

Minutes of the Joint COMPASS and AMBER TB meeting of 16 November 2021

S. Levorato

February 19, 2022

Attendace via Zoom only

Maxim Alekseev, Vincent Andrieux, Vladimir Anosov, Carlos Azevedo, Jens Barth, Franco Bradamante, Sergey Donskov, Norihiro Doshita, Christian Dreisbach, Aleksei Dziuba, Alain Magnon, Jan Michael Friedrich, Bernhard Ketzer, Igor Konorov, Stefano Levorato, Martin Losekamm, Evgeni Maev, Jan Matousšk, Christophe Menezes Pires, Damien Neyret, Daniele Panzieri, Bakur Parsamyan, Stephan Platckov, Michael Pešek, Caroline Riedl, Fulvio Tessarotto, Alexander Vasilyev, Moritz Veit.

The material presented during the meeting is available at
<https://indico.cern.ch/event/988389/>

The meeting starts at 14:00 pm

Agenda

- 1 Approval of the minutes of the Technical Board held on 28 September 2021
- 2 News and communications
- 3 Report from the Run Coordinator
- 4 PT status
- 5 Silicon report
- 6 RICH-1 report
- 7 W45 report
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1 Approval of the minutes the TB of 16 November 2021 *S. Levorato*

- a The minutes of the Technical Board held on 28 September 2021 are approved

2 News and Communications *S. Levorato*

- a The proposed dates for the Technical Board meetings in 2022 are 8 February 2022, 19 April 2022, 19 July 2022, 11 October 2022, 13 December 2022 are confirmed. The TB page is already updated
- b CAEN HV power supply can not be exchanged in 2021. 3 new A7435 modules have been received and can be used as spare.
- c The gas Nitrogen bypass will be installed on 22 November.
- d CV planning is confirmed. Restart of CV services in March 2022.
- e The Draft Injector schedule is presented. Start of NA physics in week 15. Stop of NA physics in week 46. This will result in 217 days of protons for NA. The schedule is subject to change. There is the chance NA64 will use the first three weeks of NA physics since their apparatus is already in place.
- f EP-DT support has been asked for the stretching machine rotation and the DC5 displacement.

3 Report from the Run Coordinator *Jan Matousšk*

The run coordinator reported on the run difficulties faced, namely the manpower shortage in several areas, the need of important interventions for several detectors like H1, RW, DC4, SI. The main issue were the several accidents and problems of the PT.

The beam conditions have been optimal only in the last part of the data taking. The TC congratulates for the great job and effort of the RC.

4 PT Update *N. Doshita*

Nori reports that the TE calibration at the end of the COMPASS run could not be performed due to moisture in the Helium-3 line introduced during the pipe replacement after the buckling accident. Several improvements are foreseen before 2022 data taking:

- 1 ^3He line reinforcement
- 2 The improvement of the ^3He transfer line
- 3 The installation of new two Gunn diode purchase by Yamagata
- 4 The replacement of ^3He panel valves
- 5 ^4He pumps maintenance and leak detector system maintenance

The modification of the ^4He distribution for the PT Cold Box is under evaluation with the support of EP-CRG group.

The restart planning is presented. Target material loading is foreseen in the middle of March 2022.

Manpower plan is presented. Franco Bradamante states the presence of Jaakko as necessary from January to April and the new persons, that should join the PT group from Japan and Dubna, should come and learn on the system before the target loading.

5 Silicon Update *C. Dreisbach*

C. Dreisbach reports about the operation of the silicon tracker of COMPASS. The two main issues were the error in the setting of the inlet valve status and the missing sealings of the transfer line of one station. The over pressure problem generated by a wrong setting of the exhaust valve resulted in no damage to the detectors but the fixing of SI01 window. Silicon trackers operated smoothly for the 2021 data taking. The low inlet pressure of the LN line for the cold silicon Dewar is still problematic when the external COMPASS Dewar is below 80% filling.

The PRM pilot run setup is described, five warm silicon station have been operated with minor problems.

6 RICH-1 report *S. Levorato on behalf of S. D. Torre*

The RICH-1 activity during the shutdown is presented, consisting in the cleaning of the final batch of C_4F_{10} amounting in approximately 400 Kg and if manpower available perform a gas leakage campaign.

For the PD part it is foreseen to install a deuterium lamp to have a nearly online feedback from the gaseous photon detectors response before the beam availability. For the MAPMT part support from TO colleagues is requested.

7 W45 status and plan *C. Azevedo*

The detector gas oxygen ad water contamination problem is still not understood. The material to build a continuous monitor system for the 6 W45 lines has been ordered. For the DW03V2 the goal is to locate and remove the short circuit, send the LV PSU to repair and install the the LV power cycling device.

8 DC5 report *C. Riedl*

The repair intervention for DC5 is described. DC5 will be moved into the clean room in the middle of December. The UUIC intervention will start on January 10. The broken Y prime wire plane will be repaired. Loose pins will be replaced by new ones or Knurled ones. The Intervention is supposed to finish for January 21 with the re installation of the detector in garage position in the COMPASS spectrometer. Academia Sinica can not send anyone due to travel restrictions. C. Riedl ask for space availability in 891. the TC answers it is granted. Standalone DAQ in 891 is requested for the FEE tests.

9 DCS report *C. Pires*

For the 2021 run all 17 new CAEN HV power supply and one LV PS have been integrated using the CAEN SW version 0.9.7. The CANOpen SW version 2.2.4-211 has been used for the 28 ELMBs. No issue encountered for the Wiener devices connected via SW version 1.0.0 and the LV Aim TTi PL303-P using LXI 1.0.11.

DIM Servers integrate the Rhode & Schwarz PS for the GEM LVs, the ETH484-B for GEM Ctrs, the Aim TTi PL303QMD-P and TSX3510P for GEM and Silicon ADC LVs and the Delta Elektronika PS for ECal1. BA82 water information has been added to DCS via DIP. From DCS, querying the MySQL DB, it is possible to access both the FI01XY and FI15XY and the Gunn diode monitoring information.

For the AMBER PRM DIM Servers integrate the Duet3D motor for the Trigger system and the TPC Actar Hv and Keller Pressure and temperature via EPICS. The IKAR TPC Safety System monitoring is integrated via DIP. 16 temperature probes are read-out via ELMBs. The Scaler reading is available by querying the MySQL DB via DCS.

10 DAQ report *I. Konorov*

DAQ was stable during the run, few instabilities appeared related to the mismatch between layers, the long time to stop the run. Minor issues related to Dialog due to race conditions were present too.

PA05 MWPC detector has been equipped with iFTDCs cards and tested with muon beam successfully. No degradation down to 0.5 μ s dead time. The COMPASS DAQ is ready for 2022 data taking.

For AMBER PRM run the missing hardware resources are 3 read out engines and 5 HLT nodes. Migration to ATCA standard for the future to be done. For the DAQ software the new DB library has been implemented, the DIALOG library has been upgraded. The Amber Data storage test has been performed, the RAID50 solution is the best trade off. The HLT framework for distributed computing has been tested successfully.

The discussion on COMPASS DAQ availability after 2022 concludes with the need to keep alive part of the COMPASS DAQ since not all FE will be Trigger Less compatible. The need of having two DAQs requires and extra effort for the DAQ group and can not be a long term solution.

For the PRM run significant part of computing HW is missing and has to be purchased. Electronic components for the detector multiplexer hardware have to be ordered as soon as possible due to the long delivery time of suppliers. Firmware development is not complete yet. Test of AMBER DAQ could not be performed up to now due to missing firmware: the strategy is to prepare DAQ for 2022 beam run in parallel with COMPASS and commission it.

During PRM 2 MSADC channels were connected to the ECAL2 test module and read out in free running mode via the new INFN-ICTP board. Data collected will be used to optimize the ECAL2 signal feature extraction filters.

11 GEM report *B. Ketzer*

All GM01-10, GP02-03 detectors were operational on 15.7. Few problems during the run. No major issue. The production and testing of the COMPASS GEM-3G is ongoing. Studies with the passive resistive divider are ongoing to avoid the problem faced with Stabilized Voltage Divider. The installation of the new detectors is foreseen between March and April 2022. Front-end cards (APV) are available for all the detectors. ADC components are available for the production of the boards. Igor and Bernhard agree for the production in BONN.

During the PRM run a small 10 cm \times 10 cm GEM detector has been readout via the VMM FE chip and SRS. Analysis of the collected data is ongoing.

12 Pixel MM report *D. Neyret*

Smooth detector operation during 2021. For the APV readout several fuses were too low on current surge for the transition cards, they have been replaced by 7A ones.

For the HV several problems with some A1821N modules were faced resulting in wrong large current readout and trip generation on some channels. 3 channels are not used anymore by grouping all drift electrodes of station 3 to one channel via split box. A few instabilities were reported on MP03V mesh HV. During the discussion of MM status it was requested if there is any plan to fix the DC4 noise issue. The Noise is not present all the time but appears randomly. The noise level was checked after the intervention in 891 with an average value on

0.6 mV threshold. For the operation in the COMPASS spectrometer it has to be raised from the nominal 0.8 to 1.1 mV. Damien will try to investigate the noise issue while at CERN for the MM checks.

13 ECAL1 LED system reports. *Donskov*

Laser monitoring system was replaced by LEDs using the same fibers bundles, not enough light is available for shashlik part. The proposal is to use two LED cards to increase intensity (16 LEDs in total).

14 Trigger Status *M. Veit*

The trigger commissioning phase was difficult due to beam conditions (intensity and stability) and delays until final beam settings were in place. Some problems switching on Ladder hodoscopes and broken channels in Middle vertical were faced and fixed. No major failures during beam time, overall stable operation.

Huge efforts were done to identify good XP2980 (H1) and 9813KB (HO03-04). 16 replacement PMTs for H1 (ET 9128) arrived at CERN. EMI 9813KB PMTs are more and more unreliable (8 failures during this year). Mainz got money for 35 new PMTs for HO04 still 15 kCHF are needed. PMTs candidates to be exchanged will be identified after trigger efficiency analysis.

For AMBER PRM three trigger station have been installed: 2 motorized fingers and 1 segmented trigger. Trigger signals were provided to COMPASS DAQ and auxiliary signals provided to TPC DAQ, ECAL DAQ and GEM DAQ.

15 TPC gas system *A. Dziuba, A. Vasilyev*

Two options for TPC gas circulation system have been presented: the cryogenic circulation system and the circulation system based on mechanical compressor. The PNPI expert opinion is in favor to use the system based on mechanical compressor. The main reasons for this choice are the cost, the difficulties in approving the device at CERN, the fact that the Cryogenic system does not allow for helium circulation, the large use of liquid nitrogen and its control and the impossibility to have the system ready in 2022.

16 AoB

- No other arguments are proposed.

The meeting rose at 19:00 pm.