ECALp -
sumamry last 3 meetings

Documentation

IFIC
INSTITUT DE FÍSICA CORPUSCULAR

- Everything explained here
  - https://gitlab.desy.de/luxe-ecal/Documentation
  - (this entry point is accessible to everyone)

    - FCAL-ECAL group documentation: a highly compact calorimeter for LUXE and Higgs Factories
      - Composition of the team
      - cernbox spaces
      - wiki pages
    - Access to the resources

- Designs, code, individual wikis are in:
  - https://gitlab.desy.de/luxe-ecal
  - Private repositories
  - Please upload here the latest designs and mechanics/electronics drawings… **If you send me the files, I can do it myself.**
  - The goal is to use this repository as guide for discussion.

Kapton designs (Jakub + Yan + Carlos)

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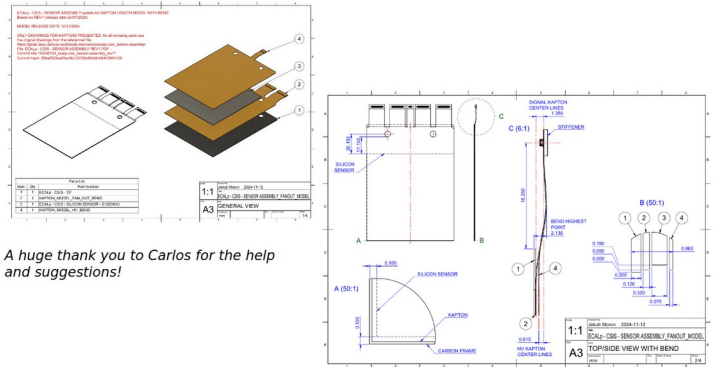
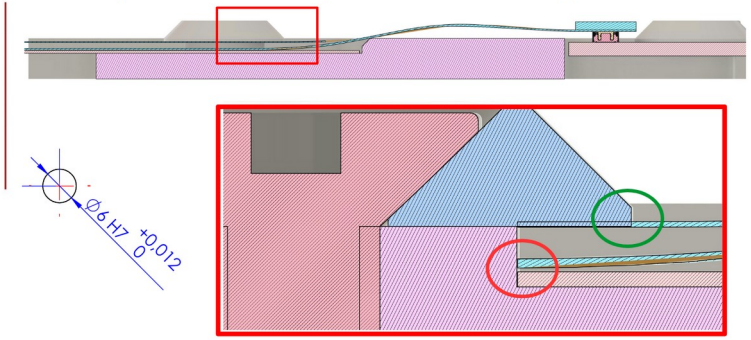
- Topic 1: defining the length → to match the connectors in the FEB, with realistic estimation of the kapton curvature
  - https://gitlab.desy.de/luxe-ecal/Documentation
- Bend end point (red square right)– not a big issue; depends on exact dimensions of the designs CSIS thicknesses implemented in the 3D model… (please, update the 3D model, to facilitate discussions in the future)

GitLab: ECALp Mechanics / ECALp-CSIS_sensor assembly / ECALp-CSIS-FO_HV / ECALp-CSIS-SENSOR ASSEMBLY_FANOUT_MODEL.pdf



A huge thank you to Carlos for the help and suggestions!

Bend end point:
- HV: washer edge (btw. HV kapton sinks into the washer ???)
- Signal: t-frame post edge, since the hole in the kapton was specified to be exactly 6mm, so kapton surface have to be parallel to the t-frame around post



https://gitlab.desy.de/luxe-ecal/ecalp-mechanics/ecalp-csis_sensor-assembly/-/tree/main/ECALp-CSIS-FO_HV?ref_type=heads

Kapton designs (Jakub + Yan + Carlos)

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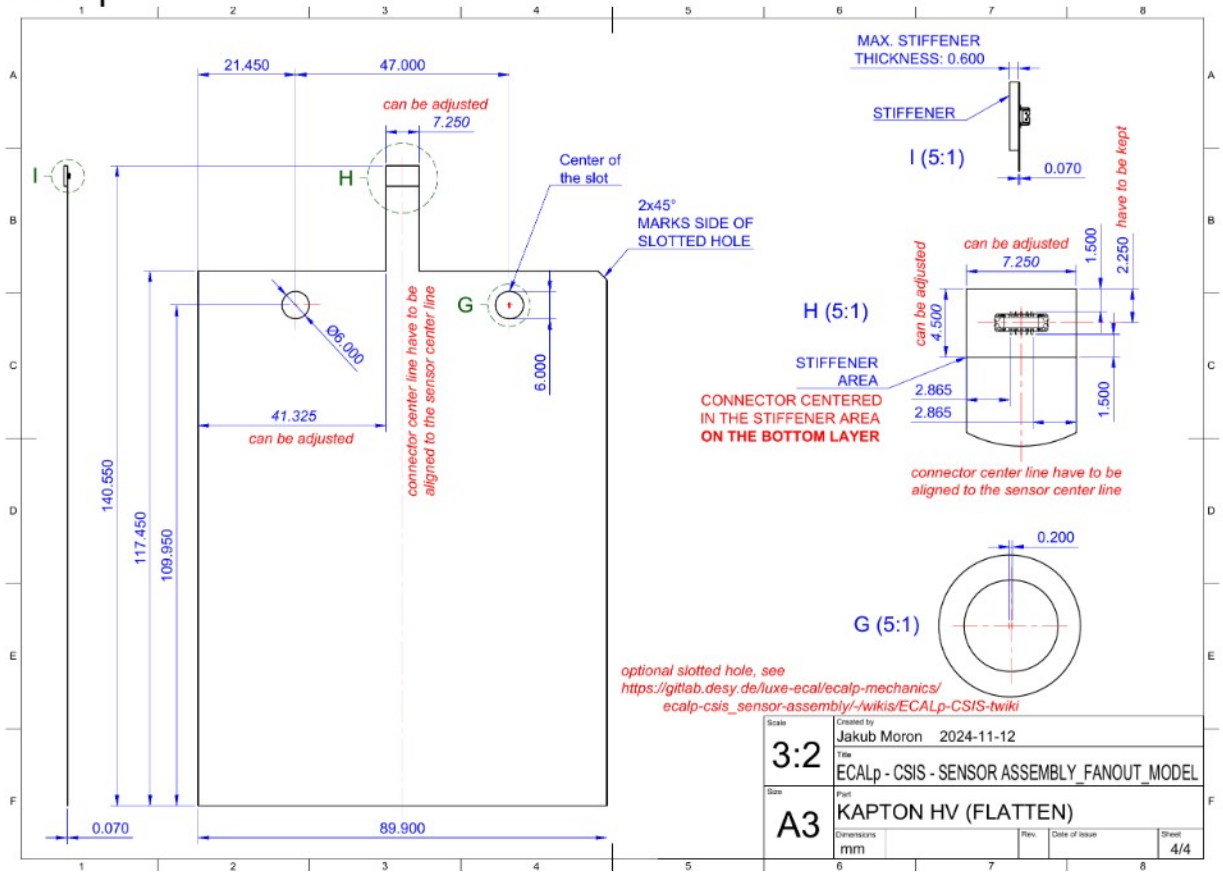

Flatten ("production mode") drawing of the HV kapton

The upper cutout (tab / protrusion) can be adjusted – adjustable dimensions are shown with *italic* font

Fixed dimensions / constrains:

- Overall length (140.55 mm)
  It is not a bug that it is shorter than signal one – it is due to the shorter loop length
- Distance from the center of the holes to the connector horizontal center line (28.35 mm) ***also smaller than signal one!***
- Connector vertical center lines aligned with sensor center line

Kapton designs (Jakub + Yan + Carlos)

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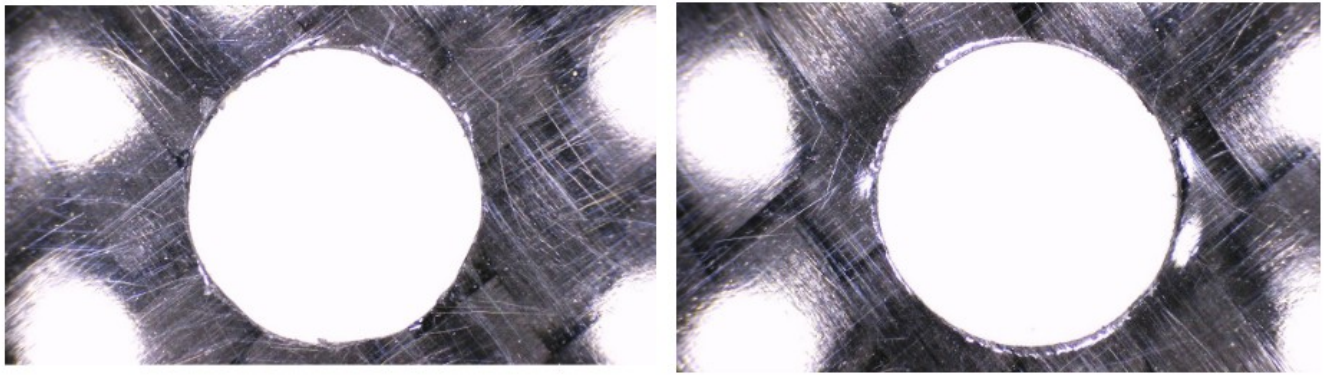
- Still open question: exact dimensions of the holes in the kaptons…
  - Depends on the manufacturer tolerances.
  - We agree that we do them slightly larger than the ones of the CF.
  - How large did we agreed? → please update the info on the wiki and the gitlab so we have it “written in stone” → or give me the info and I will do it.
  - We will understand these tolerances once we measure them at the lab.

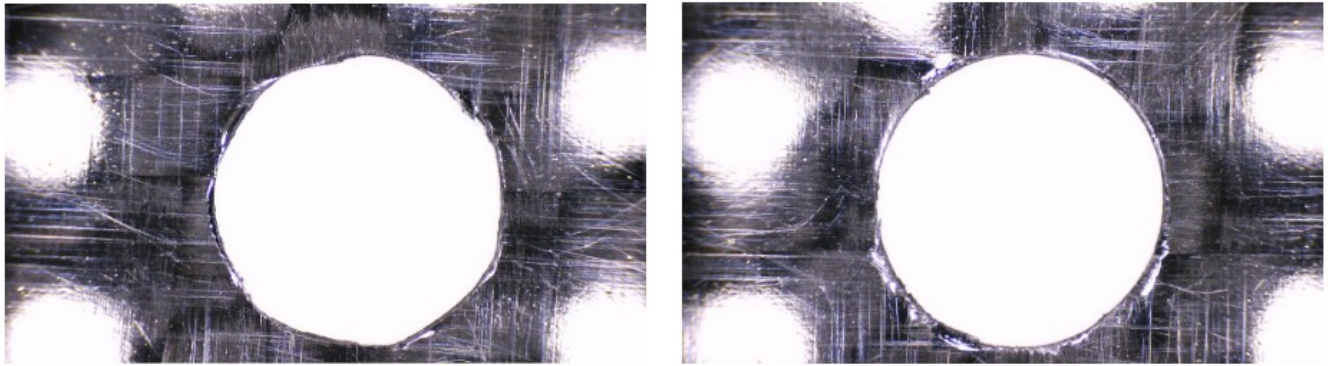
First look – HQ CF

the hole (C1) and sloted hole (C2) dimensions

CF4



CF2



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LP: low precision results

	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8	LP9	LP10	$\bar{X}$	Valor nominal
Linealidad L1	0.015	0.032	0.074	0.081	0.05	0.095	0.085	0.044	0.041	0.072	0.059	
Linealidad L2	0.003	0.022	0.026	0.028	0.061	0.074	0.018	0.025	0.02	0.058	0.033	
Distancia L1-PV1	89.881	89.848	89.726	89.817	89.921	89.821	89.726	89.846	89.811	89.956	89.835	90
Distancia L1-PV2	89.907	89.844	89.778	89.842	89.922	89.782	89.676	89.806	89.836	89.915	89.831	90
Distancia L1-PV3	89.903	89.848	89.802	89.831	89.944	89.764	89.729	89.799	89.81	89.899	89.833	90
Distancia L1-PV4	89.935	89.84	89.8	89.808	89.956	89.754	89.745	89.79	89.824	89.892	89.835	90
Distancia L1-PV5	89.938	89.81	89.821	89.796	89.947	89.712	89.737	89.749	89.822	89.873	89.821	90
Distancia L1-PV6	89.953	89.843	89.771	89.827	89.945	89.64	89.726	89.79	89.838	89.885	89.822	90
Distancia L1-PV7	89.975	89.85	89.794	89.799	89.969	89.676	89.717	89.77	89.815	89.885	89.825	90
Distancia L1-PV8	89.96	89.828	89.785	89.833	89.959	89.76	89.76	89.809	89.804	89.869	89.837	90
Linealidad PV	0.027	0.044	0.074	0.04	0.023	**0.155**	0.06	0.077	0.033	0.044	0.058	
Distancia L2-PH1	119.724	119.758	119.702	119.733	119.855	119.855	119.696	119.77	119.837	119.814	119.774	120
Distancia L2-PH2	119.729	119.785	119.729	119.703	119.807	119.86	119.684	119.805	119.828	119.765	119.769	120
Distancia L2-PH3	119.745	119.8	119.754	119.711	119.739	119.884	119.666	119.811	119.835	119.753	119.77	120
Distancia L2-PH4	119.733	119.782	119.763	119.706	119.758	119.91	119.658	119.799	119.848	119.736	119.769	120
Distancia L2-PH5	119.759	119.85	119.773	119.697	119.789	119.883	119.666	119.832	119.835	119.774	119.786	120
Linealidad PH	0.003	0.022	0.026	0.028	0.061	0.074	0.018	0.025	0.02	0.058	0.033	
Diámetro C1	6.12	6.102	6.132	6.137	6.114	6.176	6.115	6.156	6.151	6.15	6.135	6
Circularidad C1	0.047	0.049	0.035	0.034	**0.106**	0.031	0.043	0.068	0.056	0.042	0.051	
Diámetro C2	6.091	6.084	6.016	6.155	6.165	6.018	6.152	6.18	6.075	6.092	6.103	6
Circularidad C2	0.036	0.028	0.019	0.046	0.032	**0.097**	0.071	0.039	0.025	0.036	0.043	
Diámetro C3	6.084	6.162	6.1	6.156	6.134	6.14	6.157	6.169	6.133	6.103	6.134	6
Circularidad C3	0.001	0.015	0.015	0.021	0.027	0.002	0.02	0.028	0.018	0.02	0.017	
Distancia C2-C3	0.242	0.243	**0.283**	0.198	0.211	0.262	0.177	0.173	0.202	0.213	0.22	0.2
Distancia C1-PMC	47.016	47.012	47.026	47.028	47.056	46.995	46.984	46.994	47.02	47.035	47.017	47
Distancia L1-C1	21.426	21.282	**21.232**	21.351	21.374	21.24	21.317	21.279	21.326	21.316	21.314	21.5
Distancia L2-C1	109.815	109.856	109.755	109.771	109.906	109.851	109.773	109.811	109.811	109.839	109.819	110

RMS Distancia L1-PVX	0.032	0.014	0.028	0.017	0.017	0.059	0.025	0.029	0.012	0.028	
RMS Distancia L2-PHX	0.014	0.034	0.029	0.014	0.045	0.022	0.015	0.022	0.007	0.03	

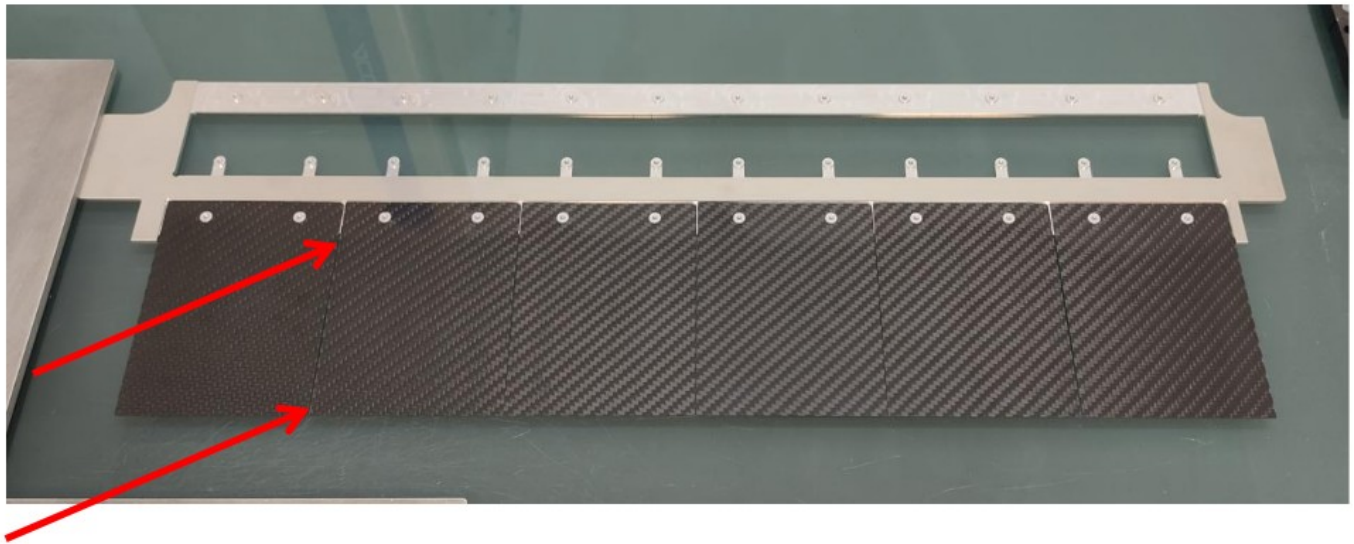
CF precision

- The Cfs provided do not match our requirements
- The communication with the provider is not the best
- The CF operation and machining is intrinsically complicated…
  - We (IFIC) are scoping the market, studying alternatives… we hope to have a new preliminary proposal by the ECAL meeting at DESY
- For the moment, the testbeam is not in danger → not excellent mechanical dmensions but we believe that we can work something out.

CF precision

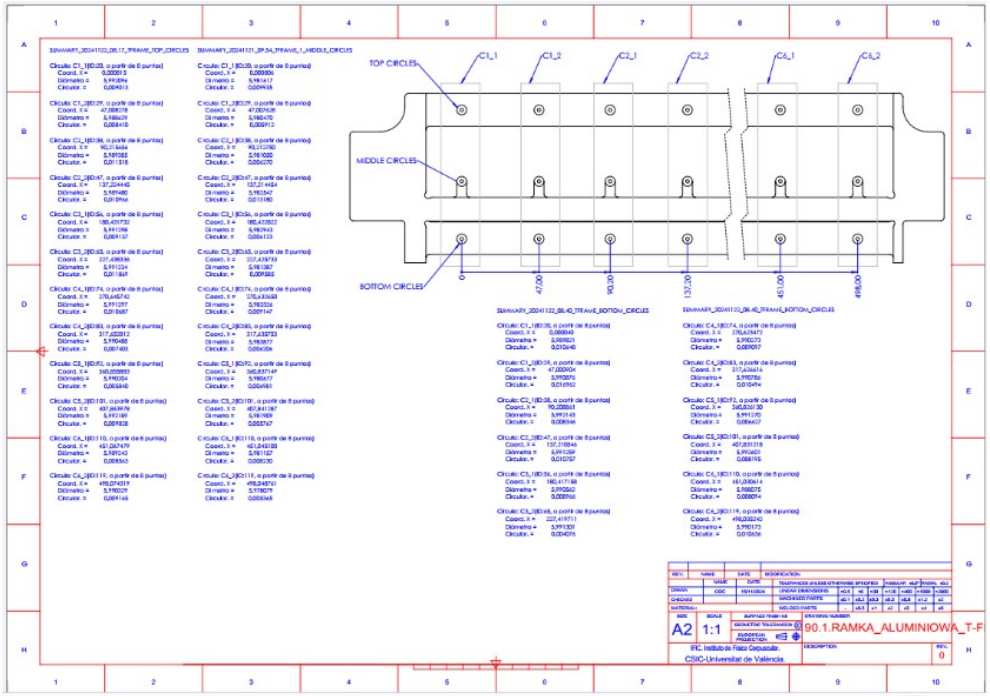
T-frame + 6 CF (gap between CF)

- CF HP1 to CF HP6 mounted on T-frame
- Top gap measured next to T-frame edge.
- Bottom gap measured end of CF.
- CMM equipment has 600 um width. Pictures where taken when both CF where on frame. Gaps bigger than 600um do not have picture.



T-Frame metrology

Results: VLC-TFRAME_CMM_RESULTS.pdf // VLC-TFRAME_CMM_RESULTS.xlsx



I will upload them to the gitlab… in a wiki? In the repository?