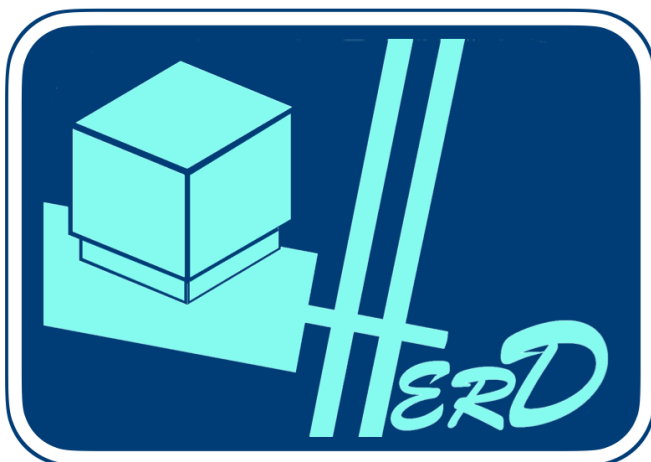


SCD mechanics status report

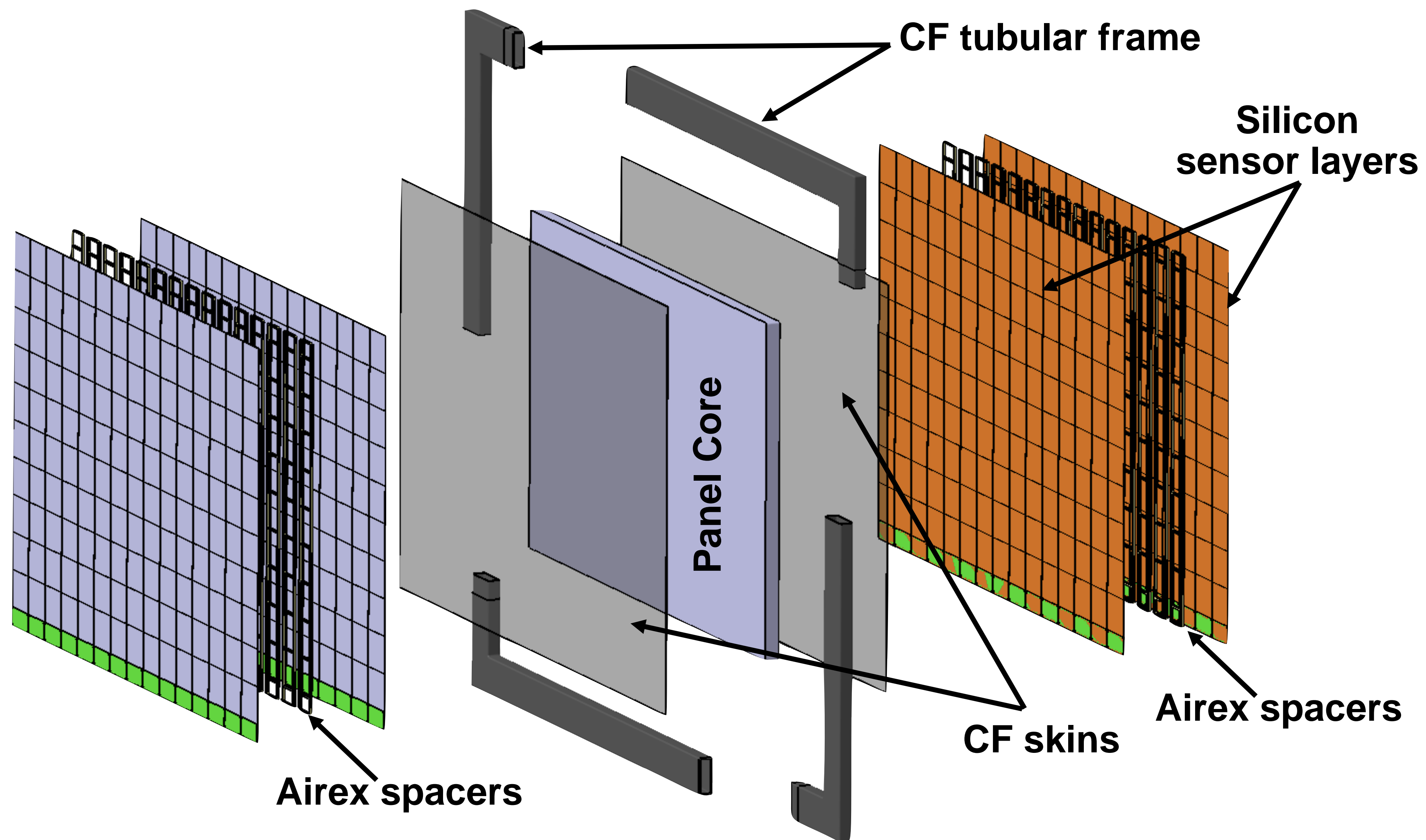
Mussolin L., Mancini E.

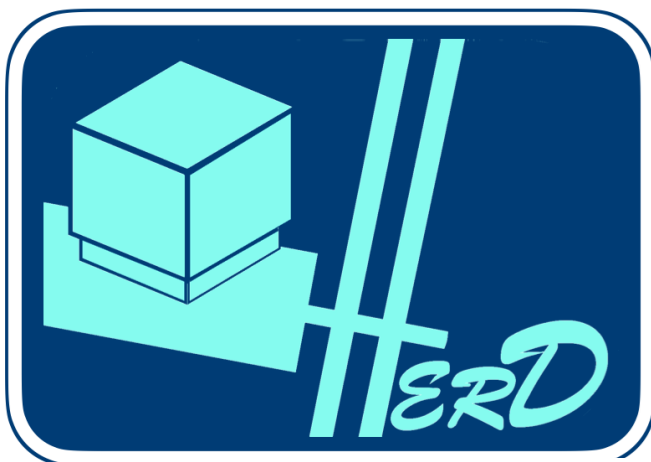
SCD meeting - 13/06/2022



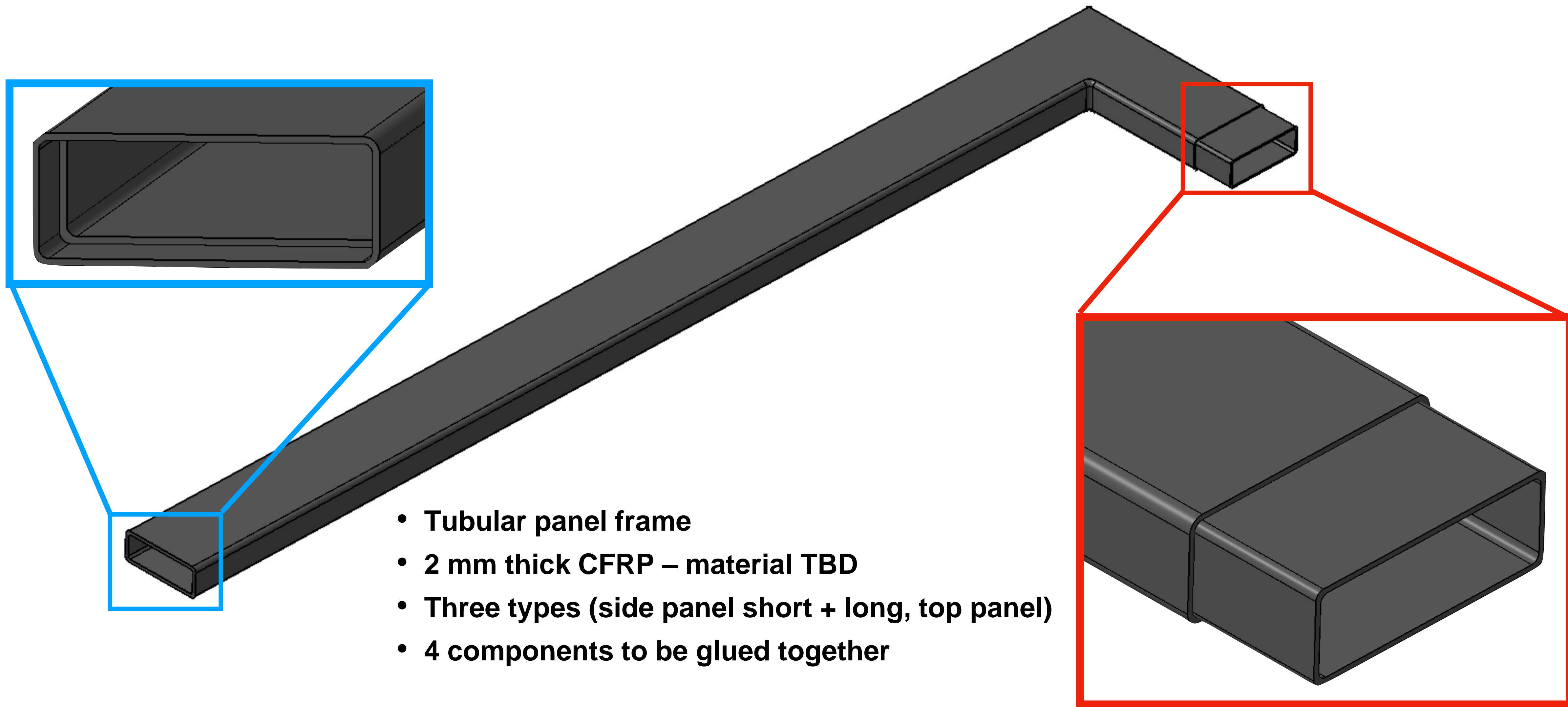


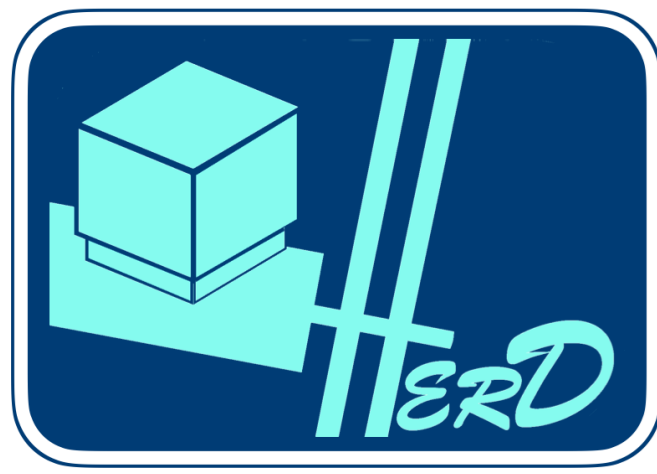
SCD mechanics



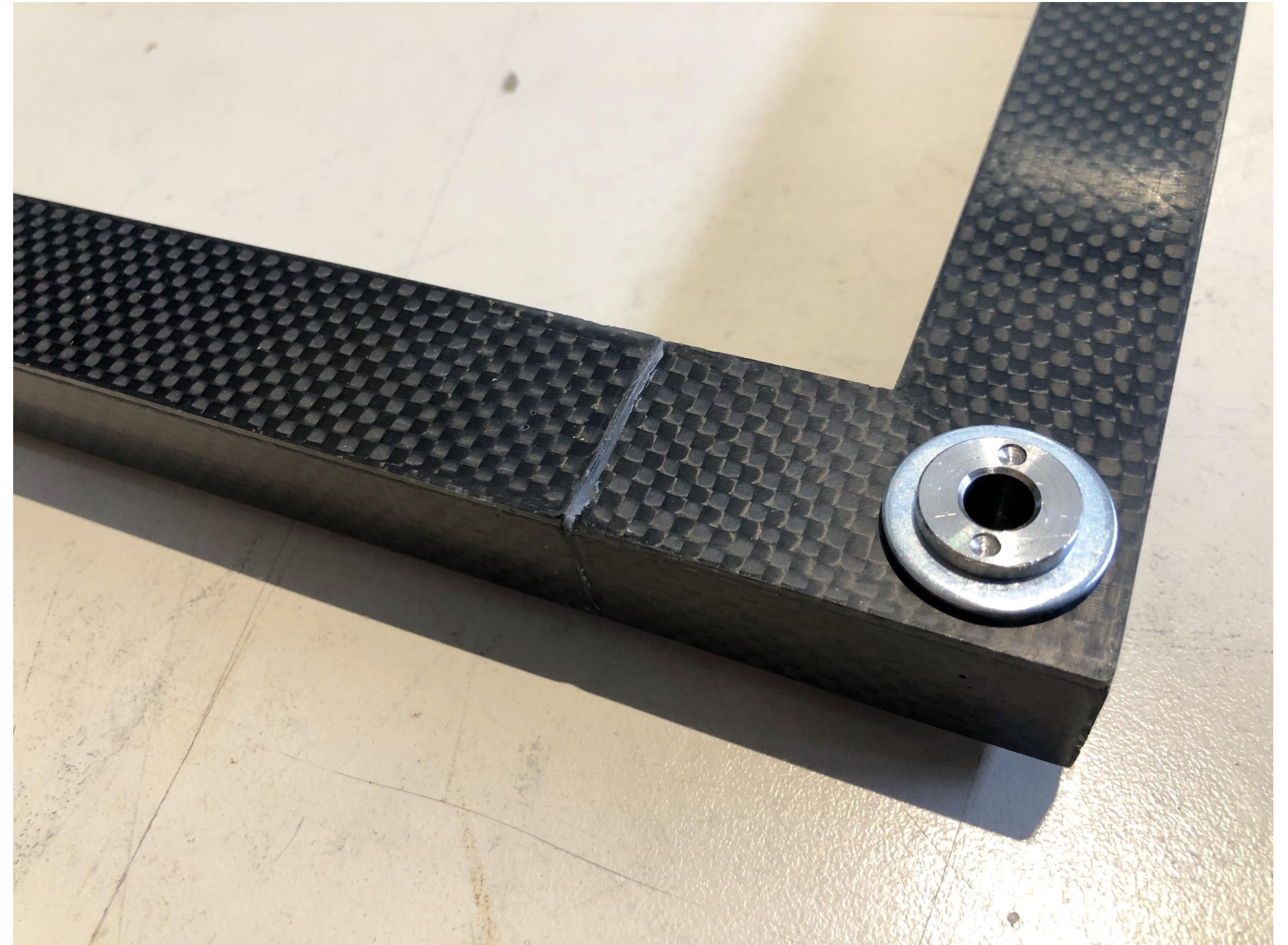


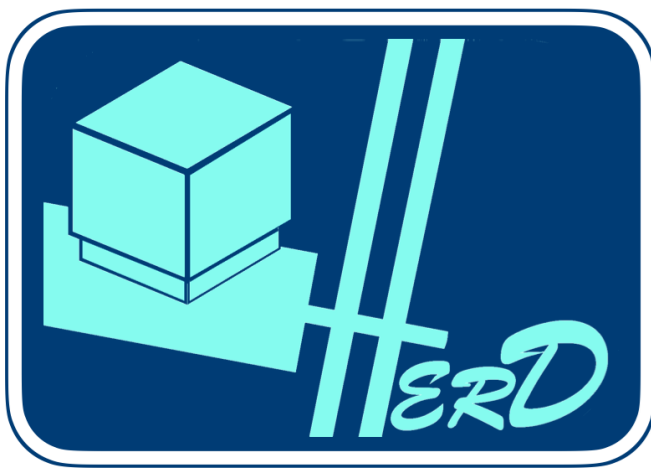
Mechanical structure - frame





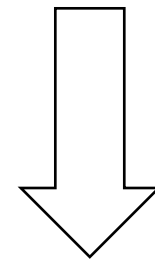
Mechanical structure - frame



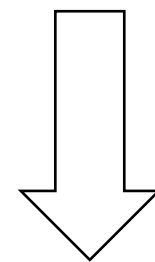


Frame CFRP samples

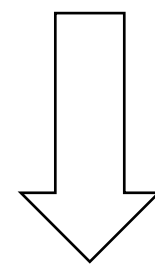
Development of 35 CFRP
sample with the frame
material



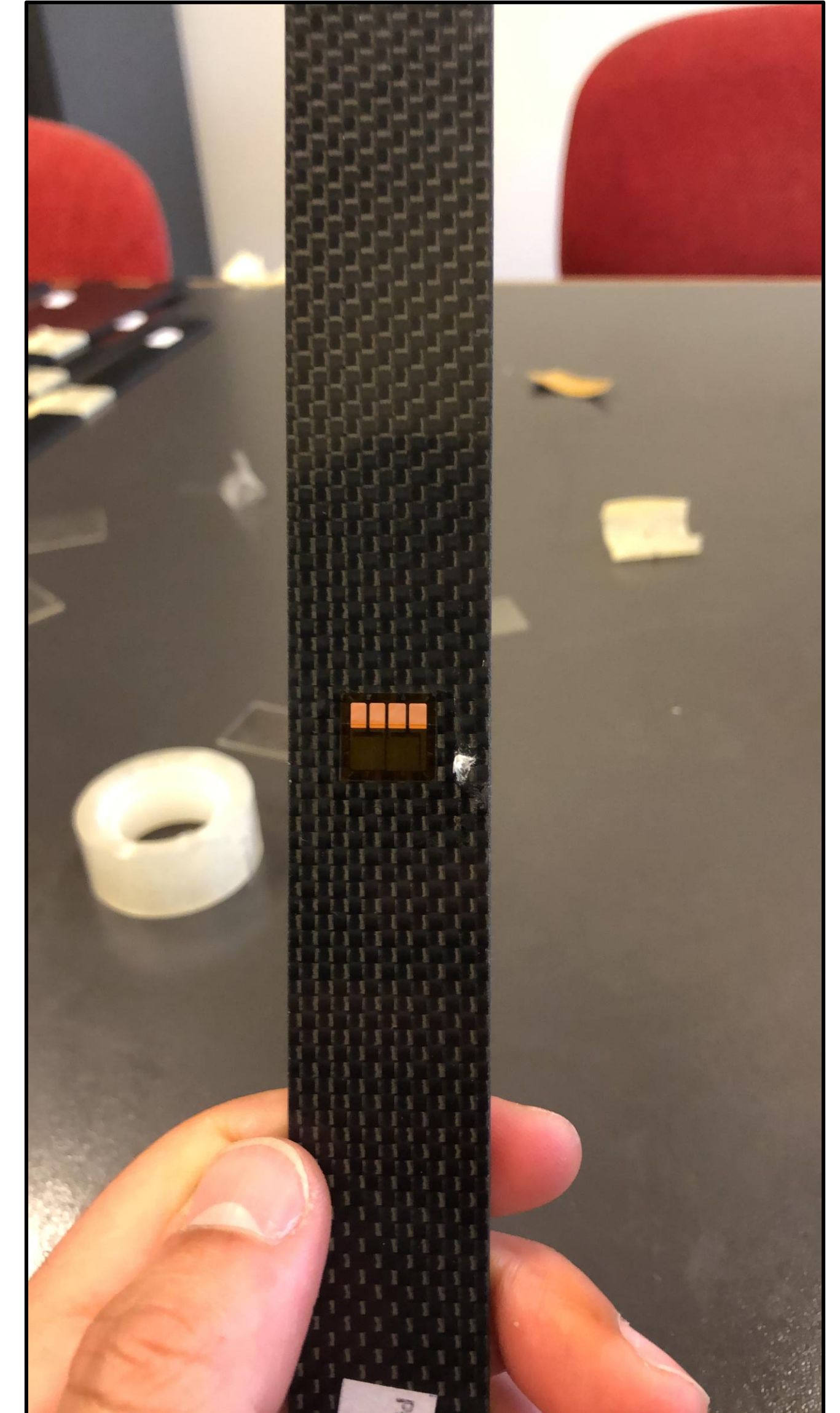
Dynamic and static
characterization of the
samples

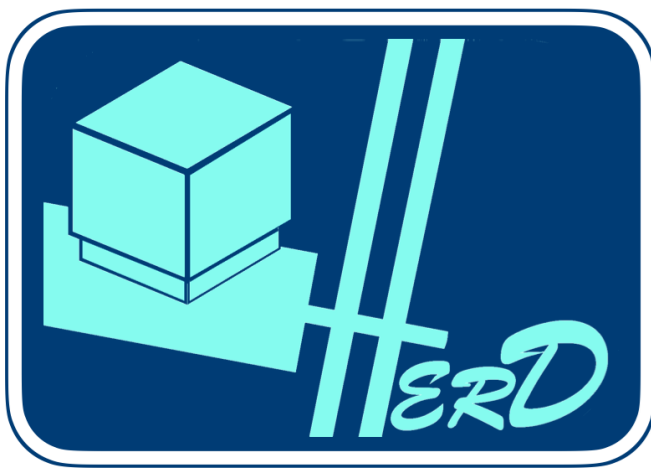


Matching with FEA



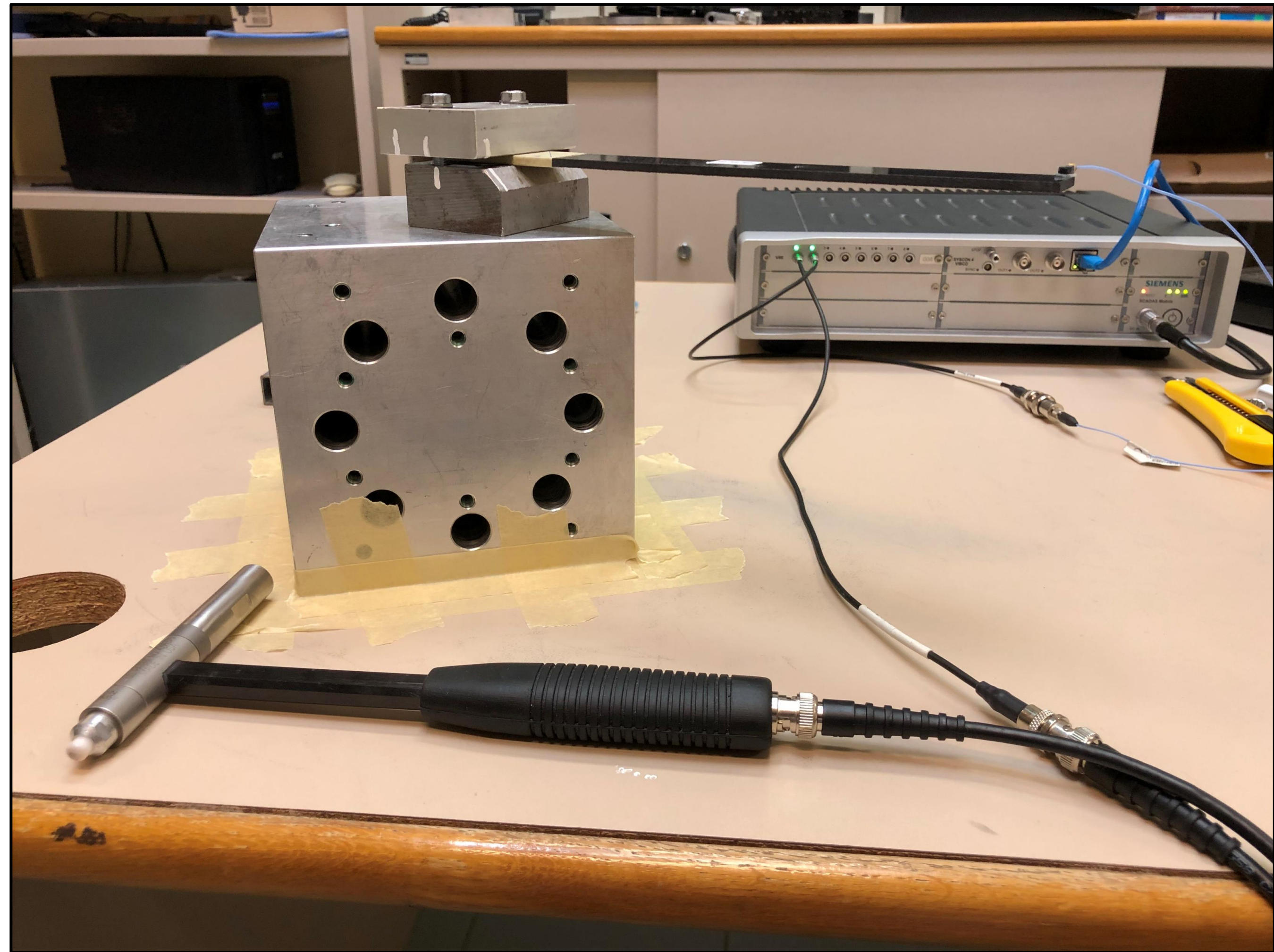
Reliable design tool

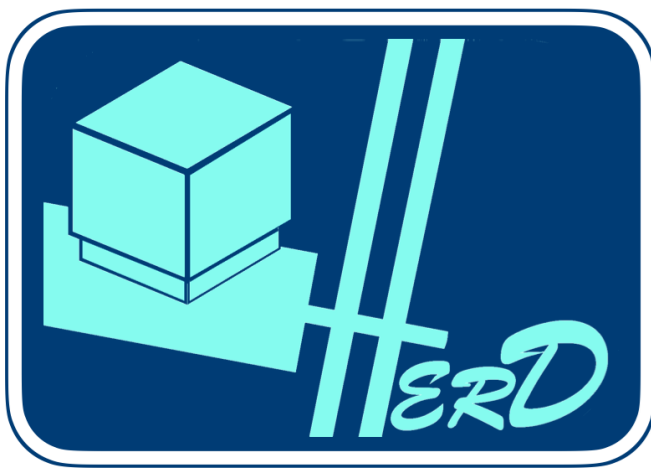




Samples – Dynamic characterization

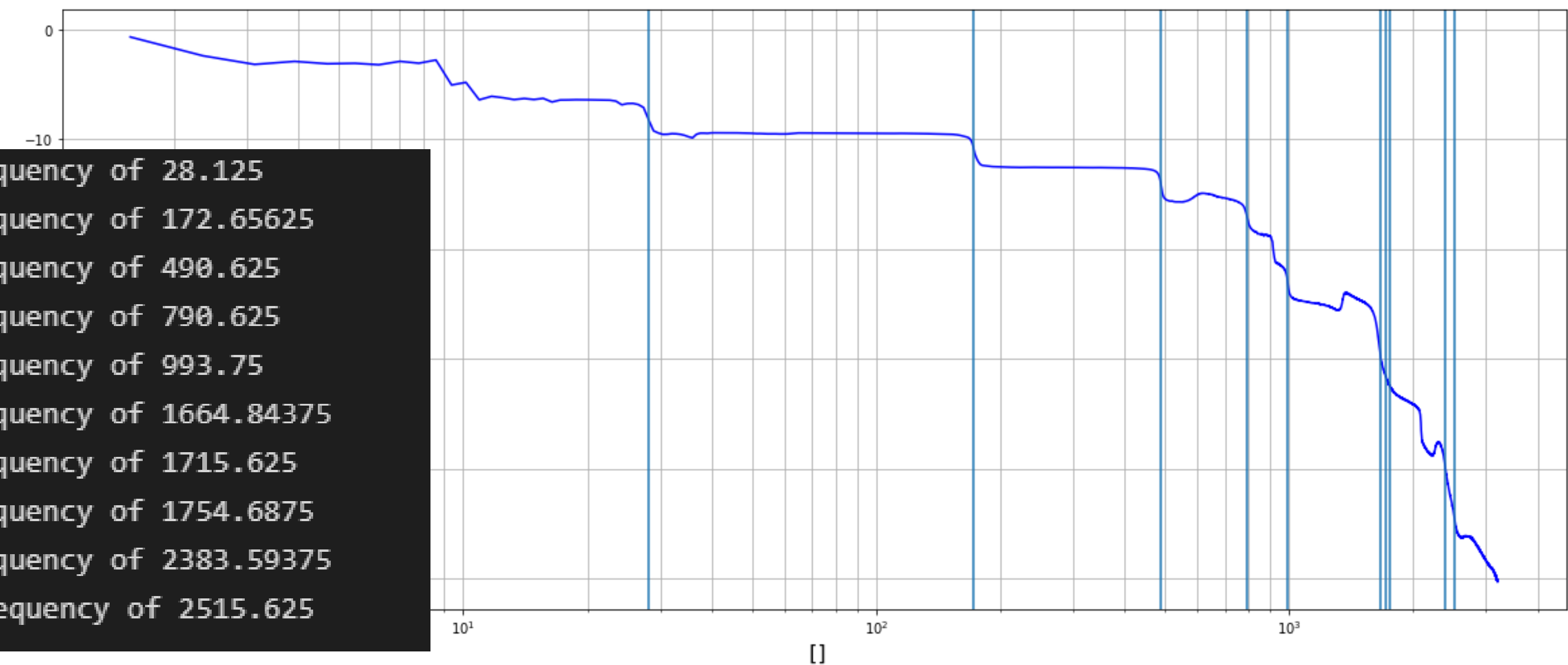
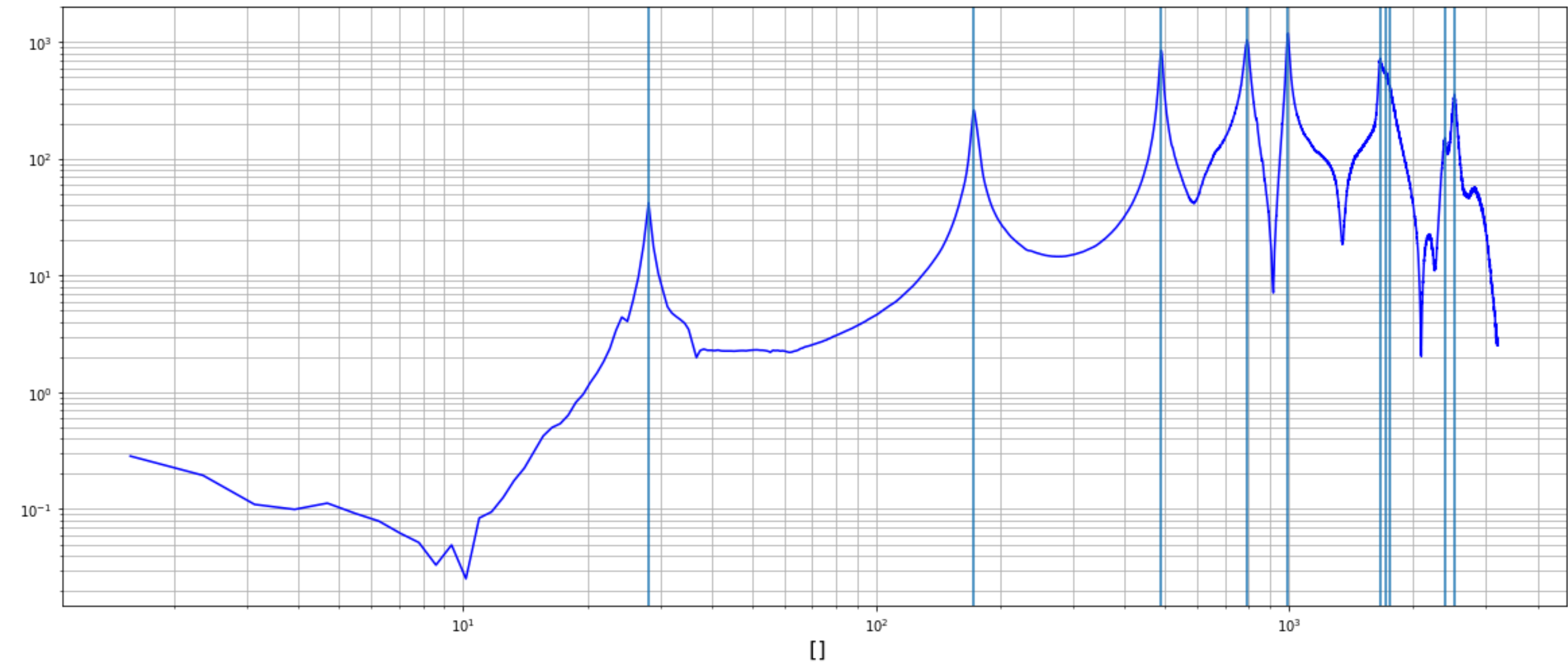
- Resonance impact test with instrumented hammer
- Detection of the first 10 resonance peaks



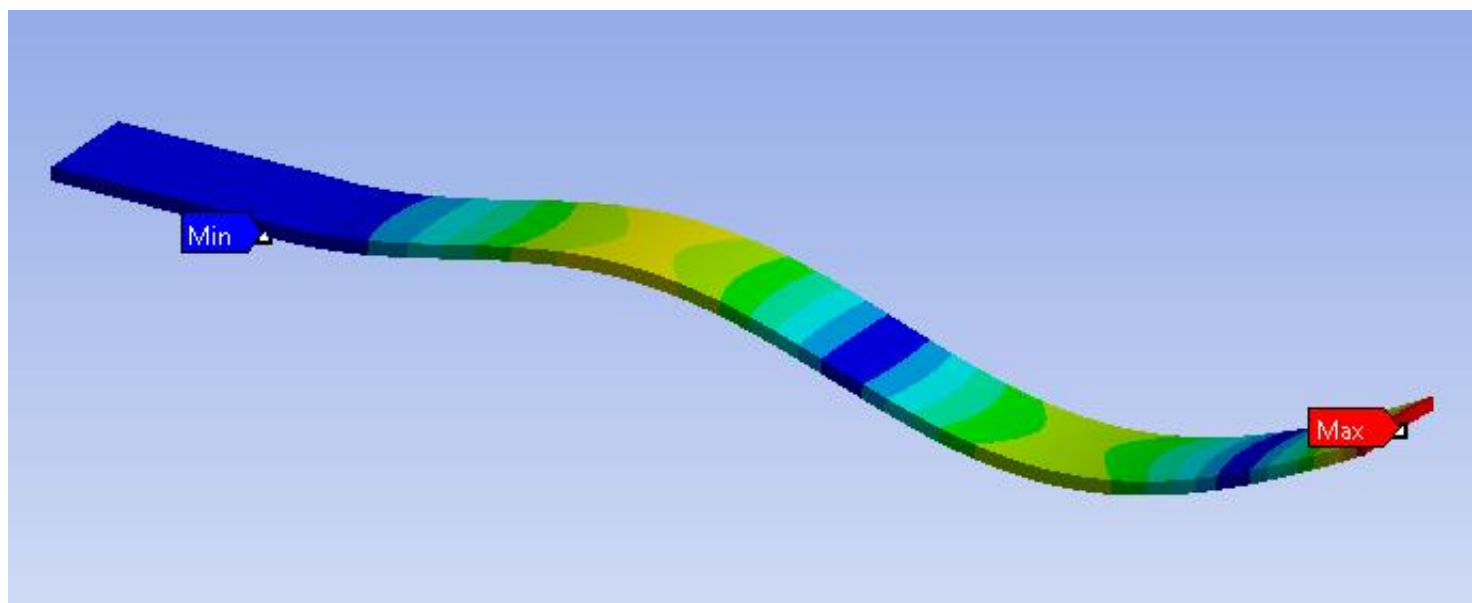


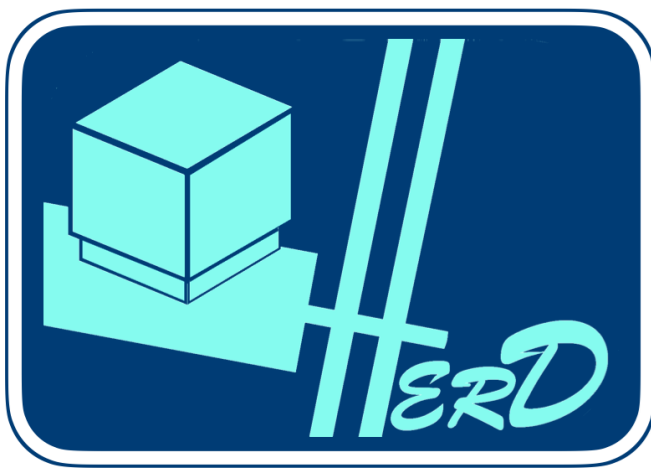
Samples – Dynamic characterization

- Resonance impact test with instrumented hammer
- Detection of the first 10 resonance peaks

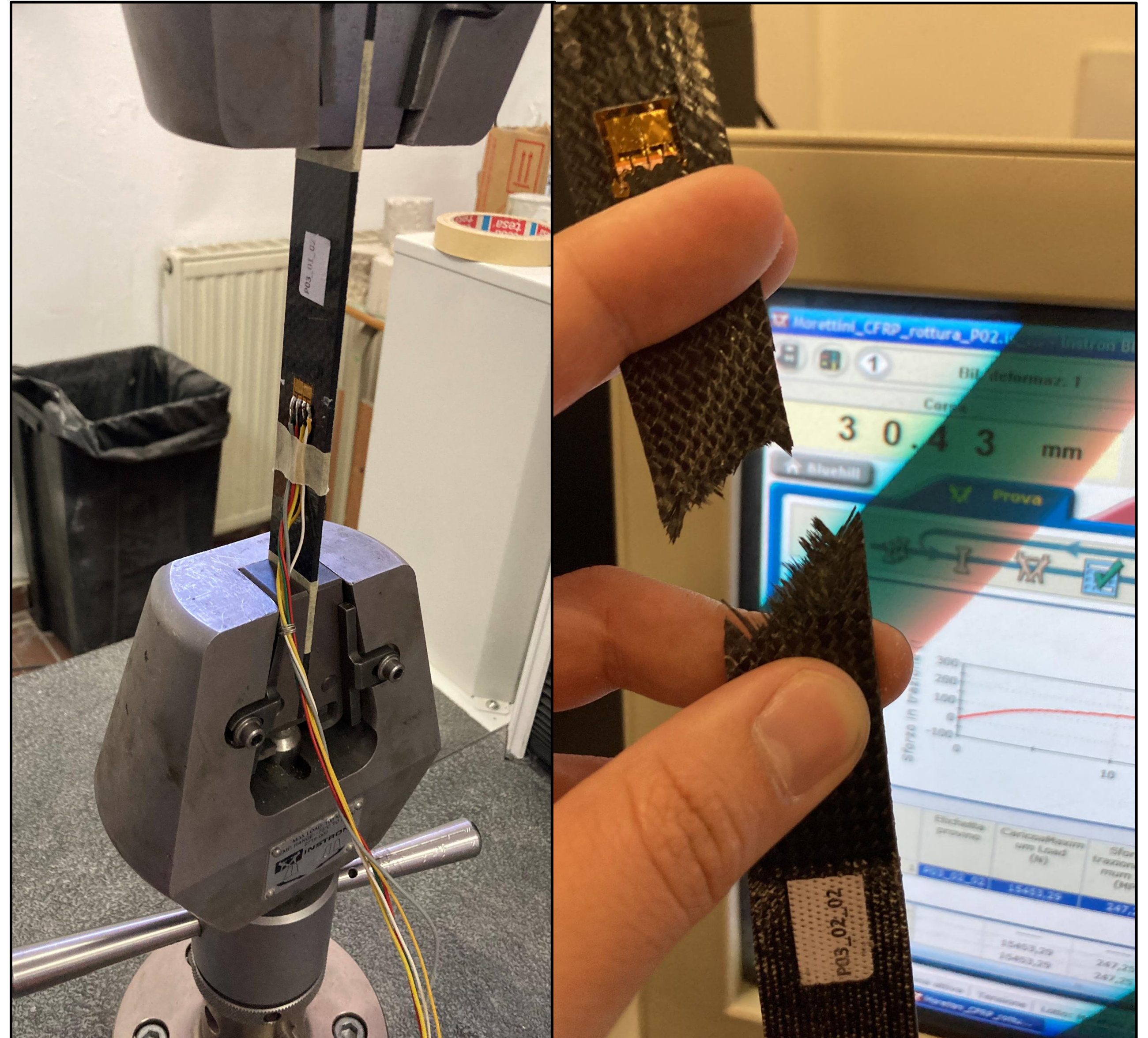
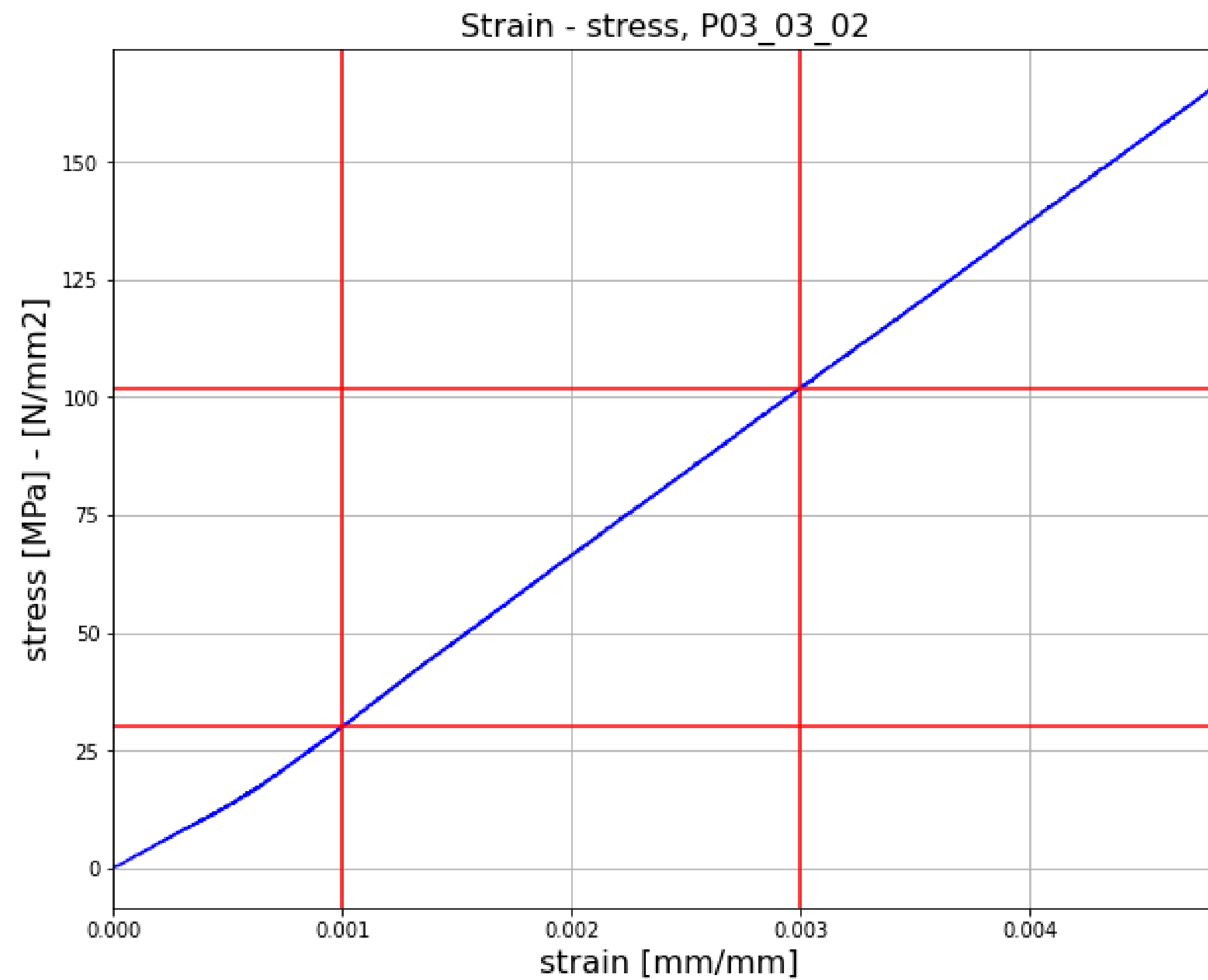


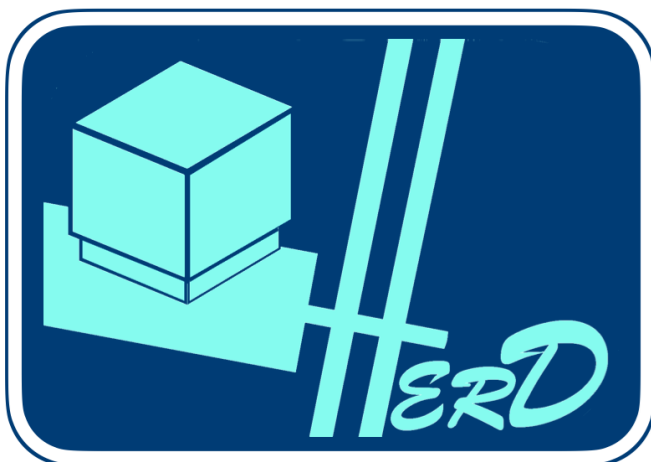
Peak number 1 is at a frequency of 28.125
Peak number 2 is at a frequency of 172.65625
Peak number 3 is at a frequency of 490.625
Peak number 4 is at a frequency of 790.625
Peak number 5 is at a frequency of 993.75
Peak number 6 is at a frequency of 1664.84375
Peak number 7 is at a frequency of 1715.625
Peak number 8 is at a frequency of 1754.6875
Peak number 9 is at a frequency of 2383.59375
Peak number 10 is at a frequency of 2515.625



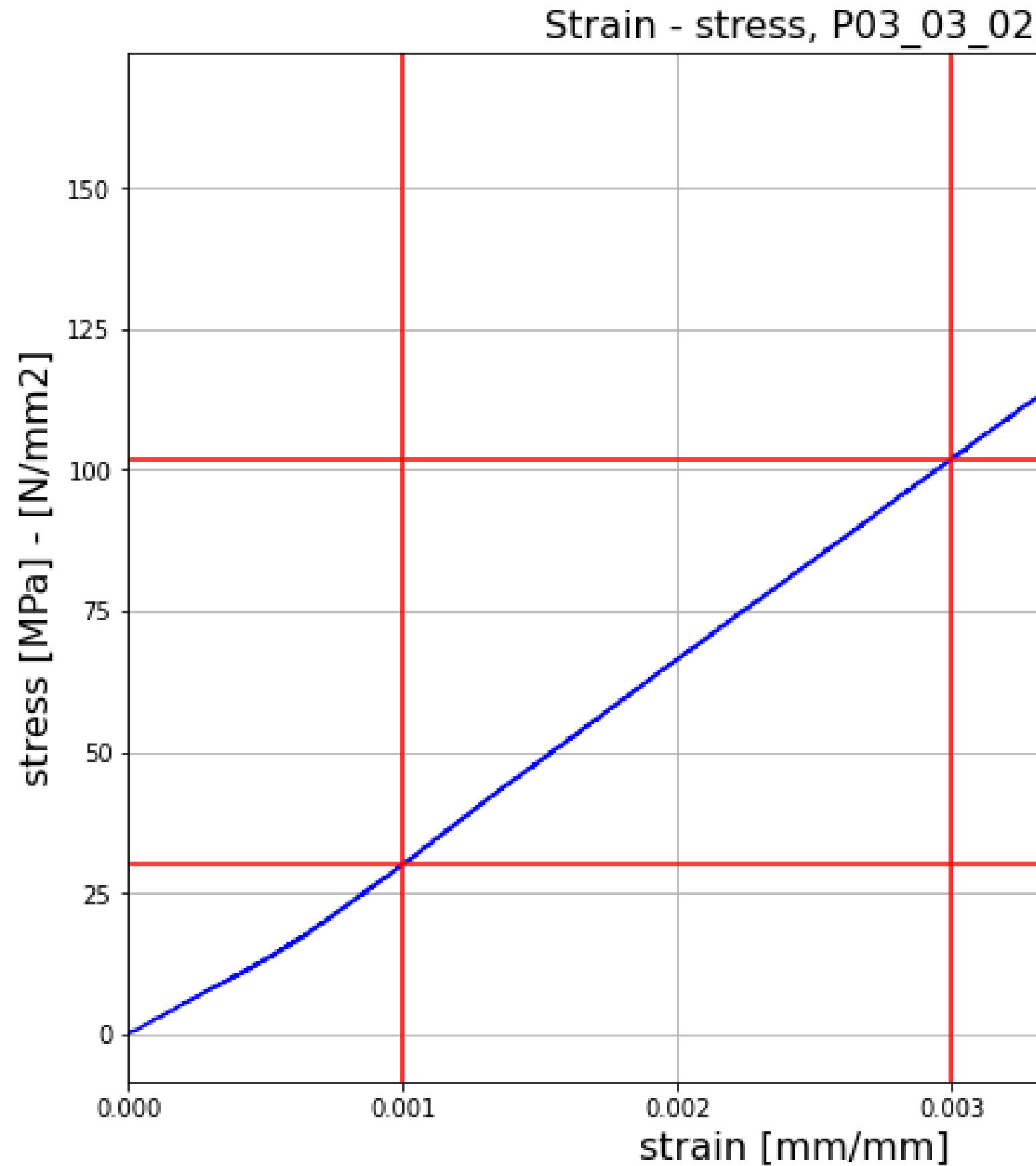


Samples – Static characterization

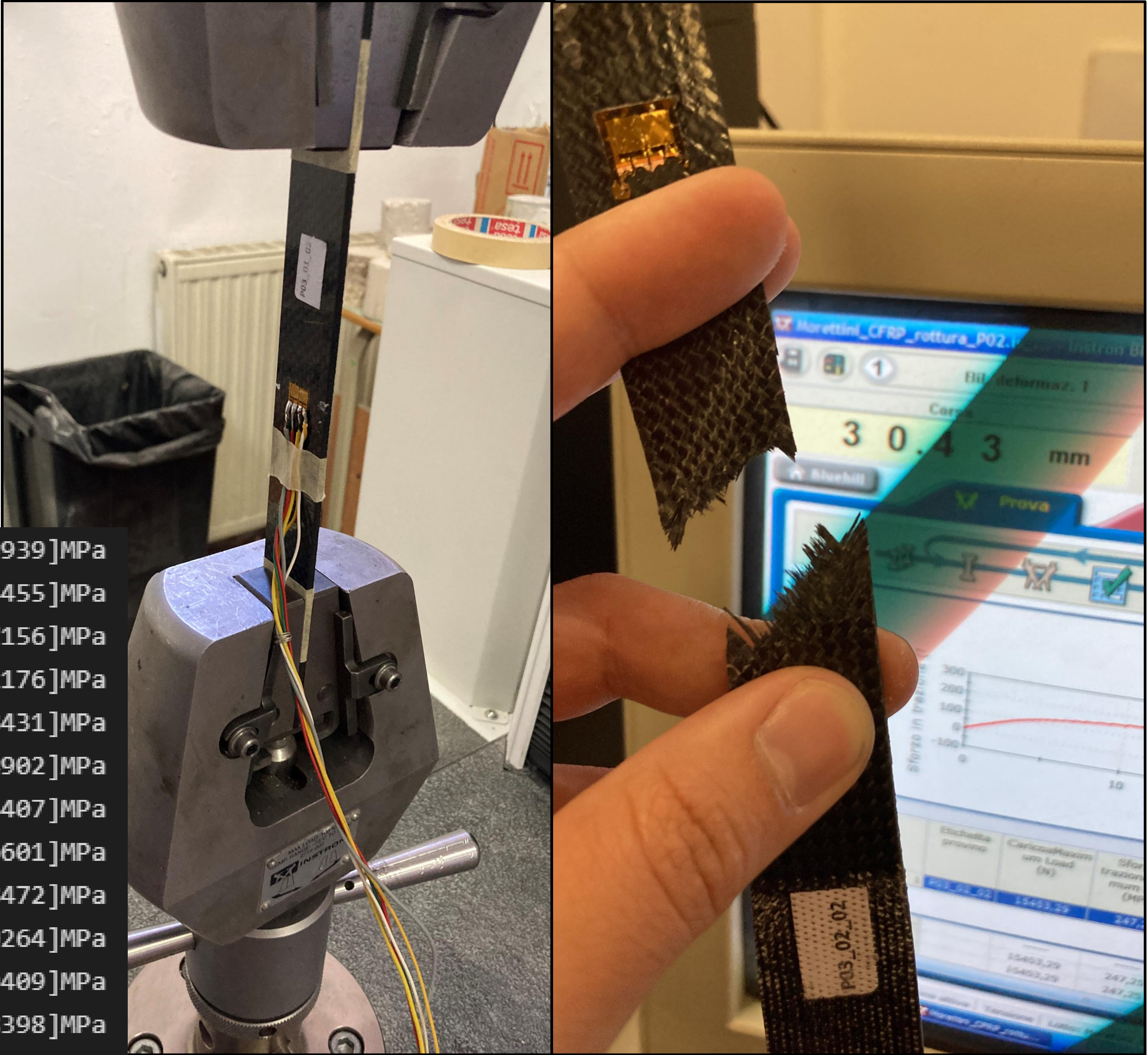


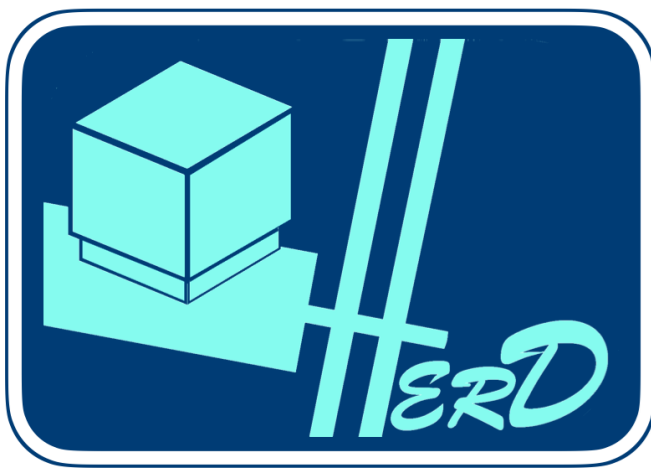


Samples – Dynamic characterization



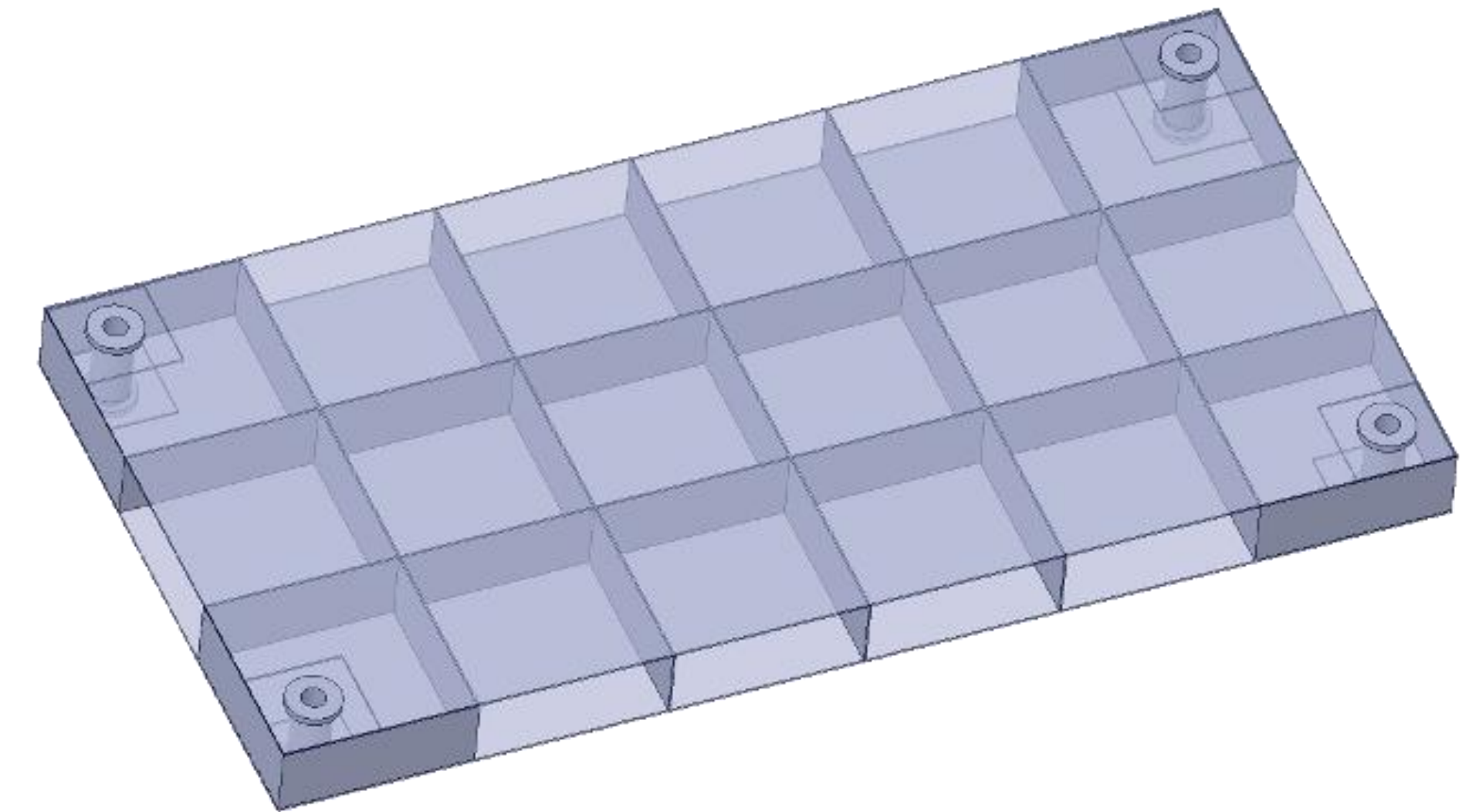
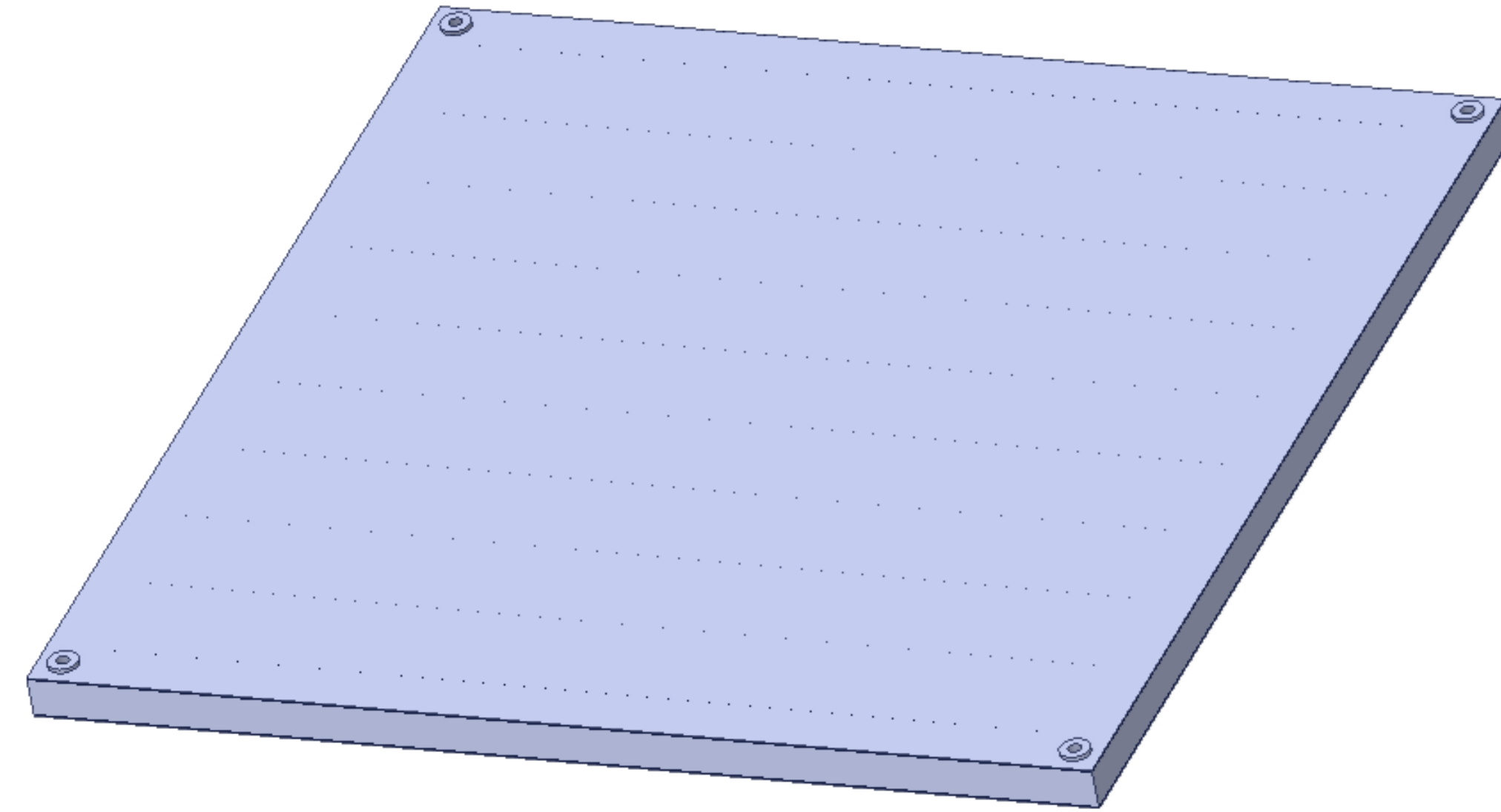
P03_01_01: [50407.08643939]MPa
P03_02_02: [10541.86464455]MPa
P03_02_03: [11159.47397156]MPa
P03_03_01: [36958.83821176]MPa
P03_03_02: [35842.89198431]MPa
P03_03_03: [35048.59814902]MPa
P03_04_01: [34424.57504407]MPa
P03_04_02: [35670.92066601]MPa
P03_04_03: [35467.86358472]MPa
P03_05_01: [42976.41810264]MPa
P03_05_02: [39223.48659409]MPa
P03_05_03: [45226.62208398]MPa

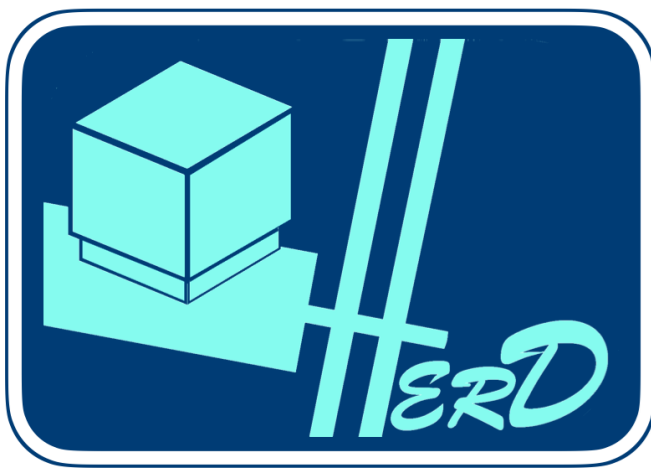




Other prototypes – To be deliver

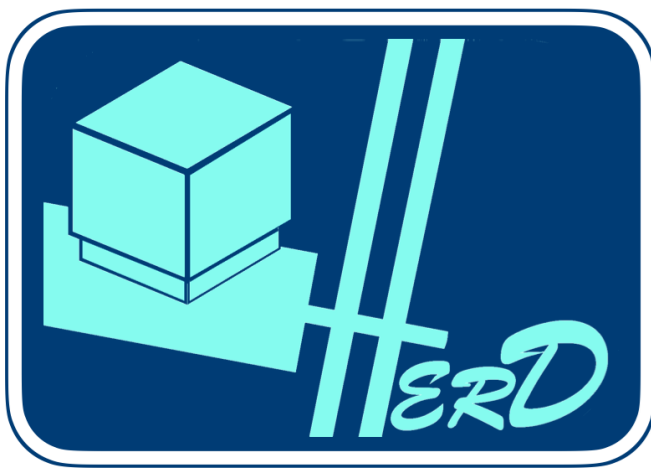
- CFRP skin samples – to be characterized
- Orthogrid samples
- Full panel (reduced dimensions 500x500 mm^2)
 - Skin – high modulus CFRP
 - Frame – standard CFRP
 - Core – Aluminum honeycomb





Prospects

- Match the experiment and the model
- Test the remaining prototype
- Develop a reliable model of the full plane
- Produce a 1 to 1 prototype
- Choose the more suitable core for this kind of application



Thanks for your attention!