Considerations on coatings for Stand-Alone Magnets

Introduction

Technical difficulties have emerged for the **in-situ coating of the beam screens for magnets operating at 4.5 K** (e.g., Q4, Q5, Q6), due to the presence of **cryosorbers**.

The situation is different for the different IRs:

IR2 and IR8

- The coating is foreseen to **reduce the load on the cryoplants** and provide more margin for the arcs
- The expected heat load reduction is in the order of **500 W[(1)] assuming SEY=1.3** (larger than what we had in Run 2 in these magnets, but we should take into account that SEY degradation was observed in the LHC during LS1)
- It is **conceivable to avoid the coating on these magnets** if needed
  - The **risk** related to an SEY degradation **is in line with the risk we are taking anyhow for the arcs** (→ Heat Load Task force is working on mitigations)
  - The **heat load (0.5 kW for SEY=1.3)** is **relatively small** compared to the **cryoplant capacity (~10 kW[(2)])**

[(1)] see CERN-ACC-2016-0112 [(2)] see HL Task Force Meeting 3 Apr 2019

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The situation is different for the different IRs:

IR1 and IR5

- Independently on heat load considerations, **the e-cloud in magnets from the IP to Q5 (included) must be suppressed**, because it can induce significant **degradation on the beams** due to the **large beta functions**
  - In fact, beam degradation from e-cloud in the IRs was already observed in Run 2 (details in presentation at WP2 meeting, 24 Sep 2019)
- Coating of these magnets should be easier thanks to the **possibility of extracting the beam screens** during LS3 works in IR1 and IR5
  - There should be no need for in-situ coating