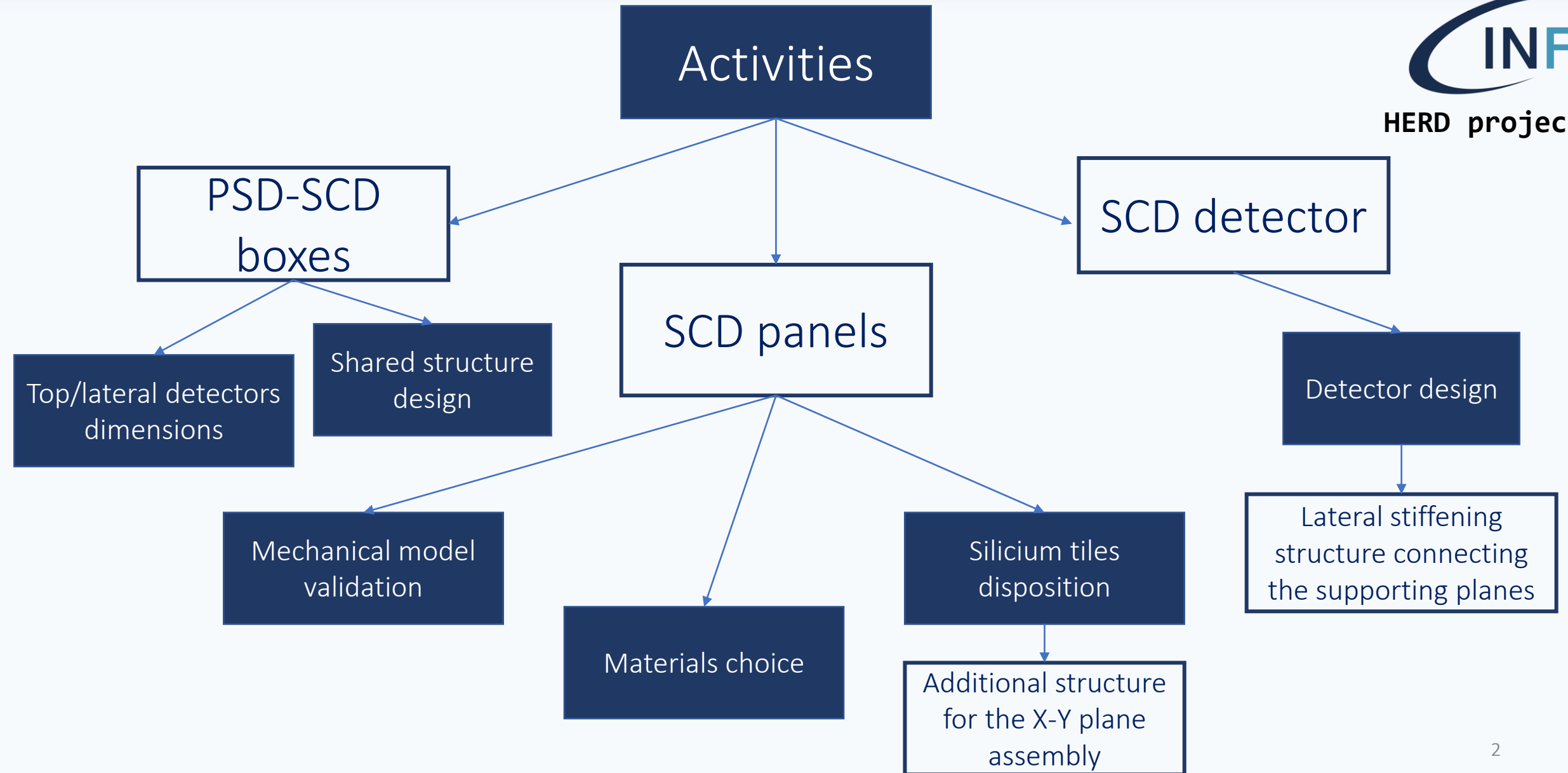




HERD Mechanical
meeting
29th of July 2021

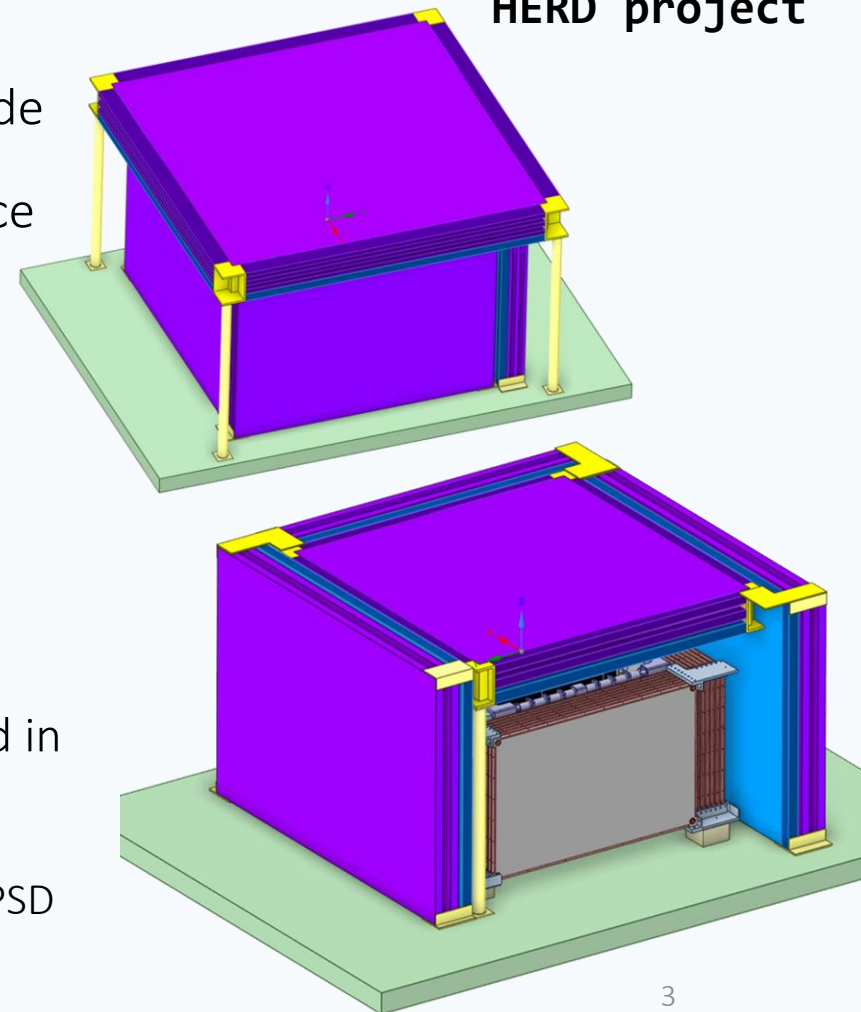
SCD mechanical team status report

Mechanical team
Perugia
L. Mussolin, G. Morettini, E. Mancini

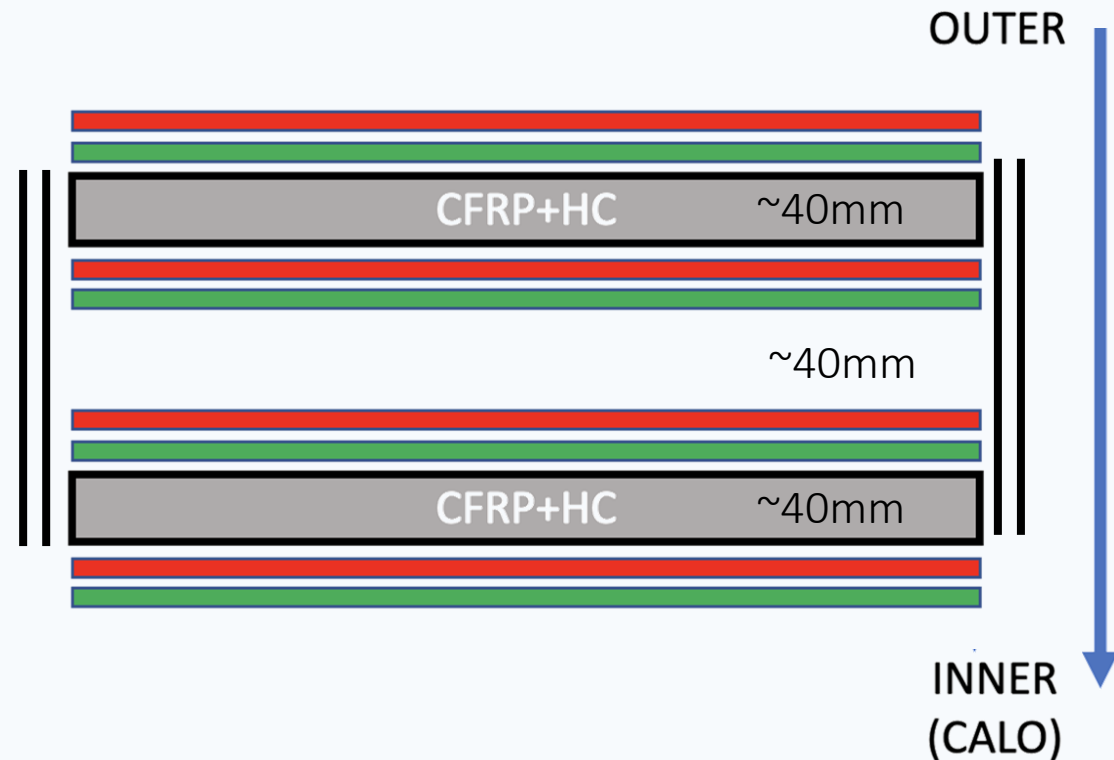


PSD-SCD top and lateral boxes

- Top/lateral detectors dimensions
 - Inputs:
 - maximization of hermeticity
 - structural performance
 - Status:
 - Top detector. Two different solutions presented: inside and outside the lateral boxes. Hermeticity simulations are on-going.
 - Lateral detectors. Their surface dimensions depends on the choice regarding the top detector and on the FIT-CALO relative position while their thickness depends on the detectors design
 - **Next steps**
 - **Choice of the more suitable solution for the top detector**
 - **Determination of the relative position of the FIT-CALO**
 - **Detector design**
- Shared structure design
 - Inputs
 - Need for a PSD-SCD shared structure to have 5 boxes to be assembled in Europe and shipped to China
 - Status
 - **Blocked** by the previous task (Top/lateral detector dimension) and by the PSD and SCD detectors design



- SCD detector design
 - Inputs:
 - Physical performances
 - Compactness/Lightweight
 - Status:
 - Number of supporting planes reduced from 3 to 2 -> design optimization
 - Usage of all the supporting planes faces as active surfaces (under discussion)
 - Preliminary design phases for a supporting structure connecting the SCD supporting planes. -> more rigid structure
 - **Next steps:**
 - **Design of the SCD supporting panels**
 - **Design the lateral structure connecting the panels**



- Mechanical model validation

- Status:

- Rebuilt of a DAMPE-like model and comparison with previous results and tests
 - Good results from the simulation of a naked plane with a thickness of 40mm constrained on the corners ($f_1 \sim 150\text{Hz}$)

- **Next steps:**

- **Evaluation of the impact of silicium on the first frequency (critical)**
 - **Validation by experiments**

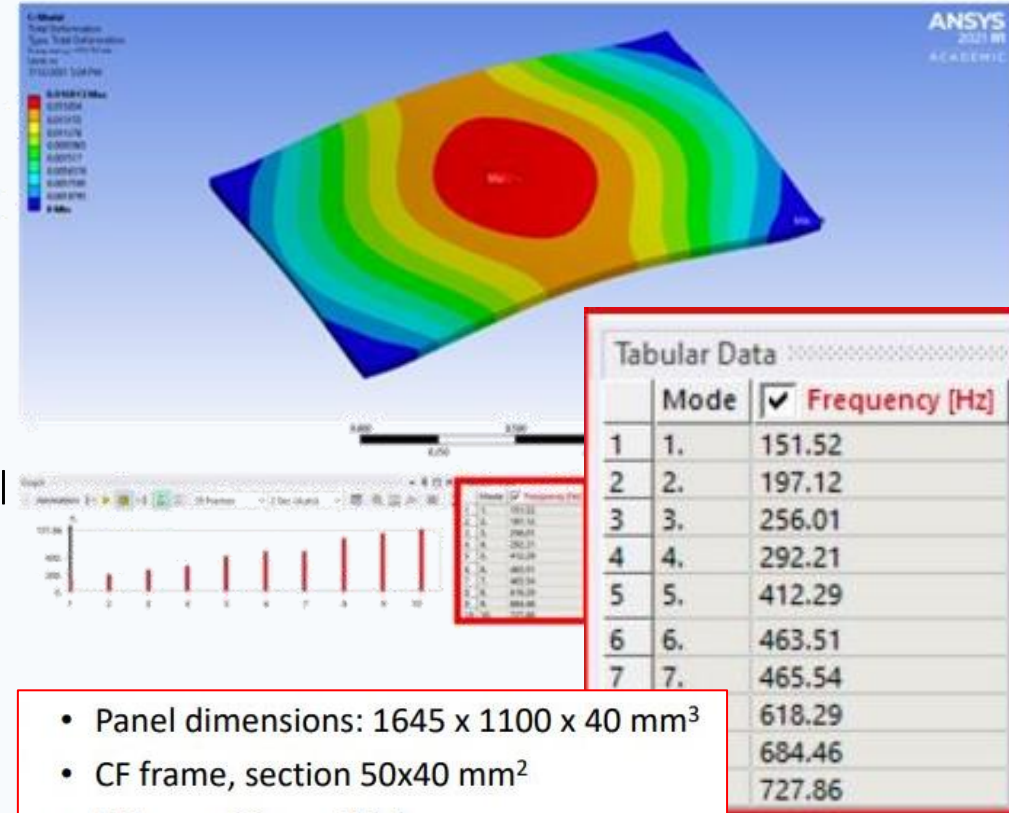
- Materials choice

- Status

- Sandwich core alternatives under analysis by the mechanical and physics team (orthogrid structure proposed)
 - Design of a reduced size prototype for mechanical test (due date November)

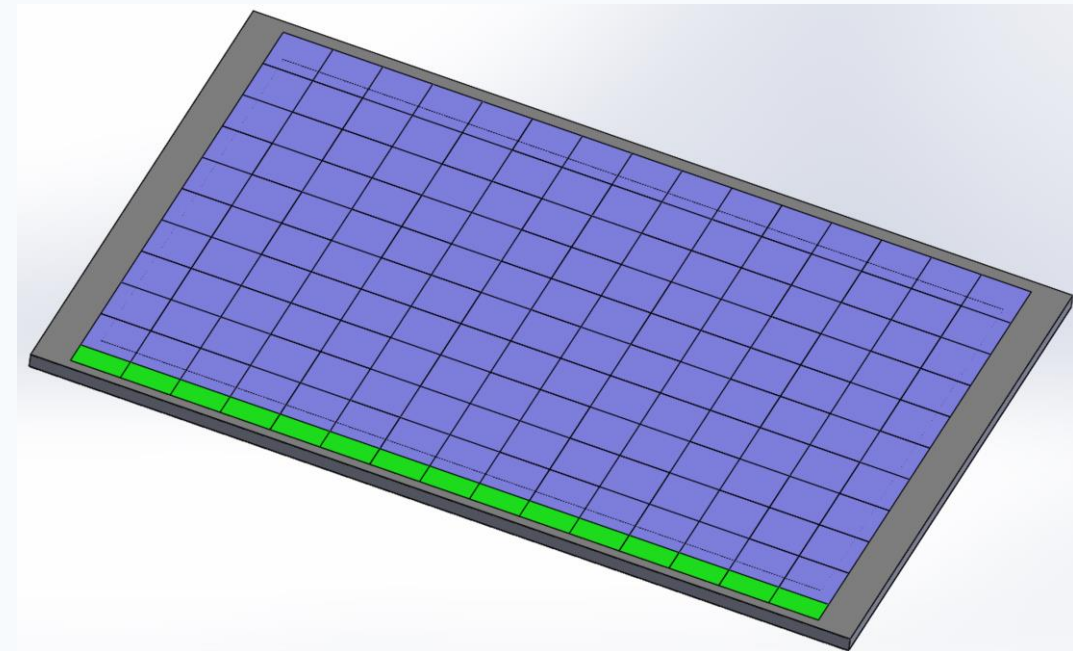
- **Next Steps:**

- **Prototype realization**
 - **Mechanical test on prototype and on prototype's material samples**



- Panel dimensions: 1645 x 1100 x 40 mm³
- CF frame, section 50x40 mm²
- HC core, 38 mm thick
- CF skins, 0.6 mm thick
- Fixed constraint on the corners

- Silicium tiles disposition
 - Input:
 - Design of a detecting surface made of superimposed X and Y planes.
 - Status:
 - Evaluation of possible alternatives to bond the X-Y planes
 - Preliminary design of a supporting structure based on the heritage from the previous experiments
- **Next steps:**
 - **Discussion with the team in charge of the realization and assembly of the detective surfaces**
 - **Structural analysis of the proposed solutions**



Thanks for the attention!