

Minutes of the Joint COMPASS and AMBER TB meeting of 8 February 2022

S. Levorato

February 19, 2022

Attendace via Zoom only

Maxim Alekseev, Vincent Andrieux, Vladimir Anosov, Carlos Azevedo, Jens Barth, Franco Bradamante, Norihiro Doshita, Oleg denisov, Christian Dreisbach, Aleksei Dziuba, Alain Magnon, Jan Michael Friedrich, Bernhard Ketzer, Igor Konorov, Stefano Levorato, Martin Losekamm, Evgeni Maev, Jan Matousěk, Christophe Menezes Pires, Damien Neyret, Daniele Panzieri, Bakur Parsamyan, Stephan Platckov, Michael Pešek, Fulvio Tassarotto, Triloki, Marat Vznuzdaev, Vasilyev, Moritz Veit, Paolo Zuccon.

The material presented during the meeting is available at
<https://indico.cern.ch/event/1093001/>

The meeting starts at 09:00 pm

Agenda

- 1 Approval of the minutes of the Technical Board held on 16 November 2021
- 2 Report from the Technical Coordinator
- 3 AMBER TPC gas system
- 4 PT preparation 2022
- 5 HCAL1
- 6 Plans for DC detectors
- 7 Silicon preparation 2022
- 8 MWPC and RW repair plan
- 9 Status of GEM production for 2022
- 10 Fiber detector and Tracking system
- 11 COMPASS and AMBER DAQ: Status and plan
- 12 RICH-1 planning

13 MM restart

16 AoB

1 Approval of the minutes the TB of 16 November 2021 *S. Levorato*

- a The minutes of the Technical Board held on 16 November 2021 are approved

2 News and Communications *S. Levorato*

- a Norihiro Doshita TB mandate has been extended till end of 2022. In response to P. Zuccon question of TB mandates after 2022 the TC replies the new AMBER TB has to be established first as organ of the AMBER collaboration after the signature of MoU, the member mandate discussions will be handled in it.
- b CV preparation is on schedule. Raw and chilled water may be available at COMPASS by middle February: TBC by CV. Regular water distribution after beginning of March is foreseen.
- c On February 21 the test of the flammable gas detection system will be performed (908 + ATEX Area). After completion of the test the use of flammable gases may be granted. Detector experts have to provide the measurements of the leak rate to be declared in the C203 form.
- d A more frequent (w.r.t. last year) refilling of the external EHN2 LN Dewar has been agreed with Cryo with the aim of solving the problem on an insufficient quantity of liquid nitrogen reaching the Silicon Dewar during the tracker operation. Insufficient LN is in fact provided when the external Dewar is near the refilling limit.
- e Liquid Helium availability has been requested for beginning of March.
- f The Draft Injector schedule is presented. Start of NA beam tuning is planned for W15, start of physics for W17. This will result in 203 days of protons for NA. NA64 has requested 23 days of NA beam allocation and will most likely start first since the apparatus is already in place. COMPASS can start collecting data from W20 or W21. **The TC remarks COMPASS must be ready to commission the spectrometer during the NA64 commissioning and data taking time.** In reply to the question of M. Veit the TC replies the Trigger commissioning time is scheduled during the W20 or W21.
- g Due to the vacuum leak upstream M2 noticed by EN-BE COMPASS has been asked to clarify the request of beam time allocation with electrons and the need of beam polarity. The TC asks the feedback of the Transversity

group of the run coordinator. EN-BE will plan the type of intervention according to the M2 users requests.

- h The TC asks the feedback of the Transversity group and run coordinator for the ECAL calibrations needs.
A planning of surveying activities is requested to COMPASS by N. Charitonidis (EN-BE) both for the BoR and for the 2022-23 YETS. Feedback is requested from TC to the Transversity group and to run coordinator. The preliminary schedule have to be provided by filling the online form **before 12 February**.
- i Interventions to fix COMPASS electrical non-conformities are ongoing via the support of EP-DT. The TC reports no intervention by the detector experts have been performed so far as requested in November according to EDMS 2643017. In response to the request of M. Alexeev concerning the possibility to have a dedicated pre-run electrical safety inspection the TC answers it is possible to organize it.
- l The electrical installations for the AMBER DAQ are scheduled to be over by mid-March.
- m The TC reminds the decabling campaign (EDMS 2611997) will start in EHN2 during next YETS. **Detector experts are requested to identify and mark old cables to be removed.**
- n The EN-BE division is planning the installation of a beam spill and profile monitor at EHN2, just before the beam dump location. Its possible fixed positions will correspond to the configuration SM1 and SM2 off, SM1 1 Tm SM2 4.4 Tm and 160 GeV beam, SM1 1 Tm SM2 5.2 Tm and 280 GeV beam. Different magnet conditions and beam energy positions, if needed, have to be communicated as soon as possible to EN-BE.
- o DC5 repair will take place between 14 and 25 February. A team of 5 people will be onsite. **W45 will not be repaired this year** due to lack of manpower.
- p The TC reminds the meeting with EP-safety and HSE dedicated to the LSD discussion for AMBER TPC and gas system which is planned on February 10.
- q ALPIDE chips for the UTS will be available before middle March when the licensing procedure will be completed.

3 AMBER TPC gas system *A. Dziuba*

The AMBER TPC gas circulation system is presented by A. Dziuba. In the proposed scheme 3 different zones are identified: the TPC area, the gas purification and circulation system, the gas storage area. Two options are available

for the TPC gas density control: thermal housing and Liquid thermo-stabilizing method. The purification system is based on Zeolite filter at LN temperature. The next step is addressing all the safety needs before progressing to the finalization of the project and the cost evaluation. To the request of frequency of purification filter regeneration M. Vznuzdaev replies the amount of Zeolite should be calibrated to perform the operation in parallel with the compressor membrane exchange which will happen on monthly base.

4 PT status and planning *M. Pešek*

The preparation of the PT target is well on track. The new Gunn diodes are being tested. The material loading is foreseen on 15 of March with one week possible delay due to the DSO test in the EHN2 hall. A detailed schedule of the commissioning and running is presented. The table with foreseen manpower is illustrated.

5 HCAL1 *O. Gavrishchuk*

The TC reports the communication by O. Gavrishchuk: HCAL1 commission will start at middle of April without any upgrade. HCAL1 will be tested before data taking with LED signals and few channels (2-3) will be repaired.

6 Plans for DC detectors *S. Platchkov*

The DC4 noise problem was investigated and studied. The noise was present already before the DC4 fix intervention of 2021. It changes in intensity with time and it is randomly present. Its most probable origin is an external source. The problem will be studied on site in April by a dedicated team. In reply to the question by A. Magnon concerning the possible induction of noise via common grounding of DC4 and GEMs B. Ketzer replies there is no common grounding between the two detectors. DC0 and DC1 FEE will be checked from remote during the month of February, on site in April. In response to the request of the TC about the BK DC00 status that can be not be rumped up at nominal speed, S. Platchkov replies the issue will be investigated when the team will be onsite in April.

7 Silicon preparation 2022 *C. Dreisbach*

The cryogenic system to run the COMPASS Silicon is already in place. The detectors are ready to be installed back. The intervention is foreseen to start at the end of March or beginning of April latest. 14 days are needed to re-cable and restart the whole detector system. C. Dreisbach proposes to perform the Silicon installation before the VI2 due to the reduced physical space. The issue of low pressure in the LN Dewar of silicon is addressed. N. Doshita explains the new procedure of filling the DL and the PT magnet should improve

the Silicon LN Dewar refill process.

To cope with the voltage loss of the long cables and the limitation of the Silicon Deutronics LV PSU a DC to DC converter is proposed to be installed before the Silicon FEE boards. A set of accelerometers will be installed on the Silicon support structure.

8 MWPC and RW repair plans *M. Alexeev*

M. Alexeev reports that after the 2021 repair campaign between 24 to 26 RW MDT tubes are presenting again a gas leak. The repair operation requires the dismount of the whole FEE to have access to each gas and HV line, that will be independently tested and fixed. The EM shielding, partially installed in 2021 will be completely refurbished after FEE installation. The RW repair operation is expected to last 1 month.

PA05 equipped with iFTDC requires the installation of EM shielding for the whole detector FEE cards.

PB10 will be moved to clean room for the Mylar foil repair. The detector window will be obtained by gluing two separate foils. It was not possible to acquire large enough foils. M. Veit suggest to contact Raphael Dumps. Depending on the repair duration of PB10 others MWPC detector may be repaired. Maxim reports in fact several chambers may present performance degradation during 2022 run. Space requirements to perform the operation in COMPASS clean room are presented. The repair work should last nearly two months. Maxim communicates Torino colleagues will be have an almost permanent presence on site.

9 Status of GEM detectors *Dmitri Schaab, Bernhard Ketzer*

The status of production of the detectors part is presented. GEM foils: 12 good, 2 unknown, 7 ordered. Drift planes: 5 good+ 1 ordered, read out planes 5 good+ 1 ordered. Taking finally into account the mechanical support and/or frames availability currently 5 detectors in total (incl. backup material) can be assembled. Assembled APV cards are fully available while both production and test of supply and ADC cards is not over. **The availability of GEM stations is in a critical status for 2022 data taking.**

The PRM readout requirements for AMBER GEMs are illustrated. The starting point is the 30 cm x30 cm GEM with divided strips and active central sector equipped with self-triggering VMM. The number of channels per projection foreseen are 1536, the number of projections per station is 4, the number of stations to be installed is 6.

10 Update on SFHs / UTS for PRM *M. Losekamm*

The UTS prototype mechanical support is completely built, the production of a second one will follow. 3 test campaign are envisaged:

1. Initial tests of end-to-end light yield, with a prototype equipped with few channels (≈ 8) to test light yield and coincidence trigger rates in beam. The setup will be close to final: beam-dump area, after COMPASS beam start
2. Test of full SFH prototype with all four planes (two X, two Y) with 64 or more fibers per plane: beam-dump area, summer/autumn (TBC)
3. Integrated testing of prototype UTS SFH prototype + SPD prototype: TBD

11 DAQ report *I. Konorov*

The COMPASS DAQ status is illustrated: after AMBER pilot run most of fiber connections were restored back, DAQ computers and DAQ Event builder are UP and running. All VME crates will be switched ON in end of February. **C203 DAQ will be ready for detector commissioning already in March.** Standalone DAQ is ready for DC05 tests in clean room.

For AMBER DAQ the data Base On Demand (DBOD) is proposed. TPC read out integration in AMBER DAQ will be performed by oversampling with 77.78 MHz (2xTCS clock), averaging 4 samples (19.44 MHz effective sampling rate) and use TPC trigger for data reduction. Several activities are ongoing on site for the DAQ development with the goal to have FriDAQ operational with iFTDCs by end of March. Further development of HLT test environment were also performed: full implementation SciFi detectors with iFTDC to emulate HLT functionality, the evaluation of HLT functionality in case of TPC trigger read-out and T0 calculation.

I. Konorov is requested to elaborate on the complications of COMPASS and AMBER DAQ Interleaved operation. The best scenario would be to switch off COMPASS DAQ and move detectors to AMBER DAQ, although AMBER computing and DAQ FPGA module are independent from COMPASS DAQ and both DAQ can be operated in parallel. There are anyway several complications to operate them in parallel or interleaved mode: computing and shared software, support of computing infrastructure and two DAQ versions which requires additional manpower as well as shared detectors. Short term support can be discussed but long term support is excluded.

I. Konorov communicates Antonin Kveton has left COMPASS/AMBER, January was his last month in COMPASS. Martin Zemko's 3 year contract will come to the end in 7 months, an extension has been asked till end of 2022 to EP-DT. I. Konorov remarks it is important to keep Martin for longer time at least for full commissioning of AMBER DAQ. I. Konorov proposes to negotiate with EP group (as done for Martin Zemko by G. Mallot) to provide positions for new students as support and development of AMBER DAQ.

S. Huber will leave TUM in July. I. Konorov underlines we are going to face severe problem with AMBER DAQ manpower.

12 RICH-1 planning and updates *C. Chatterjee*

For the COMPASS RICH-1 a continuous deuterium lamp source has been installed to verify the gaseous single photon detector functionality. New pumps for the radiator precleaning system have been installed. The gas cleaning is expected to start during the end of February or the beginning of March. During 2021 463 kg out of 606 kg of C4F10 have been cleaned and transferred (eff = 76.5%). 630 kg from LHCb have been procured on top of the previous ones. 154 kg have been cleaned (89% efficiency). 620 kg are at the moment stored in the RICH-1 storage tank. During 2021 40 kg of radiator gas have been lost during the detector operations. The amount of gas available at COMPASS is enough for 2022 run.

The sectors with missing electronic signals of the hybrid photon detectors are under investigation. Interventions will be made ASAP. HV distribution may be the source of this inefficiency.

Various replacements and maintenance operation are foreseen to have the RICH-1 fully operational before the COMPASS commissioning phase.

13 Starting up of pixelized Micromegas detectors for 2022 data taking *D. Neyret*

Detector commissioning is foreseen to start during the W15 (11-15 April) on site. After successful commissioning onsite it will be continued from remote. When dedicated beam will be available the latency tuning, time and amplitude calibrations will be done. Low intensity muon beam including halo trigger and alignment are requested. D. Neyret asks for the rental of 2 A1821N and 1 A1821HN HV modules.

14 AoB

- No other arguments are proposed.

The meeting rose at 13:15 pm.