

Minutes of the MPD Detector Advisory Committee (DAC) from June 18 2019 at VBLHEP, JINR.

(The agenda of the meeting is under the following link:

<http://indico.jinr.ru/conferenceDisplay.py?confId=904>)

Present: Hans H. Gutbrod, Itzhak Tserruya

From JINR (Dubna)/WUT (Warsaw): A. Kisiel

From NCBJ (Swierk): M. Bielewicz

From PNPI (Gatchina): V. Riabov

From JINR (Dubna): MPD Team

### **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 and computing, readiness for mass-production, and news about formation of the MPD Collaboration bodies.

The DAC notes with satisfaction the achieved progress. Several questions arose during discussion, which concern MPD magnet delivery to JINR, upgrading of the VBLHEP PC farm, and improvement of the MPD web-page. All the questions were answered. The DAC strongly recommends to establish regular weekly or biweekly meetings of the PWG.

### **Status of TPC TDR (S. Movchan, VBLHEP)**

*S. Movchan* presented the status of TPC. TPC assembly starts in June 2019. The critical issue is still production of serial pad planes, 6 of which (out of 30) are ordered. Delivery of SAMPA chips from CERN is expected soon. FEE integration is progressing, several design options of integration presented. Construction of service systems for TPC is ongoing.

The DAC notes the progress. It is pleased to learn that a new group from IAEA Beijing under leadership of Xiaomei Li is interested to join the TPC project and to work on a modern ALICE-like GEM readout. During discussion, the speaker was asked about the TPC group composition, material budget of the TPC FEE, design of TPC cooling, SAMPA chip delivery processing, suppression of noise from the SAMPA chip, and TPC simulation strategy. The design of the TPC cooling should be evaluated by TPC-hands-on experts, e.g., H.R. Schmidt and Thomas Mohrhard, both GSI. The MPD-AC would like to be informed about the arrival of the SAMPA chips at JINR. Full simulation of the TPC response is needed by including the true signal

response of the readout chambers. The DAC repeats the request to the TPC team to finish designing TPC FEE as soon as possible and make necessary calculations/simulations with all service systems and cables included in the MC database.

### **Progress in ECAL TDR (I. Tiapkin, VBLHEP)**

*I. Tiapkin reported on recent progress in ECAL construction. He overviewed the achieved progress in designing containers for ECAL modules and calibration stands and presented results of electron beam tests with ECAL prototypes. Based on the positive decision of financing of the Chinese contribution to ECAL construction, an updated timeline for ECAL manufacturing was presented.*

The DAC noted the progress and encouraged the ECAL team to ensure uniformity of manufacturing procedures at different production sites.

### **Progress in ECAL simulation (V. Riabov, PNPI)**

*V. Riabov presented recent results on behalf of the ECAL simulation group. The following subjects were addressed:*

- *Cluster unfolding in ECAL*
- *ECAL space and energy resolution*
- *Cluster-to-track matching*
- *Electron and gamma PID*
- *$\pi^0$  and eta reconstruction with ECAL and via conversion*
- *Dilepton invariant mass spectra*

The DAC congratulates the team for the excellent work.

Since the spectra of produced particles in the NICA energy range are rather steep, and low  $p_t$  are dominant, the DAC worries about too low efficiency of gammas and mesons at small  $p_T$ . The DAC recommends to study single particle simulations and compare them to full event simulations (or single particle embedded into full event simulations) in order to assess where the efficiency losses occur.

The MPD –AC request a simulation based on true test signals of prototypes and signal cuts just above (30%) the pedestal of the detector. This would ensure optimal position resolution and also lowest energy cut of photons or electrons, thus increasing the efficiency at low momenta. It also would shed more accurate light on the population density of hits onto ECAL.

The DAC recommends to have dedicated persons working on gamma reconstruction and dileptons.

The DAC would like to see rather quickly a simulation of the  $\pi^0$  and eta reconstruction with ECAL and Dilepton invariant mass spectra with these new lower energy cuts.

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

*M. Bielewicz presented an update of the proposal for a new MPD sub-system – a muon detector made of scintillator tiles with SIPM-based readout (MCORD). The team is now building a demonstrator of two sections (2x8 scintillators) or two half-sections (2x4 scintillators) to be ready by the end of 2019. In response to DAC questions from recent MPD DAC meeting, the team presented a proposal of using MCORD as a cosmic ray trigger detector (during MPD commissioning) and as a muon detector during data taking.*

The DAC notes with satisfaction the achieved progress and expressed its skepticism about using the proposed detector as a muon detector. The DAC asks the team to improve motivation for MCORD physics cases and perform detailed MC simulation of MCORD performance in (di)muon reconstruction. In details, the DAC request to see simulations with MPD Magnet switched-off and -on in order to see how much signal is generated by leaking showers.