

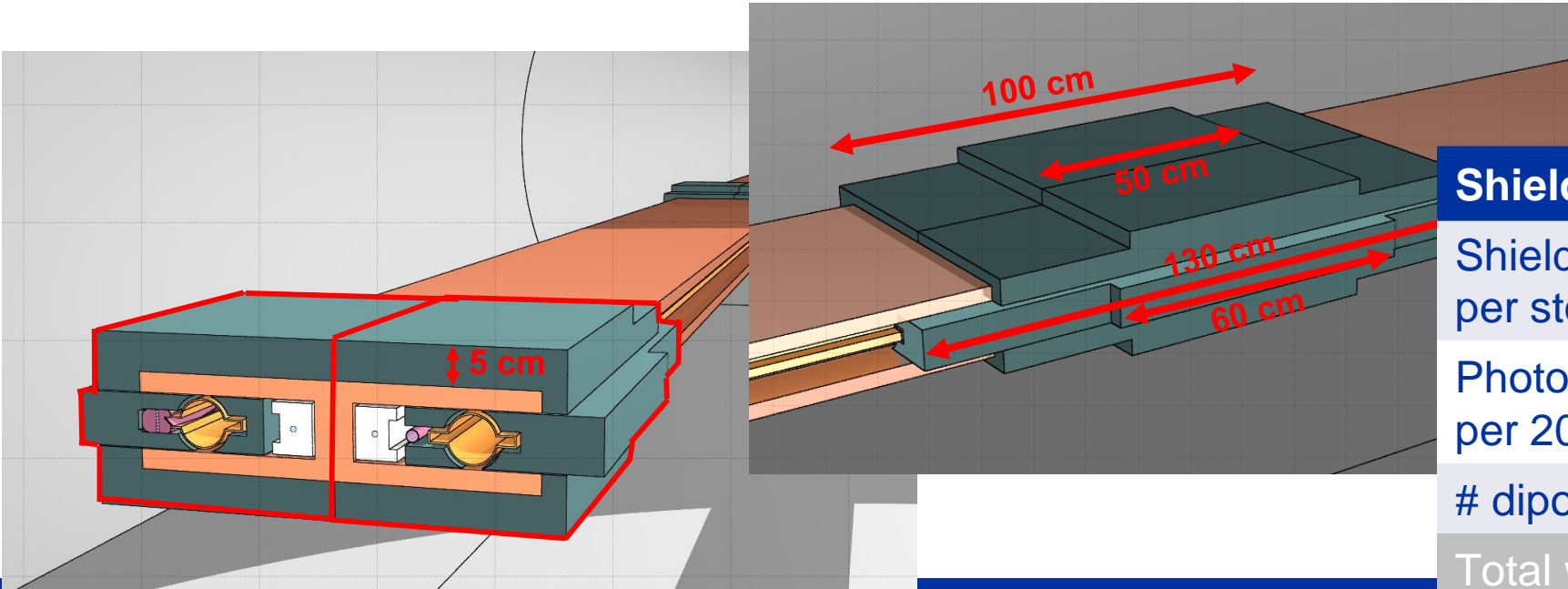


SR radiation shielding for the FCC-ee arcs – status and next steps

A. Lechner for the FCC-ee Radiation and Shielding WG

Introduction

- **Status of conceptual shielding design:**
 - The current conceptual design (as presented in the FSR) allows us to reach the presently assumed target radiation levels
 - The target radiation levels might require further iteration → nevertheless, the technical shielding design should start from the present conceptual design

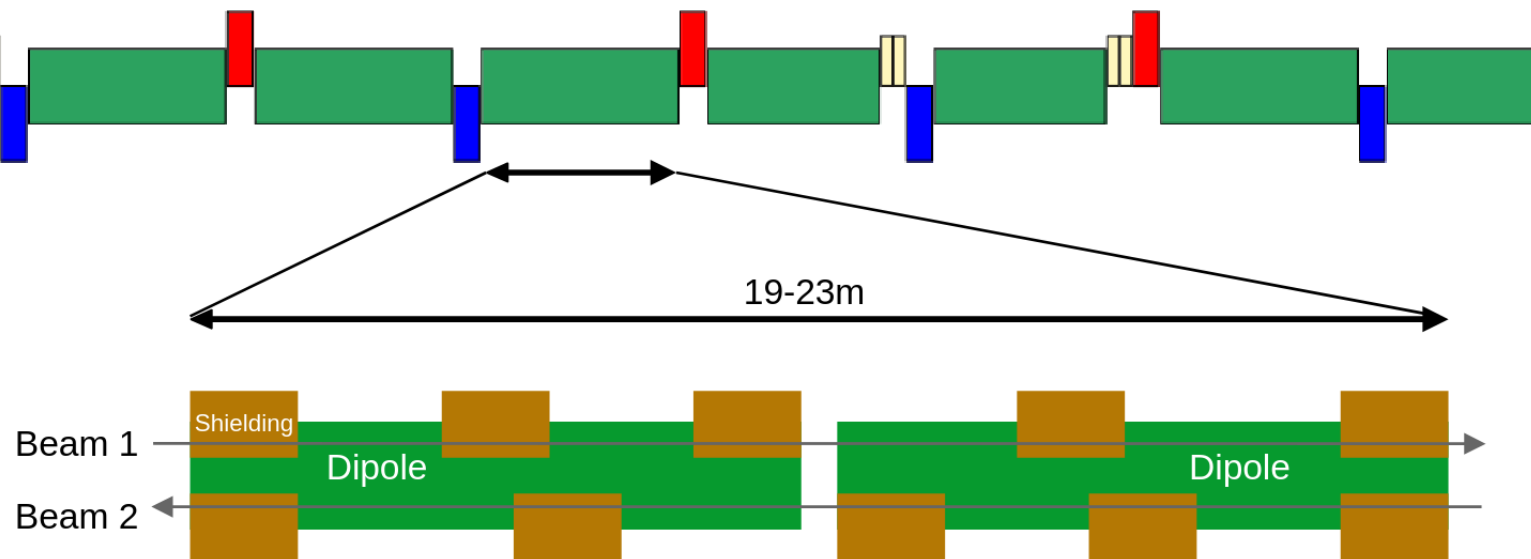


Shielding material for full ring (arcs)

Shielding weight per stopper	400 kg
Photon stoppers per 20 dipole	10
# dipoles	2580
Total weight	10320 tons

Number and layout of photon stoppers & shielding

- Presently we assume 10 photon stoppers per “20m”-dipole (5 stoppers per beam)
- Follow-up items from last year (for TE/VSC):
 - Can the number be reduced to 8 photon stoppers (4 per beam) since the stoppers are now closer to the beam?
 - Can we have a periodic placement of the stoppers & shielding for a given dipole length? (→ highly beneficial for the overall integration and support design)



→ Can these points be followed up by TE/VSC?

Shielding material choice and engineering design

- **Have identified a baseline material last year (Pb-Sb alloy)**
 - **Follow-up items from last year (for SY/STI):**
 - Confirm the material choice (in terms of material availability, procurement, etc.)
 - Determine the required Sb content
 - Determine which kind of housing is required (for structural and safety reasons)
 - Study the thermo-mechanical response of the material and design a cooling circuit (→ carry out thermo-mechanical studies), note: this will also define the required services
- First studies ongoing (see presentation of Alvaro)
- In order to proceed with the dimensioning of the shielding and the engineering design in STI, would need the latest CAD models for the dipoles, SR absorbers and vacuum chambers

Open questions to be addressed

- **Required tolerances and gaps**
 - What distance do we need between vacuum chamber and shielding?
 - What distance do we need between SR absorber and shielding
 - Can (must) the shielding be in thermal contact with yoke?
- **Support**
 - How is the shielding mounted on the magnets/supported inside magnets?
 - Common support for magnet and shielding?
 - Does the magnet design need to be adapted for additional weight? How much does this depend on number and layout of shielding units?
 - First ideas about the assembly requirements?
- **Cooling circuit**
 - Where can the cooling circuit for the shielding be routed?



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