

A meeting of the MPD Detector Advisory Committee (DAC) took place on January 23 2019 in VBLHEP, JINR. The agenda of the meeting is under the following link:

<http://indico.jinr.ru/conferenceDisplay.py?confId=722>

Present: Hans H. Gutbrod, Itzhak Tserruya, and Peter Hristov

From WUT (Warsaw): A. Kisiel

From NCBJ (Swierk): M. Bielewicz

From MEPhI (Moscow): A. Taranenko, P. Parfenov

From PNPI (Gatchina): V. Riabov

From JINR (Dubna): MPD Team

From Tübingen via Video (partially)

Status of the MPD project (A. Kisiel, WUT, MPD Spokesperson)

A. Kisiel overviewed the status of the MPD project. He presented recent progress in MPD simulation, status of MPD TDR preparation, readiness for mass-production, and formation of the MPD Collaboration.

The DAC notes with satisfaction the achieved progress.

The DAC urges the MPD team to finalize the formation process for the MPD management structure, and present ASAP:

- A structure of the MPD Collaboration with the names of all the MPD sub-projects leaders and system integration responsible persons;
- A list of the EC board members;
- A proposal for the structure of the MPD Physics and Analysis Working Groups.

The DAC points out that the number of nucleons bonded in the produced light nuclei (out of the total baryon number) is not negligible at NICA energies. The DAC asks the team to make simulations with models that include cluster formation mechanism estimating the impact of the light nuclei production to the results for event-by-event net-proton fluctuations.

The DAC also suggests looking for emission patterns in the event-by-event analysis, going beyond the standard v_1 , v_2 , v_3 , etc. analysis.

The DAC urges the MPD management to establish a team dedicated to the analysis of dileptons.

Status of MPD TDRs (V. Golovatyuk, MPD Project Manager)

V. Golovatyuk presented the TDR readiness status for MPD sub-systems. The final versions for the MPD magnet, FHCAL, FFD, and TOF detectors are ready; for the TPC TDR updated versions of TDR Chapters dedicated to the TPC electronics (based on the SAMPA chip) and TPC integration are needed; the ECAL, DAQ, and Integration TDRs

are still progressing and their new versions (statuses) will be presented during the next DAC meeting in June.

The DAC notes the progress in MPD TDR preparation. However, in order to guarantee high-quality evaluation of the MPD DAQ system, the DAC suggests inviting to the next DAC meeting additional expert(s) in the field of real-time data acquisition in high-energy physics experiments.

Status of ECAL simulation (B. Dabrowska, VBLHEP)

B. Dabrowska presented recent developments in ECAL simulations. The subjects of studies were:

- *Comparison of two alternative ECAL digitizers and cluster finders (JINR versus ITEP);*
- *Neutral pion reconstruction in two gamma decay mode.*

The DAC notes the progress and asks the ECAL team:

- to provide a detailed information on MPD reconstruction efficiency for neutral pions as a function of pseudo-rapidity and p_T ;
- to study MPD performance for η -meson reconstruction.

Update on ECAL construction (A. Semenov, VBLHEP)

A. Semenov reported on recent update on ECAL construction. He overviewed the achieved progress (and timelines) in designing ECAL containers, power frame, electronics installation system, and calibration stands. One quarter of all ECAL modules will be produced in Russia by the end of 2020, construction of the remained 75% of modules expected to start in China in 2019 if the financing of this project will be provided by the Ministry of Science & Technology (China).

The DAC noted the progress and encouraged the ECAL team to finalize the ECAL TDR ASAP. It also looks forward to timely solution of assuring production of the 75% of modules in China.

MCORD – MPD Cosmic Ray Detector at NICA (M. Bielewicz, NCBJ Swierk)

M. Bielewicz presented a proposal for a new MPD sub-system – a muon detector made of scintillator tiles with PMT-based readout (MCORD). MCORD tasks, design options, results of simulation, and a tentative time line were presented. There had been intensive discussion (I. Tserruya, H. Gutbrod, P. Hristov, V. Golovatyuk, V. Kekelidze, A.Kisiel, V. Riabov, and Yu. Lukstins expressed their opinions), which can be summarized as follows.

The DAC thanks the MCORD team for an interesting proposal. The DAC asks the team to re-evaluate the MCORD tasks and design options such that the following requirements are fulfilled:

- MPD needs an effective trigger during commissioning, thus MCORD phase space coverage should be large.
- The role of the MCORD detector in the MPD calibration procedure needs to be better understood.
- The DAC encourages the MCORD team to look into the possibility for MCORD serving as muon identifier within the MPD system
- MCORD physics case for cosmic ray studies needs to be strongly improved.

Responses to MPD DAC questions (A. Zinchenko, S. Movchan)

A. Zinchenko presented a response to the DAC on MPD tracking efficiency for transverse momenta below $p_T=0.2$ GeV/c. After improving seeding procedure and correcting an error in the track reconstruction code, the track reconstruction efficiency increases by 3-6% for $p_T=[0.07$ to $0.2]$ GeV/c and by 10-20% for $p_T=[0.05$ to $0.07]$ GeV/c.

The DAC noted the answer.

S. Movchan presented the status of TPC. TPC assembly starts in February 2019. By the end of 2019, all four cylinders, field cage, HV electrode, and flanges will be assembled. The critical issue is now production of serial pad planes, only 6 (out of 30) are ordered. Payment to CERN for 4500 SAMPA chips done (delivery – June 2019), pilot FEE system based on SAMPA (512 channels) is under test now, design of FE card, readout, data concentrator, and overall FEE integration is progressing.

The DAC congratulates the team for solving the problem with the TPC electronics and switching to the SAMPA chip. The DAC appreciates the progress achieved in designing new TPC FEE, however, the current situation with the value of the material budget in the endcap region remains unclear. The DAC urges the TPC team to finish designing TPC FEE ASAP and make necessary calculations/simulations with all service systems and cables included in the MC database.