Introduction to the internal review on Heat Loads for HL-LHC Scope (P1/P5)

Laurent Tavian

CERN, 27/04/2021

Scope of the review

- Scrutinize the heat-load definition in order to proceed with the HL-LHC cryogenic refrigerator invitation to tender forecast for mid-2021.
- Take into account:
  - All the user cooling requirements (IT+D1, D2, crab cavities and cold powering of the high-luminosity insertions IR1 and IR5),
  - Parasitic heat loads due in particular to the distribution systems
  - Adequate margins and any constraints already present in the cryogenic architecture.
- The review does not include the thermal and hydraulic design for each cooling loops.

Mandate to the review panel

- Assess that all heat loads related with users cooling or with the cryogenic distribution system are taken into account for all the operating modes taking into consideration beam parameters, design luminosity and design energy.
- Verify that the last design version was considered in particular for the users and that the margin is only considered once and take into consideration the maturity of the design.
- Make sure that the local cryogenic capacity is adequate, and that local margins are considered accordingly.
- Ensure that the global overcapacity margins on the refrigerator capacity are adequate to fulfil the HL luminosity ramp up program and take into account any deviation from the heat load specification for the users, with mitigation in place when necessary.

The review panel

- Laurent Tavian (ATS-DO, Chair)
- Udo Wagner (TE-CRG)
- Cedric Garion (TE-VSC)
- Delio Ramos (TE-MSC)
- A. Ballarino (TE-MSC)
- Elias Metral (BE-ABP)
- Vittorio Parma (SY-RF)
- Anton Lechner (SY-STI)

- Linkperson: Serge Claudet (WP9 Leader)
- Scientific Secretary: Vanessa Gahier (TE-CRG)

Agenda of the review

08:30 → 08:35 **Introduction by Chairman of review panel** 5m
Orateur: Laurent Jean Tavian (CERN)

08:35 → 08:50 **Introduction to the HL-LHC cryogenics architecture** 15m
Orateur: Serge Claudet (CERN)
HL_WP9_Cryo_HLR... HL_WP9_Cryo_HLR...

08:50 → 09:10 **Methodology** 20m
Orateurs: Peter Zijm (CERN) , Serge Claudet (CERN) , Vanessa Ga
HiLumi_WP9_Heatl... HiLumi_WP9_Heatl...

09:20 → 09:35 **Inner triplet heat loads** 15m
Orateur: Peter Zijm (CERN)
20210422_Inner_Tri... 20210422_Inner_Tri...

09:40 → 09:50 **D2 design heat loads** 10m
Orateur: Andrew John Lees (CERN)
2021-04-15 - Heat L... 2021-04-15 - Heat L...

09:55 → 10:05 **Cold powering heat loads** 10m
Orateur: Vanessa Gahier (CERN)
HL_WP9_Cold_Pow... HL_WP9_Cold_Pow...

10:10 → 10:20 **Crab cavities heat loads** 10m
Orateur: Krzysztof Brodzinski (CERN)
2021-04-27_HL-LHC... 2021-04-27_HL-LHC...

10:25 → 10:35 **Break** 10m

10:35 → 10:50 **Beam induced heat loads** 15m
Orateur: Giovanni Iadarola (CERN)
006_heat_load_revi... 006_heat_load_revi...

11:00 → 11:15 **Collision induced heat loads** 15m
Orateur: Marta Sabate Gilarte (CERN)
HeatLoads_MSG.pdf HeatLoads_MSG.pptx

11:25 → 11:40 **Summary table / refrigeration requirement** 15m
Orateur: Vanessa Gahier (CERN)
WP9_HL_Refrigerat... WP9_HL_Refrigerat...

11:40 → 12:00 **Wrap up discussion** 20m

12:30 → 14:00 **Lunch Break** 1h 30m

14:00 → 17:30 **Close Session + Complements** 3h 30m

Thanks for your time and questions