

## Notes from the AMBER Drell-Yan RP meeting on 30/11/2021

<https://indico.cern.ch/event/1098906/>

Present: C. Ahdida, V. Andrieux, C. Azevedo, O. Denisov, A. Devienne, A. Gerbershagen, S. Girod, F. Metzger

- S. Girod [presented](#) the shielding layout model:
  - A proposal for filling the hole in the PPE211 shielding wall at the upstream part of EHN2 at the CEDAR level was shown. A remaining 0.2 m gap for cables would be left at the PPE211 floor level
  - An updated chicane design for PPE211 to beam area with an entrance towards the buffer area was presented. An integration study will be performed once simulation results confirm efficiency. The buffer area can stay
  - 40 cm thick concrete shielding could be placed on top of MBPH.065.115 and MBPV.065.111 in case needed. Otherwise concrete slabs to cover the full area could also be checked if required by RP (see notes for A. Devienne's presentation)
  - The downstream target bunker design around the absorber already exists from AMBER for the polarized target setup. Since main leakage of radiation from the downstream part of the bunker, an extension of the roof shielding above the tracking detectors is to be investigated
  - The upstream target bunker is to be designed by the design office
  
- A. Devienne [presented](#) the updated RP studies on the new shielding layout:
  - The EHN2/TT84 shielding proposal was included in the FLUKA model with a hole of 40x20 cm<sup>2</sup> for the cable passage
  - A new access chicane of PPE211 proposal was also already included in the FLUKA model
  - The EP Safety Office has confirmed that an 80 cm wide maze is fine for an emergency evacuation pathway from the AMBER shielding bunker
  - The beam losses at MBP were improved with a new auxiliary map file provided by D. Banerjee and also the magnet aperture MBP was corrected from 11 cm to 14 cm as given in the magnet database. The changes allowed to significantly reduce the losses in the beamline, however a vertical offset of the beam at the MBP is still seen and to be further investigated
  - Once the beam losses in the beamline are well described, the requirements for an eventual shielding implementation in that area can be defined
  - Currently the main contribution of the skyshine radiation however originates from the downstream part of AMBER target bunker
  - The prompt radiation at the beam level show satisfying results with allowing mainly for a Non-designated Area in the accessible part of the EHN2 hall
  - Possible improvement on the Jura side (currently closed for access) is to be discussed as it also contributes to the skyshine radiation towards ECN3 and could then limit a future intensity upgrade there. The tracking detectors can be rolled out to both sides, wherefore the space for a shielding implementation inside EHN2 is limited. A shielding towards the top may help also for the skyshine radiation towards the Jura side

- The downstream earth mount was added to the FLUKA geometry in order to well represent the dose from muons downstream of EHN2, which is well below the annual limit during Drell-Yan runs
  - The updated results of the annual dose from the skyshine radiation was presented for an intensity of  $3.07 \times 10^{14}$  p/year (double 2018) leading to a slightly lower annual dose with less than 10 uSv/year at 500 m distance
  - The AMBER superconducting magnet will be off during the upcoming Drell-Yan run (only used for polarized target), wherefore there is no threat for a quench due to radiation
  - The residual radiation is slightly higher since more beam particles propagate to the target
  - There are currently two options for access restrictions to the AMBER shielding bunker:
    - Full access system, which would increase the cost and might also risk delays in view of cabling
    - Lock with an RP key, which would cause access constraints for AMBER, particularly during the commissioning
  - Part of the commissioning can be done with less beam intensity, however a (nearly) full intensity test is required for testing the detectors. RP will therefore investigate more cooling times (5/10/30 minutes) and a commissioning phase with  $\frac{1}{2}$  of nominal intensity for 2 weeks
- C. Ahdida showed a short [ECR draft template](#) provided by A. Gerbershagen
    - For the moment it includes a short introductory section
    - Shielding layout, integration studies, and RP and environmental assessment to be included once available
    - The preliminary list of authors/checkers/approvers is to be checked
    - RP will give priority to the chapter about the RP and environmental assessment wrt. to the more detailed RP Technical Note

Next steps:

- A. Devienne will contact D. Banjeree for a further investigation of the beam offset at the MBP
- A. Devienne to contact S. Girod for discussing shielding improvements for the downstream part of the AMBER target bunker and the Jura side
- Contributions to the ECR are to be implemented in the draft template once studies are finalised

The next meeting will be scheduled for the 17th of December at 10 am.

C. Ahdida, 30/11/2021