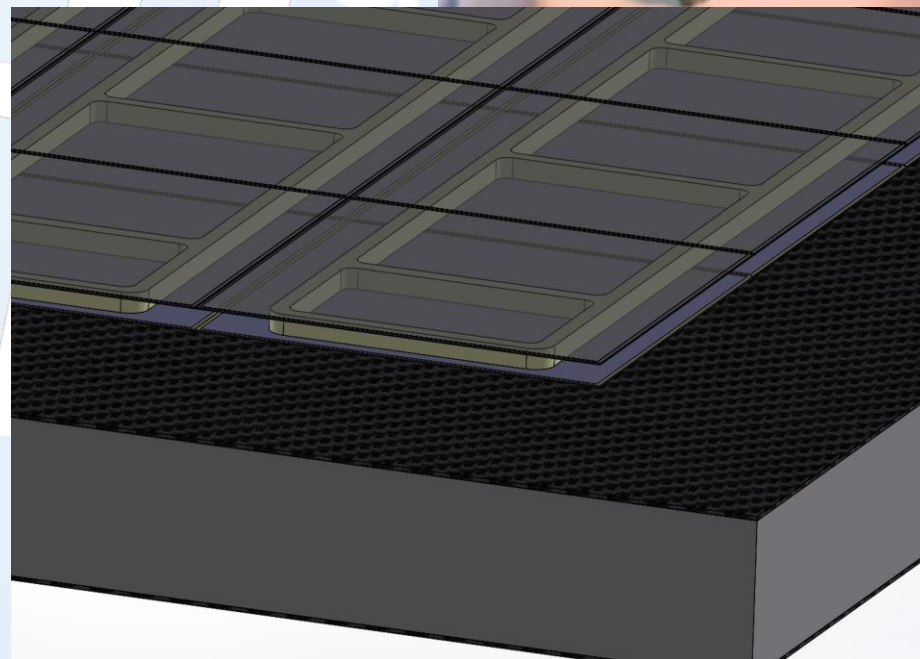
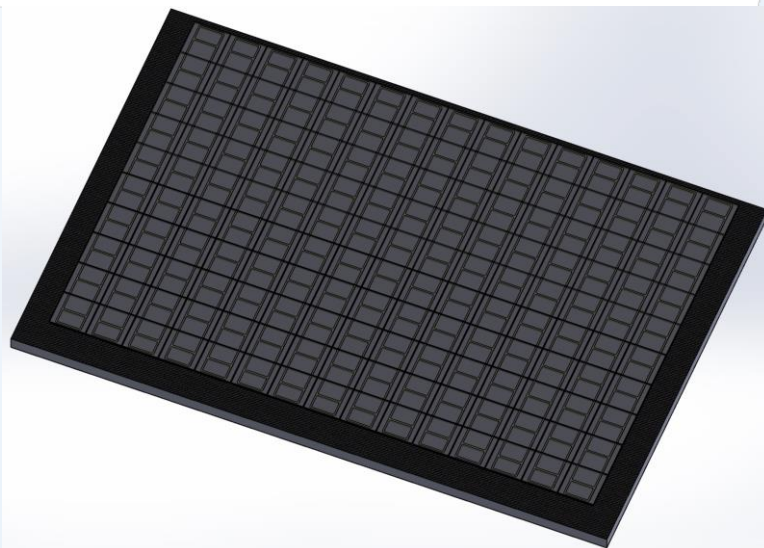
Desired outputs:

- **Calibrated model for mechanical response prediction**
- **Deep understanding of the orthogrid core**

HERD SCD – Detector top layer supporting structure

Preliminary design:

- **Structure:** airex – CFRP structure (AMS heritage)
- **Requirements:** capability to withstand the launch loads + position stability
- **Height:** TBD. Effort towards < 5 mm
- **Critical aspects:** ladder length
- **Verification:** static and vibrational tests, thermo-vacuum on ladder with fake and real detectors.



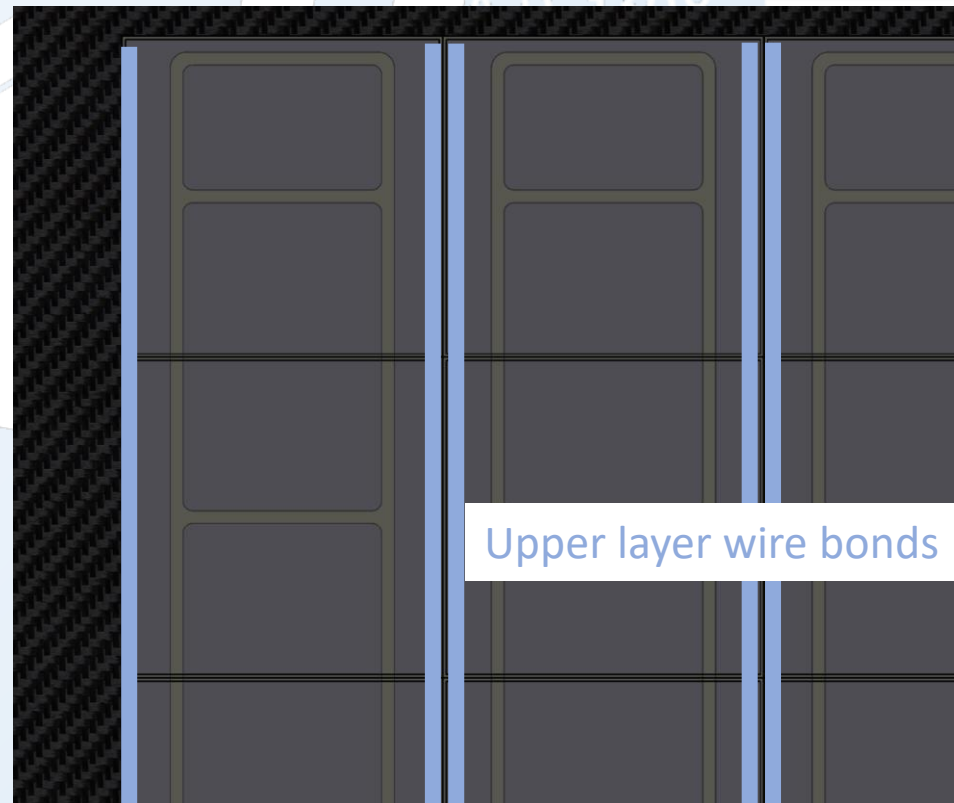
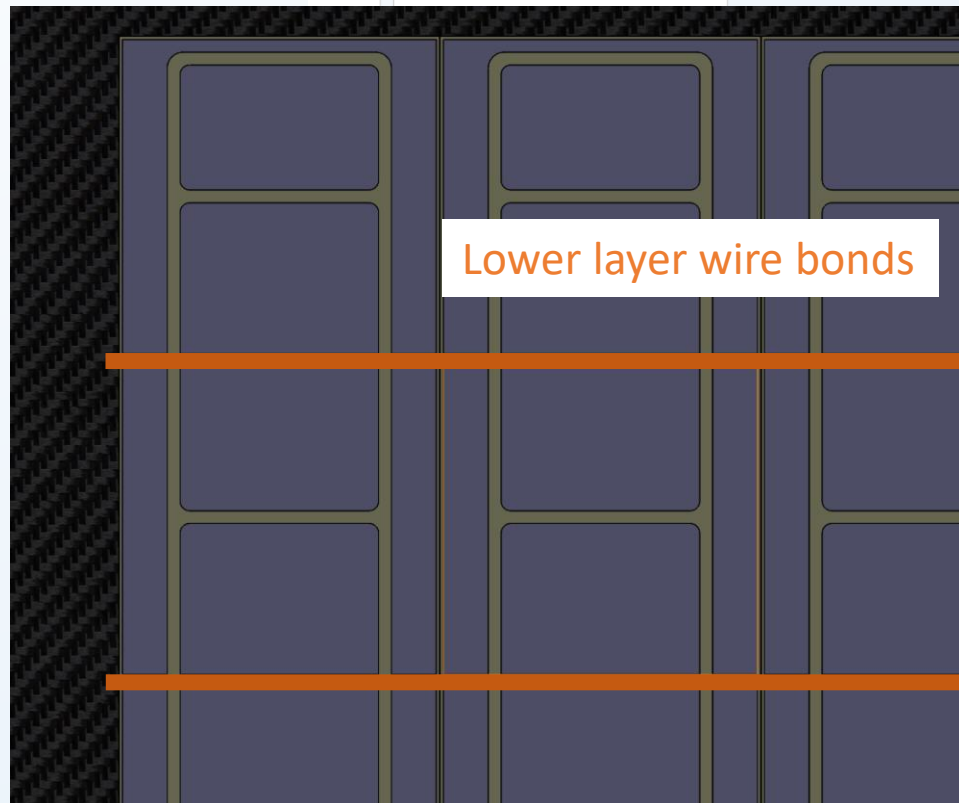


Thanks for the attention!

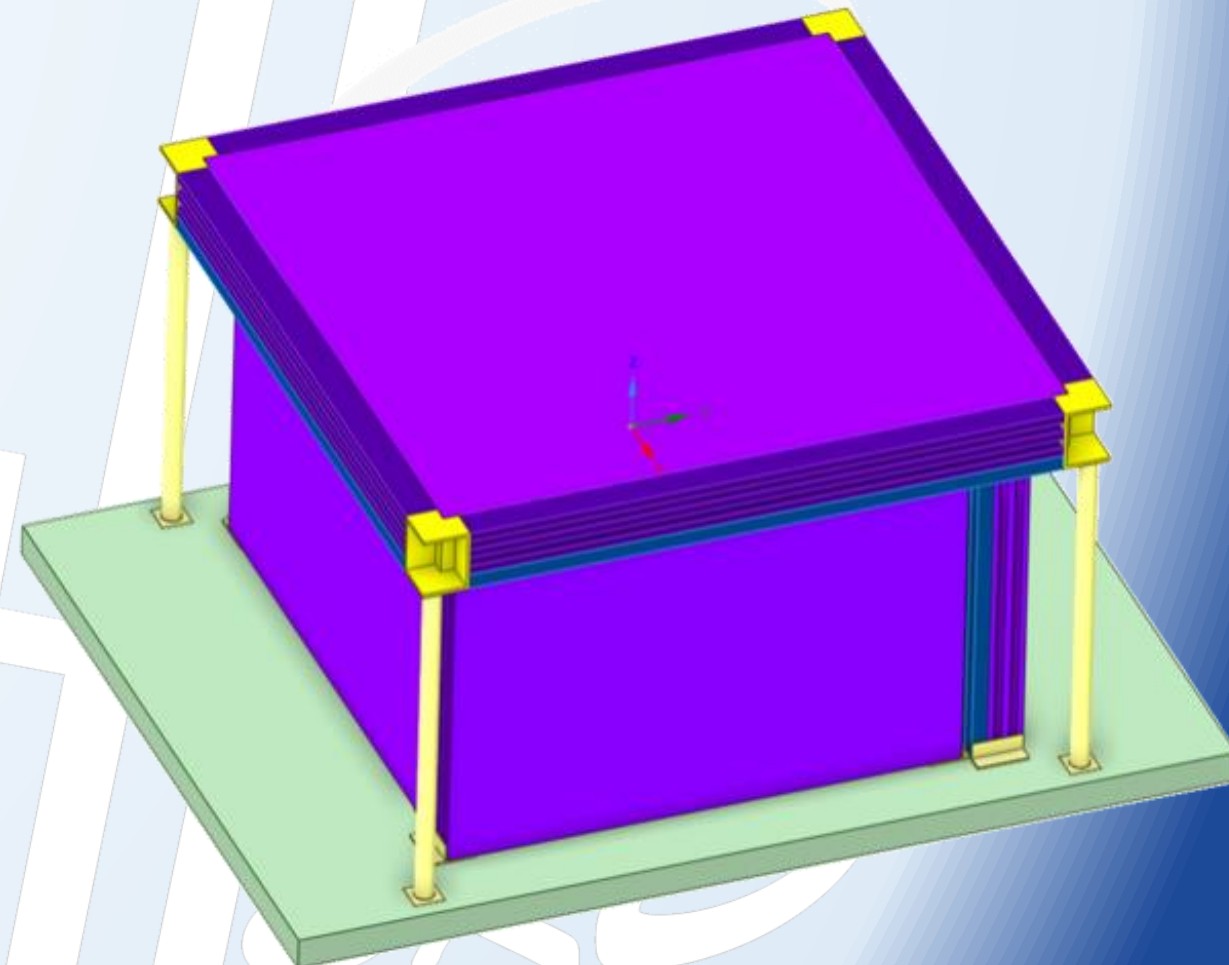
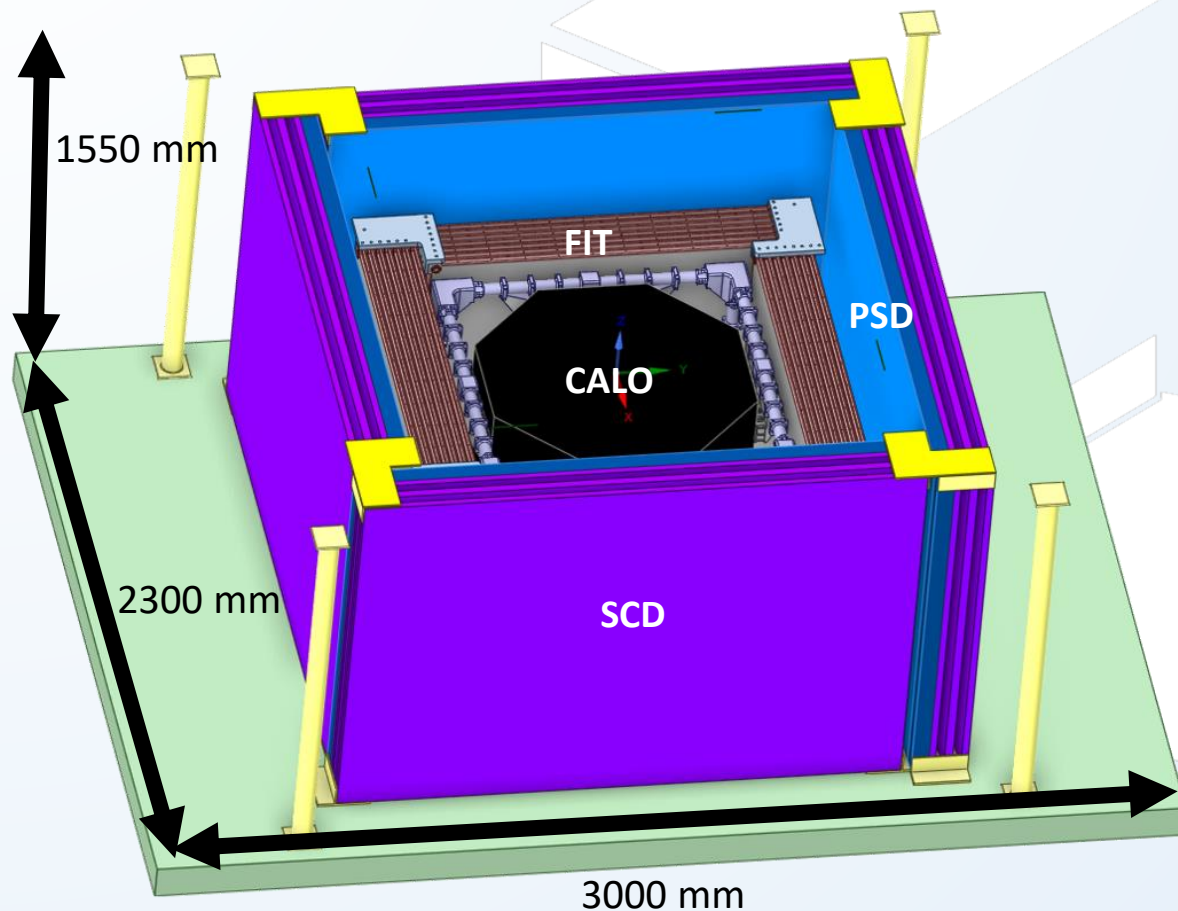
HERD SCD – Detector top layer supporting structure

Preliminary design:

- Per-ladder single structure,
- As lightweight as possible,
- Pockets to avoid wire bonds on lower plane,
- Free area on the upper layer for lateral wire bonds,
- Must be glued on lower layer active area,
- Verification needed for temperature coefficient mismatch

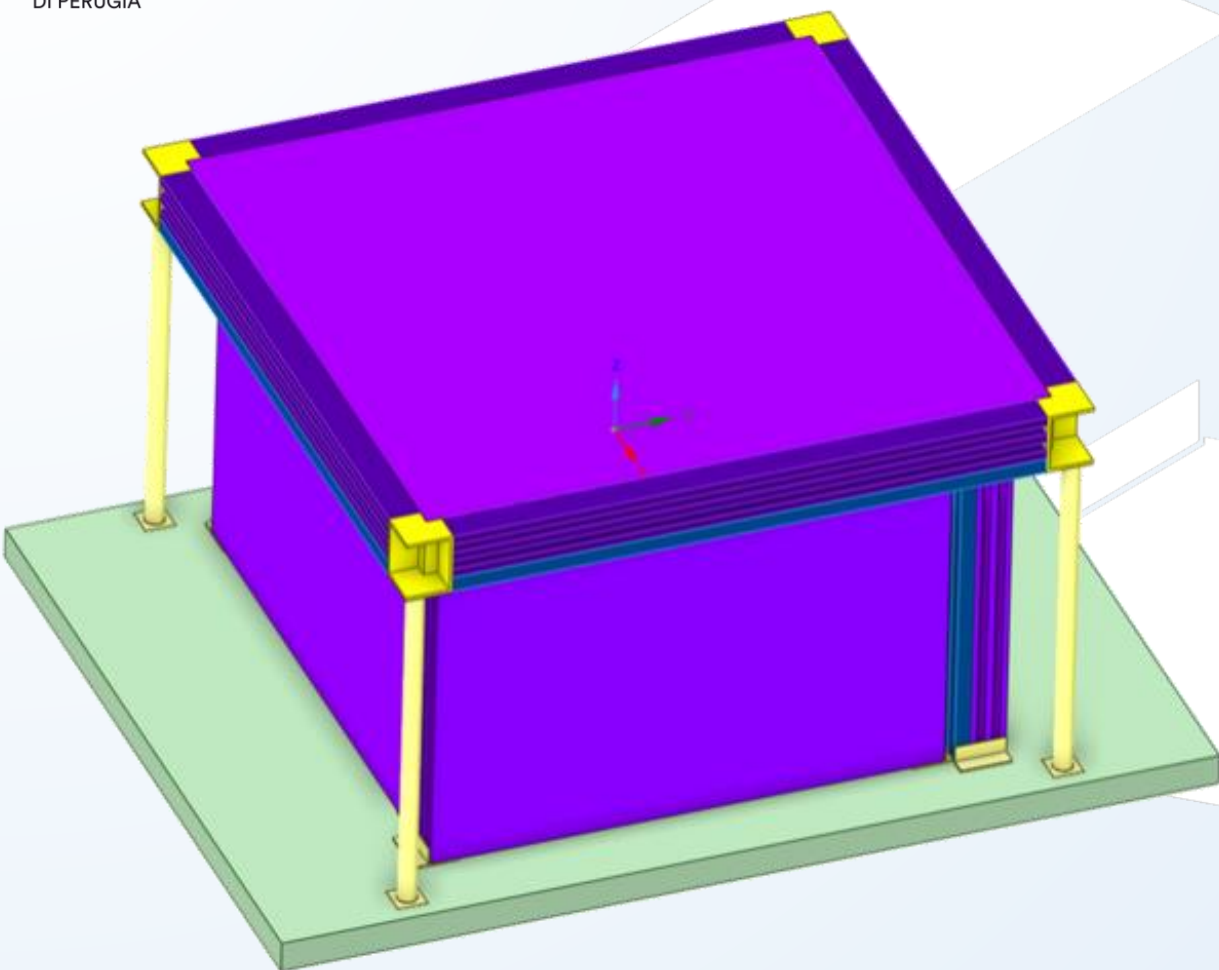


HERD Overall

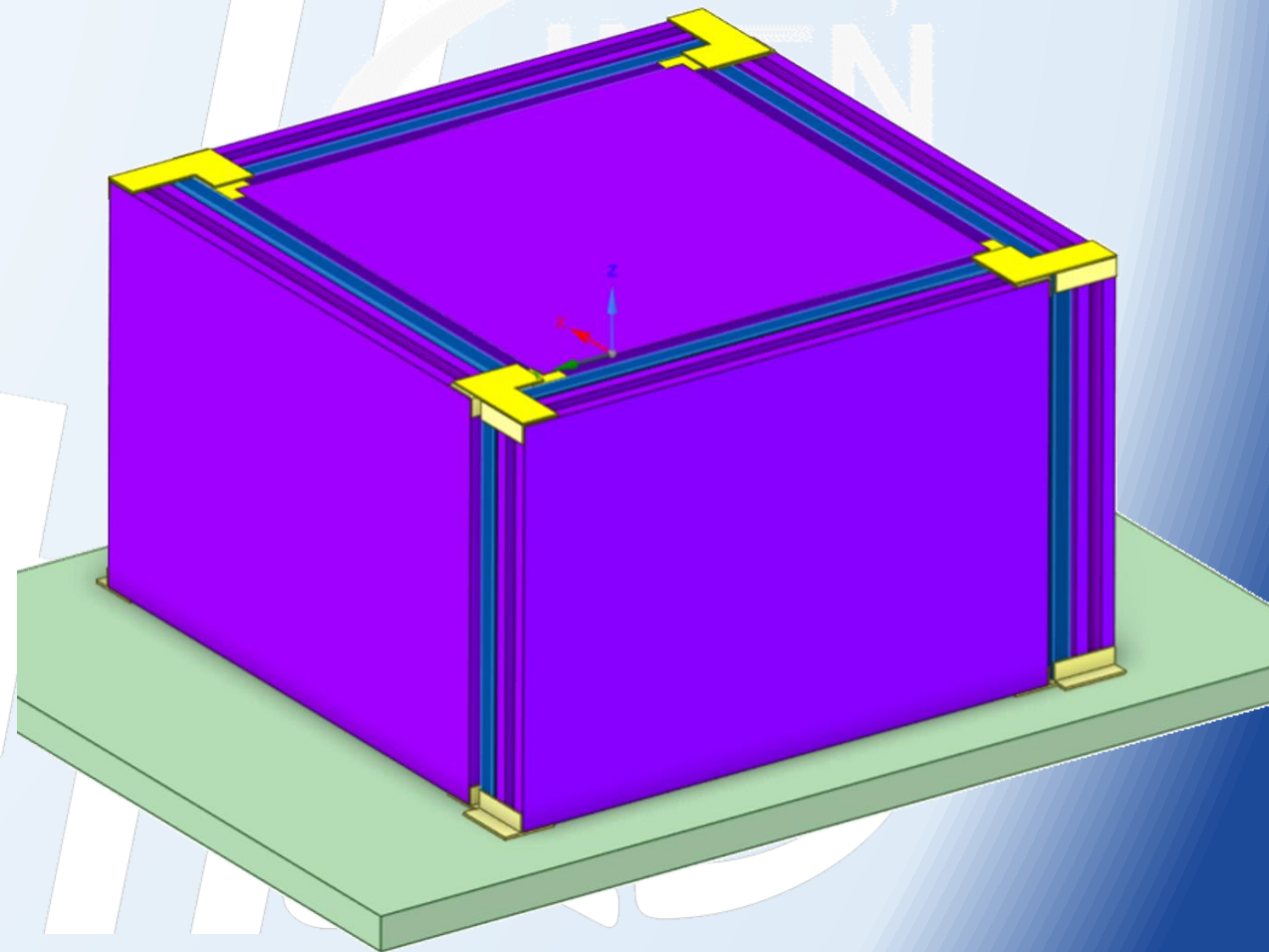


- 4 equal side assemblies plus one top assembly
- Each SCD assembly is composed of two identical planes

HERD Overall



“Top outside” Configuration



“Top inside” configuration