

# List of Actions for the Accelerator Design meetings

Chair: Daniel Schulte

## MEETING HELD ON 01/03/2021

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<b>1: Magnet working group</b>	Try and answer to Peter McIntyre's question: is their new solenoid technology of interest for optimizing $\mu$ -cooling scenarios?
<b>2: Muon collaboration</b>	Think and propose possible test facilities (to be discussed during the coming workshop on 24-25/03/2021).

## MEETING HELD ON 08/03/2021

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<b>1: Everybody</b>	Send names of speakers to Roberto Losito for the Muon Collider Testing Opportunities ( <a href="https://indico.cern.ch/event/1016248/">https://indico.cern.ch/event/1016248/</a> ) on 24-25/03/2021.
<b>2: Particle Physics team?</b>	Clarify the origin of the neutrino energy distribution in the rest frame of the decaying muons.
<b>3: Particle Physics team?</b>	Clarify the origin of fraction of neutrino energy going into to inelastic interactions.
<b>4: D. Schulte, C. Carli and D. Neuffer</b>	Understand the origin of the difference of a factor 1.5 in the radiation level between the formulae of B.J. King obtained in ( <a href="https://arxiv.org/pdf/physics/9908017.pdf">https://arxiv.org/pdf/physics/9908017.pdf</a> ) and another of his papers (link to be added in the future => See minutes of meeting held on 15/03/2021).

## MEETING HELD ON 15/03/2021

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<b>1: C. Curatolo and D. Lucchesi</b>	Discuss the past MDI considerations concerning muons in particular for CLIC, with Helmut Burkhardt and the CLIC detector people (similar subject studied and it was a big concern).
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## MEETING HELD ON 29/03/2021

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<b>1: Everybody</b>	Look at our website ( <a href="https://muoncollider.web.cern.ch/welcome-page-muon-collider-website">https://muoncollider.web.cern.ch/welcome-page-muon-collider-website</a> ) and send any comment to Elias (many thanks in advance!).
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## MEETING HELD ON 12/04/2021

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**1: Kenneth  
Richard Long**

Following a question from PhilippeL, why is there no cost estimate for the “utilities” in the overall cost estimate for nuSTORM (and what should it be)?

**2: Elias Métral,  
Ilias  
Efthymiopoulos,  
Simone Gilardoni**

Check possibilities of a high-power proton beam at CERN, either from SPS or PS, with different pulse lengths (based on an estimate from DanielS,  $\sim 100 \mu\text{s}$  is the time we have and one should try and see what would be the maximum number of protons we can send during this time).

## MEETING HELD ON 19/04/2021

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**1: Marco Calviani  
(from the  
previous  
meeting)**

Establish some contacts with Mu2e (at FNAL) and COMET (at JPARC) concerning the target/solenoidal system.

**2: Chris Rogers  
and Daniel  
Schulte**

Define what the cooling demonstration should be and estimate the corresponding cost.

**3: Manfred Wendt**

Think about what could be done for the instrumentation to measure a low-intensity beam of muons (few  $1\text{E}5$  in a bucket and few  $1\text{E}8$  in all buckets).

## MEETING HELD ON 26/04/2021

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**1: Muon Beam  
Panel**

Produce an interim report for the LDG by end July 2021 (instead of September as initially planned).

**2: Chris Rogers**

Send a first set of relevant parameters for the cooling.

## MEETING HELD ON 03/05/2021

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- 1: Jean-Pierre Delahaye** Finalise/check the list of main relevant parameters all along the muon collider chain and send the “final version” to Elias such that this information can be stored on our website and be available for all the community.
- 2: Everybody** Contact Daniel (and Elias) if you would like to have some seminar(s) before the 1<sup>st</sup> Community Meeting.

## MEETING HELD ON 10/05/2021

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- 1: Everybody (and in particular a convener for a WG)** Answer to the questions raised by email to discuss them and conclude at the second conveners’ meeting this Wednesday.
- 2: Jean-Pierre Delahaye and Mark Palmer** Try and send to all of us the list of parameters to be used for the different stages of the muon collider chain (as the 1<sup>st</sup> Community Meeting will take place next week).

## MEETING HELD ON 31/05/2021

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- 1: Daniel Schulte** Decide on the exact date and format of the 2<sup>nd</sup> Muon Community Meeting (current proposal: 3 consecutive days, July 12-13-14, between 14:00 and 18:00).
- 2: Everybody** Continue to progress in the different Working Groups and prepare the 2<sup>nd</sup> Muon Community Meeting in July.

## MEETING HELD ON 14/06/2021

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- 1: Roberto Losito** Try and estimate the cost of the 2 proposed options by Chris, as this will be essential to guide further discussions and see what we can afford (and what we cannot).
- 2: Marco Calviani** Confirm, or not, some predictions about the effect of the bunch length on the thermal shock, which depend on other factors as well, and quantitatively establish the potential limits: do we need to go down to bunch lengths of ~ 1-2 ns or could ~ 100-200 ns be OK?
- |                     |  |
|---------------------|--|
| <b>3: Everybody</b> | Continue to progress in the different Working Groups and prepare the 2 <sup>nd</sup> Muon Community Meeting of July 12-14. |
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## MEETING HELD ON 13/09/2021

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- 1: Everybody / conveners** Following the recent decision from the LDG to discuss the deliverables and rough cost of the work programme already on September 22, please send updated info to Elias and Chris asap (ideally before coming Muon Beam Panel meeting on 16/09 at 14:00).
- 2: Elias and Chris** Organise a meeting this Friday 17/09 to discuss the results of Action 1.
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## MEETING HELD ON 20/09/2021

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- 1: All WGs** DEADLINE: tomorrow Tuesday 21/09/21 at 18:00 => Send to Chris, Daniel and Elias the template prepared by Daniel (and discussed during the meeting last Friday => See <https://indico.cern.ch/event/1077527/contributions/4532065/attachments/2311486/3933946/Template.pptx>) filled for each WG.
- 2: Guillermo Brauchli and team** DEADLINE: this Friday 23/09 => Try and perform a short survey to see who could help and who we could help with this technology.
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## MEETING HELD ON 08/11/2021

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- 1: Daniel and Chris** Finalise the final report to be sent to the LDG tomorrow morning (instead of next Friday as initially foreseen), with the latest comments received from the LDG during lunch time.
- 2: ScottB** Try and find back what he did in the past with grain-oriented steel etc. and discuss this with HerbertDG who is willing to collaborate on this.
- 3: HerbertDG and FulvioB** Start to collaborate and discuss also with the CERN magnet group and Stephan Russenschuk (who knows a lot about magnet modelling) in particular.
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## MEETING HELD ON 22/11/2021

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**1: All people interested by EU proposals**

Contact Roberto Losito and Daniel asap.

## **MEETING HELD ON 29/11/2021**

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**1: Roberto Losito** Roberto Losito will organise meetings on Tuesday afternoons (14:00 - 15:00) to continue the discussions on the possible EU co-funding.

**2: Everybody** Start to think about the Snowmass preparation with the goal to meet altogether ~ end of February or beginning of March, before submitting something to the White paper.

## **MEETING HELD ON 13/12/2021**

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**1: Everybody** Prepare for the Snowmass White Papers and EU proposal.

## **MEETING HELD ON 17/01/2022**

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**1: Nadia Pastrone** Try and find the best period to organise the first in-person muon meeting/workshop in 2022 (to be decided in February).

## **MEETING HELD ON 31/01/2022**

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**1: Claudia Ahdida et al.** Perform a comparison between FLUKA and MARS as suggested by Nikolai Mokov.

**2: Giuseppe Lerner** Perform new simulations by scanning the angle.

## **MEETING HELD ON 16/05/2022**

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**1: Fulvio Boattini and Davide Aguglia** Continue and work on a more realistic cost model for the power converters.

**2: Antoine Chance** How much mismatch can we allow between RF and magnets?

**3: Heiko Damerau** What can be done from the RF (longitudinal beam dynamics) point of view, inserting the magnets waveform in the longitudinal code? It would be important to provide Fulvio and Davide with the required values of dB/dt at injection and dB/dt at extraction (min and max values).

## MEETING HELD ON 12/09/2022

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**1: Alexej Grudiev** Provide DavidA with the information (related to the fundamental mode and HOMs, required numbers, etc.) about the ILC/TESLA cavities such that he can compare to the results he presented (and hopefully check that there are no issues...).

**2: David Amorim** Check the very low resistivity of Tungsten at low temperature

**3: Luca Bottura and magnets team** Provide DavidA with more complex chamber geometries for the 3 TeV collider (if you think there is a need to study them).

## MEETING HELD ON 17/10/2022

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**1: Everybody** Send to ChristianC and LucaB any comments / feedbacks you would have from the 1st Muon Collider Collaboration meeting (<https://indico.cern.ch/event/1175126/>) to take them into account for the future editions.

## MEETING HELD ON 31/10/2022

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### 1: All Working Group Leaders

Please remember to send me your preferred date(s) to present during a Monday afternoon's Accelerator Design Meeting. For the moment, the planning is the following:

- 1) Physics (Andrea Wulzer) => **To be scheduled after 15/11/22**
- 2) Detector and MDI (Donatella Lucchesi) => ?
- 3) Protons (Natalia Milas) => ?
- 4) Muon production and cooling (Chris Rogers) => **Was done on Monday 31/10/22**
- 5) Muon acceleration (Antoine Chance) => ?
- 6) Collider (Christian Carli) => ?
- 7) Magnets (Luca Bottura) => **To be scheduled in December**
- 8) RF (Alexej Grudiev + Claude Marchand for EU RF WP) => ?
- 9) Beam-matter interaction / target systems (Anton Lechner) => ?
- 10) Collective effects (Elias Metral) => **Could be scheduled as of 14/11/22**
- 11) Cooling cell (Lucio Rossi) => ?
- 12) Demonstrator (Roberto Losito) => ?.

## MEETING HELD ON 14/11/2022

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### 1: All Working Group Leaders

Fill the Doodle sent by R. Losito for the MuCol study kick-off meeting date

## MEETING HELD ON 21/11/2022

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### 1: David Amorim

Try and better understand the movies of the unstable bunch in the presence of an initial transverse offset

### 2: David Amorim

Perform the same simulations with non-pulsed sextupoles, which partially compensate the chromaticity (letting it drift with energy)

### 3: David Amorim

Redo all the simulations presented for the case of the nominal impedance model (with the ILC RF cavities), i.e. without the factor 2 or 3, which was used to better observe the effects of some parameters in the unstable regime



## MEETING HELD ON 28/11/2022: NO PARTICULAR ACTION (TO BE CONTINUED)

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### MEETING HELD ON 05/12/2022

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- 1: N. Milas, D. Schulte and C. Rogers** Investigate the main parameters for the proton beam with respect to the target size and material and the required muon beam emittance
- 2: D. Schulte and E. Métral** Invite our US colleagues to a future design meeting to present their experience, views and ideas for the proton complex

### MEETING HELD ON 12/12/2022

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- 1: Daniel and LucaB** Plan a meeting at the beginning of 2023, with all the relevant people, to discuss the recommendations from LucaB et al. to use 9 T (for NbTi) and 14 T (for Nb<sub>3</sub>Sn) instead of the 10 T and 16 T, which we are currently considering in our studies.

### MEETING HELD ON 06/02/2023

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- 1: David Amorim** Do a similar study for the RCSs as the one he did for the collider to evaluate the minimum required aperture.
- 2: Antoine Chancé** Following the question from Roger Ruber, check with Max<sup>TM</sup> by how much the beam position will change in an FFA and what the effects would thus be.

## MEETING HELD ON 13/02/2023: NO PARTICULAR ACTION (TO BE CONTINUED)

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### MEETING HELD ON 27/02/2023

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- 1: Fabian Batsch** Check for consistency and comparison of longitudinal emittances in MuCol documents, MAP and studies presented today.

**MEETING HELD ON 06/03/2023: NO PARTICULAR ACTION (TO BE CONTINUED)**

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**MEETING HELD ON 20/03/2023**

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**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).

**MEETING HELD ON 27/03/2023: NO PARTICULAR ACTION (TO BE CONTINUED)**

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**MEETING HELD ON 03/04/2023: NO PARTICULAR ACTION (TO BE CONTINUED)**

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**MEETING HELD ON 24/04/2023**

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**1: Rui Franqueira  
Ximenes**

Produce the plot of the required beam size as a function of the beam power in order not to break the target.

**MEETING HELD ON 15/05/2023: NO PARTICULAR ACTION (TO BE CONTINUED)**

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## MEETING HELD ON 22/05/2023

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**1: All IMCC WG Leaders and MuCol WP Leaders (and all other people involved)**

All the relevant people should have access (please tell me if I need to add some other people) to the Overleaf Document on Parameters (see <https://www.overleaf.com/project/61c964cd97ae7f106627d3ed>) and should now:

1) Have a close look to the structure and send me any feedback to add/change/remove some chapters

2) Send us / confirm the name of the people who should be responsible for the writing and follow-up of the chapters

=> Many thanks in advance for your swift follow-up (as Daniel would like to discuss this at the Annual Meeting in Paris/Orsay mid June)

## MEETING HELD ON 05/06/2023: NO PARTICULAR ACTION (TO BE CONTINUED)

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**MEETING HELD ON 18/09/2023: NO PARTICULAR ACTION (TO BE CONTINUED)**

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**MEETING HELD ON 25/09/2023: NO PARTICULAR ACTION (TO BE CONTINUED)**

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**MEETING HELD ON 02/10/2023: NO PARTICULAR ACTION (TO BE CONTINUED)**

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**MEETING HELD ON 30/10/2023: NO PARTICULAR ACTION (TO BE CONTINUED)**

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**MEETING HELD ON 13/11/2023**

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**Action 1  
(Everybody, any  
time):**

Please send to Elias ([elias.Metral@cern.ch](mailto:elias.Metral@cern.ch)) as PSC chair, or to the whole PSC ([IMCC-PSC@cern.ch](mailto:IMCC-PSC@cern.ch)) if you prefer, the list of conferences linked to IMCC (with possibly the date, the url and in particular the deadline for abstract submission or day of the presentation) where you plan to go in the future (end of this year + next year in particular) with the subject to be presented (title and rough abstract if/when available): many thanks in advance!

**Action 2  
(Everybody, any  
time):**

Please remember to try and introduce briefly newcomers joining the team.

**Action 3  
(Everybody  
before  
01/12/2023 at  
12:00 Geneva  
time):**

Please send to Elias ([elias.Metral@cern.ch](mailto:elias.Metral@cern.ch)) as PSC chair, or to the whole PSC ([IMCC-PSC@cern.ch](mailto:IMCC-PSC@cern.ch)) if you prefer, all the abstracts linked to IMCC (with presenter / main author / list of co-authors) which will be presented to [IPAC24](#) (reminder: deadline for abstract submission on IPAC24 website is 11/12/2023).

## MEETING HELD ON 20/11/2023

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- Action 1 (Everybody):** Reserve the slot (@16:00) on Monday 04/12/23 for the IMCC EOY/ Xmas drink together
- Action 2 (Alexej Grudiev et al.):** Study the effects of using an RF cavity gradient of 25 MV/m (more optimistic) and 15 MV/m (more realistic)
- Action 3 (Avni Aksoy):** Send to FabianB the number of muons and the full phase space at the end of the RAL2 simulation such that FabianB can use this for his tracking in RCS1

## MEETING HELD ON 22/01/2024: NO PARTICULAR ACTION (TO BE CONTINUED)

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## MEETING HELD ON 15/04/2024

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- Action 1 (Elias and Muon Collider Secretariat):** Send a last email/reminder to the IMCC CC, Governing Board, Steering Board and Management Board (and others if needed) to check that all the people are inside the IMCC Authors List.
- Action 2 (All IMCC WG Leaders and MuCol WP Leaders):** Following the email from Elias after the meeting, send him proposals for subjects/speakers for the next meetings: it was decided after the meeting that we will rotate between the different MuCol WPs starting on Monday 29/04/24. The next meetings will then be on Mondays 29/04/24, 13/05/24, 27/05/24, 03/06/24, 10/06/24, 17/06/24 and 24/06/24.

## MEETING HELD ON 29/04/2024

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- Action 1 (PSC members and IPAC24 Authors):** Authors to send all the papers to Elias and PSC to review the 14 abstracts submitted to IPAC24 (where the deadline for paper submission is 15/05/24).

**Action 2 (All IMCC WG Leaders and MuCol WP Leaders):** Send to Elias proposals for subjects/speakers for the next meetings: it was decided after the meeting held on 15/04/24 that we will rotate between the different MuCol WPs starting on Monday 29/04/24. The next meetings will then be on Mondays 13/05/24 (finally cancelled due to the RCS workshop on Wednesday 15/05/24: <https://indico.cern.ch/event/1388830/>), 27/05/24, 03/06/24, 10/06/24, 17/06/24 and 24/06/24.

## MEETING HELD ON 27/05/2024

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**Action 1 (Elias and David):** Following the results from ErikK, organise a meeting with all the relevant people to discuss the best option for the RCS normal conducting beam pipe.

*Reported by E. Métral and D. Schulte*