

Accelerator Design meeting

Monday 20/03/2023, 16:00 – 17:30

(<https://indico.cern.ch/event/1260423/>)

Chair: Daniel Schulte

Speakers: Roberto Losito (replacing Lucio Rossi)

Participants (zoom): 31
Alexej Grudiev, Antoine Chancé, Anton Lechner, Bernd Stechauner, Carlo Carrelli, Chris Rogers, Christian Carli, Daniel Schulte, Daniel Novelli, Daniele Calzolari, David Amorim, David Neuffer, Donatella Lucchesi, Elena Fol, Elias Métral, Fabian Batsch, Francisco Javier Saura Esteban, Fulvio Boattini, Hans S-M, Jean-Pierre Delahaye, Jose Antonio Ferreira Somoza, jpavan, Kyriacos Skoufaris, Luca Bottura, Nadia Pastrone, Roberto Franceschini, Roberto Losito, Rui Franqueira Ximenes, Siara Sandra Fabbri, Scott Berg, Vladimir Shiltsev.

MEETING ACTIONS

1: RobertoL, ChrisR and Daniels Clarify the different goals of and collaboration between the different Work Packages (in particular between WP4 and 8, i.e. between the physics and integration studies).

1. NEWS (DANIEL SCHULTE)

- RobertoL announced that not all institutes signed the MuCol agreement (e.g. CEA did not sign yet => It is there still in the hands of the legal service) and he reminded that the budgets will be distributed only after the signatures. Therefore, Roberto encouraged all the institutes to contact the relevant people to ask them to sign asap. RobertoL also mentioned that the scope of the work and initial steps for MuCol were decided. There are some peculiarities for MuCol so Roberto will transfer this info such that it is known by everybody (during the general talk of the kick-off meeting next Tuesday and some decisions could be taken by the governing board in the afternoon: e.g., the WPL, DWPL, etc. will need to be

endorsed). There is a candidate from the US for the role of gender advisor and Elias was proposed for the publications/conferences/dissemination/outreach/etc. (still to be finalised).

- NadiaP mentioned that she will contact all the institutes to verify what is going on (who they are, what they are doing, etc.).
- DanielS mentioned 2 meetings in the US last week (1 on detectors and 1 on accelerators): and we will discuss tomorrow, during the coordination committee, the creation of a Task Force to look at the integration in the IMCC by the US.
- Elias added that a new seminar series dedicated to future collider projects started at CERN last Tuesday (see <https://indico.cern.ch/event/1260648/>). This first seminar presented the status and goals of ongoing studies related to the Future Circular Collider (Frank Zimmermann), the Muon Collider (Daniel Schulte) and Linear ee Colliders (Steinar Stapnes).

2. REPORT FROM WP8 ON COOLING CELL INTEGRATION (ROBERTO LOSITO FOR LUCIO ROSSI)

- **Important:** RobertoL set up a banner (it is a 1st attempt, to be accepted at some point) which should appear in all the talks on MuCol.
- Scope => 2 objectives for the WP8
 - o 1st objective: **select the technologies** which are the most suitable for the construction of a cooling cell (that will demonstrate the feasibility of the concept)
 - o 2nd objective: **design** each component and **integrate** them in a single assembly (that will demonstrate that there is no showstopper for such systems)
- Interactions: WP8 is strongly linked to WP4-6-7 (muon production and cooling, RF and magnets)
- Solenoids: agreed, after several meetings, on reasonable parameters for a solenoid which could be built immediately
 - o 1st parameter to be decided: free bore of ~ 500-600 mm
 - o Configuration with 2 solenoids in order to have the maximum flexibility in defining the magnetic field profile on the RF cavities (i.e. uniform or variable)
- RF
 - o 1st critical choice to make: which frequency? => Need first to fit into the bore of the solenoid
 - o WP6 has the task to analyse the situation and find the best frequency
- Absorbers
 - o We will start with solid absorbers, which is easier to integrate

- o However, also fluid based absorbers will be studied in WP4
- A first sketch of the layout of the cell is shown on slide 8
- Next steps
 - o 1st: decide the RF frequency (3 GHz; 1.3 GHz; ~ 700 MHz) => Input needed from WP6
 - o HTS cable to be used needs to be discussed soon with WP7
 - o Define the test programme for such a cell in order to select the best type of absorber
 - o Question raised: what can we learn by a beam test with protons?
- Conclusions
 - o Work started and 1st choices have been tentatively made
 - o Need confirmation from WP6-7 about what is feasible
 - o WP8 meeting will continue every 1st Monday of every month
 - o e-group: MuCol-WP8-members@cern.ch
- Discussion
 - o ChrisR mentioned that he is not sure what we want to do with this cell as what is sketched on slide 8 is not a cooling cell: it is fine for an RF test but it is not a cooling cell. DanielS said that we need to pick up a cell which has a challenging integration: we don't need the full solution but we need to identify the engineering limitations, without aiming at building it immediately.
 - o RobertoL clarified that for the EU project, the demonstrator does not exist: we (just) need to design a cooling cell and RobertoL mentioned that what is shown on slide 8 is already a challenging situation for the first time: if we solve this then the next steps will be easier (it is therefore a step in the way). MuCol is a design study and nothing will be built, as there is no money to build anything.
 - o ScottB mentioned that it would be good to design something which will end somewhere in a cooling cell (even if not taken of course the most challenging one). Some people doubt that we can put altogether a working cell, so we should keep this in mind.
 - o RobertoL said that it is up to WP4 to do this but ChrisR replied that they will not do engineering studies as they have no money for this: they will do only the physics studies. RobertoL thinks that we should discuss more the collaboration between the WPs as he thinks we need to put together the physics and integration => This needs to be clearly defined (see Action 1).
 - o LucaB reminded everybody that even if we study integration for years we can only check when we build something. DanielS mentioned that studying this on paper, we should be able to identify already many possible issues.

- o VladimirS mentioned that the longitudinal fields are tested at FNAL and here the field lines are transverse (looking at slide 8), so these are complementary studies.

3. AOB (EVERYBODY)

- o I mentioned that there will be an ATS seminar on Thursday 30 March 2023 @ 11:00 - High Power Targetry R&D program with the RaDIATE Collaboration and target perspectives in the framework of Snowmass by Dr. Frederique Pellemoine (from FNAL): <https://indico.cern.ch/event/1265906/>.
- o Next meeting next week: demonstrator (Roberto Losito) => See <https://indico.cern.ch/event/1260424/>.

Reported by E. Métral and D. Schulte