Review Questions

1) What is the path to determining the maximum main solenoid field and the warm bore aperture? :

4T chosen for first iteration as proven technology and straightforward system and validity confirmed with single particle simulations and scaling from available data in test facility. Simulations with distributions indicted potential asymmetries. Higher fields would provide additional margin ➔ simulations, test stand and RHIC. Initial aperture was just a starting point with default LHC aperture. Aperture: 60mm will work.

Review Questions

2) Does a superconducting magnet design for 20 bar He pressure create additional cost risk?

Yes, but we do not think that this is necessary. But do need pressure safety valves as already foreseen in the current baseline design [e.g. Crab Cavities].

Review Questions

3) Have you eliminated the option of installing the service module behind the electron lens?

There are 2 distinct aspects to be considered, thermal contraction of main cryo-line and volume for service module and jumper.

- Any additional tapping to a new user will need cryogenic valves, themselves to be placed next to an internal fixed point (to avoid longitudinal movement warm-cold). Introducing an additional internal fixed point will require to restore at least on one side the thermal contraction, and most likely to adapt/modify a significant part of the about 50m of existing cryoline between the connections to D3 and RF.

  ➔ at this stage of conceptual approach, the safest is to consider having access to the existing cryoline for cutting/dismantling/removal as well as re-installation and welding.

- With the required work for the thermal contraction of the main line, we have to modify the zone only once, with hollow e- lens and 3rd RF module as possible users. With the enlarged volume required by a service module w.r.t standard pipe element, we considered so far more realistic to place this equipment in the enlarged portion of tunnel, behind the D3-undulator magnets.

  ➔ at this stage of conceptual approach, we do not know how to transport a service module with valves and jumpers behind the D3-undulator with the magnets in present position, therefore the safest consideration is removing some equipment.

Review Questions

4) Is there a schematic of mechanical fixed points in the structure?

Yes: the fixed point is the support of the main solenoid close to the e-gun.

Review Questions

5) What mechanical alignment tolerances are assumed in the present design (straightness of solenoid and absolute position of solenoid extremities)?

50μm over 3m; 0,3mm assuming ability to correct position with orbit correctors; 100μm. Should be able to relax this in a second iteration. This subject is already on the to-do list of the alignment working group (for next year).

NOTE: for collimation purposes small deformation of the electron beam along the length are less critical because it is the integrated field seen by the proton beam that matters.

Review Questions

6) Please explain the possible beam size adjustment with the main solenoid, which will affect e.g. the ramp rate of the main solenoid?

Beam size only controlled by solenoid at the source, main solenoid at constant field and orbit correction via dedicated orbit correctors. Alternative: ramp the main solenoid in order to avoid impact on proton beam orbit: 12 min from 0T to 4T.

Review Questions

7) Please elaborate on running ALICE with greatly reduced luminosity with halo elimination and witness bunches?

ALICE is supposed to run at 10^{31} cm^{-2} s^{-1}. For a Gaussian beam this would mean running with a full separation of 4.8 sigma.

With reduced tails this implies running with a smaller separation. The exact value will depend on the exact transverse distribution.

For a strong reduction of the tails one would expect that the levelling will be more “noisy” because orbit variation will have a larger impact on the luminosity but one should still be able to level the average luminosity.

If we pulse the lens one should be able to maintain the halo for some trains (also interesting for diagnostic purposes).

Review Questions

8) To what extend has a bremsstrahlung based overlap monitor been evaluated?

None as we do not expect significant signal during routine operation (overlap or e-beam only with beam halo). Could perhaps deliver signals during setup.


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