

Minutes PANDA Collaboration Meeting (June 2021 - online)

Monday, June 14, 2021

10:00 AM	Plenary - Michael Papenbrock (until 1:00 PM) (Online)		3:30 PM	Plenary - Markus Moritz ((Giessen)) (until 5:00 PM) (Online)	
		Zoom link			
10:00 AM	"Report from the Speaker" - Ulrich Wiedner (Bochum) (Online)		3:30 PM	"PWA for the double-strangeness baryon spectroscopy studies" - Jenny Pütz (Online)	
10:30 AM	"Report on the Status of MoU" - Ralph Boehm (FAIR) (Online)		4:15 PM	"Hadron resonances from Lattice QCD with an eye on PANDA physics" - Daniel Mohler (GSI) (Online)	
11:15 AM	"Report from the Technical Coordinator" - Lars Schmitt (FAIR) (Online)		5:05 PM	Committee Meetings (until 6:35 PM) (Online)	
12:15 PM	"Report from the Computing Coordinator" - Tobias Stockmanns (FZ-Jülich) (Online)		5:05 PM	Finance Board (closed) - Ralph Boehm (Online)	

Plenary-Michael Papenbrock

Report from the Spokesperson – U. Wiedner

Ulrich gave the introduction to the collaboration meeting. A major part of his presentation was a report on the meeting with the “Experts Committee Experiments” (ECE) and “Experiments Cost Scrutiny Group” (ECSG) at FAIR. The ECE/ECSG appreciated the well prepared meeting and presentation. Ulrich commended L. Schmitt and R. Böhm for their excellent work on this. The committee acknowledged the visible construction progress despite of unsolved funding issues and a lack of personnel. The Barrel EMC and the construction of the pixel part of the MVD are considered critical items. The updated EMCAL TDR is in excellent shape, the addendum is recommended for approval. Ulrich pointed out that the Construction Memorandum of Understanding (see talk by R. Böhm) will be the major work item for the upcoming months. There will be resources review board in February 2022. Lastly, the annual report is ready and will be submitted to the Joint Scientific Council.

Report on the Status of MoU – R. Böhm

Ralph reported on the status and upcoming steps for the Construction Memorandum of Understanding (C-MoU) while also providing context for its purpose and structure. The involved parties are FAIR/GSI, the PANDA institutions and funding agencies. Although it is not legally binding, the C-MoU serves as a strong moral commitment and is even required by some funding agencies. The work on the C-MoU will closely follow the path of CBM, which proved to be successful. There is good progress with the work packages and cost update as the relevant reports are currently under review or already approved. As an outcome of the rebaselining process, the PANDA hall will be accessible for installation in the middle of 2024, i.e. procurement needs to start already in 2022. The goal is to have C-MoU draft in the summer of 2021 and an agreement in the fall of 2021.

Report from the Technical Coordinator – L. Schmitt

Lars gave a comprehensive overview on several areas, regarding general news on PANDA, system highlights and updates, as well as infrastructure updates. There is progress on all sides with a lot of it being very visible and components are assembled and infrastructure is being constructed. The FAIR Phase 0 programme is in motion and has beamtimes with rich physics output. Construction of FAIR is successfully progressing as well. At PANDA, a major achievement was the completed assembly of the solenoid yoke. The procurement for the Barrel DIRC is ongoing. A first slice of the Barrel EMC has been assembled and is currently being tested. The DAQT TDR and infrastructure report are under review at the ECE. The in-kind contract for the Forward Tracker has been signed with Jagellonian University in Krakow. As future milestones, the cryostat and cold mass for the solenoid will be delivered later this year, whereas the super-conductor production should finish before the middle of 2022. The GEM TDR is to be submitted in the third quarter of 2021. Concluding, PANDA is on track for Day-1!

Report from the Computing Coordinator – T. Stockmanns

Tobias reported on the newest release of PandaRoot, which contains many new features for the EMC, GEM, tracking, particle identification, event generation, analysis, the event display, and underlying system. Many of these features should allow for a better user experience and more realistic simulations. In addition, there were many bugfixes and it is strongly recommended to use the latest release for physics simulations and analysis. Tobias also reported on a recent PandaRoot users questionnaire. The major outcome is to improve the documentation in general and make it easier to find. A Docker container is now available and options are being explored how to make it accessible for download. In the context of the ESCAPE network, which offers funding for data infrastructure for Open Science, there will be a test of a data lake in November 2021 together with CBM and R3B. The task for PANDA will be the ingestion and reconstruction of raw data. Finally, Tobias expressed a major concern on the dropping number of PandaRoot developers. Many subsystems have no active developers assigned to them and the source code is not always in a usable state. If this does not change, PandaRoot might not be able to reconstruct experimental data!

There have been contributions from Jenny Putz and Daniel Mohler in the plenary session Monday afternoon.

Jenny showed overall in a very descriptive presentation, that the software framework PAWIAN is a reliable tool for performing partial wave analyses on cascade particles. There is almost nothing known about multi strange baryons. PANDA will be an excellent opportunity for their deep investigation. The ppbar annihilation will have a very high production yield for those resonances. She showed, that there are no acceptance holes in the Dalitz-Plots for the reconstruction of exemplary decay channels seen within PANDARoot simulations. The quantum numbers, the resonance width and mass, which were put into the simulation, could be precisely reconstructed from a data set which corresponds to few days of data taking. A publication is foreseen.

Daniel Mohler gave his excellent collaboration debut talk about the hadron resonances from lattice QCD with an eye on PANDA physics. He is a new member of the theory advisory group and active in the fields of baryons and heavy-light mesons with strangeness content and charmonium energy scans close to threshold. After an introduction to lattice QCD, he showed that calculations from quark-antiquark interpolating fields are in good agreement with experiments but p-wave states, like from the h_c , are not. In the field of exotic D_s and B_s , lattice QCD has made progress over time, allowing more complex methods involving moving frames. The physical predictions from effective field theory fits to

lattice calculations. There are many new puzzles in the area of exotic charmonium like states, for example 5 quark systems or new 0^{++} states below 4.13 GeV. For the 2^{++} states, which are likely related to $\chi_{c2}(3930)$, further studies needed to be more physical and relax man assumptions that went into recent calculations. He brought up many new aspects for PANDA.

Tuesday, June 15, 2021

9:00 AM	Computing - Tobias Stockmanns (FZ Jülich) (until 10:30 AM) (Online)	agenda	Zoom link
9:00 AM	Front End Electronics - Holger Flemming (GSI, Darmstadt) (until 10:30 AM) (Online)	agenda	Zoom link
11:00 AM	Computing - Tobias Stockmanns (FZ Jülich) (until 1:00 PM) (Online)	agenda	Zoom link
11:00 AM	Detector Control System - Florian Feldbauer (U Bochum) (until 1:00 PM) (Online)	agenda	Zoom link
11:00 AM	Mechanics - Lars Schmitt (GSI, Darmstadt) (until 1:00 PM) (Online)	agenda	Zoom link
2:00 PM	Micro Vertex Detector - Daniela Calvo (INFN Torino) (until 4:00 PM) (Online)	agenda	Zoom link
2:00 PM	PID Cherenkov - Carsten Schwarz (GSI, Darmstadt) (until 4:00 PM) (Online)	agenda	Zoom link
2:00 PM	Physics - Electromagnetic Processes - Alaa Dbeyssi (GSI, Darmstadt) (until 4:00 PM) (Online)	agenda	Zoom link
4:30 PM	Luminosity Detector - Miriam Fritsch (U Bochum) (until 6:30 PM) (Online)	agenda	Zoom link
4:30 PM	PID Cherenkov - Carsten Schwarz (GSI, Darmstadt) (until 6:30 PM) (Online)	agenda	Zoom link
4:30 PM	Physics - Hypernuclei (until 6:30 PM) (Online)	agenda	Zoom link
4:30 PM	Tracking - Peter Wintz (FZ Jülich) (until 6:30 PM) (Online)	agenda	Zoom link

Computing

Tobias Stockmanns, FZ Juelich: Three major topics were reported on in the computing session: track propagation, EMC reconstruction and tracking.

Propagating measured charged particle candidates through the detector is one major aspect for particle identification. Currently PandaRoot employs the GEANE propagation software for that task. While this works well for most particles a clear deviation of the propagated position to the simulated position is visible for electrons. This problem exists independent of the selected Geant version for the simulation or a different propagator (genfit). In the study performed by Tobias Stockmanns it became obvious that the calculation of the energy loss by Bremsstrahlung done by the propagators correctly predicted the mean value of the energy loss but because of the large asymmetry of the distribution the correction is too large for most electrons. A proof-of-principle was shown that a correction for the Bremsstrahlungs loss is possible if the emitted photon is measured in the EMC.

In the recent release of PandaRoot all particle propagators are independent of each other which makes it difficult to exchange them in the algorithms where they are used. To make the propagators interchangeable Sarah Gaiser developed a common base class for propagators and tested if Geane or genfit could be replaced by the much faster helix propagator in some cases. The results look very promising and will become part of the next PandaRoot release.

In the Barrel and Forward EMC the spatial reconstruction shows spiky features in the polar angle. Those are correlated with the crystals as Naomi Davis has shown. The origin of those features is not understood, yet. Investigations are focusing on the centroid determination of EMC clusters.

Split-off recognition is an ongoing topic for the EMC. Jonas Kohlen developed a simple method employing a set of cuts to identify local maxima in a cluster. He could achieve a split-off identification rate of over 90% with marginal losses in non-split-off clusters.

Tracking is one of the most computing intensive tasks performed online. One way to speed up the tracking is by using GPUs. Anna Aliche investigated the possibilities and speedup of the Apollonius-Hough tracking in such an environment. She ported the Apollonius-Hough trackfinder developed by her onto a GPU. The trackfinding efficiency and the ghost and clone rate stayed the same, but she could achieve a speedup factor of 85 in the first Apollonius state. The subsequent Hough transformation reduced the overall speed up down to a factor of 2.5–3 due to memory management problems with large Hough spaces.

Also aiming towards highly performant tracking for online usage, is a Language Model based Machine Learning approach which is under development by Jakapat Kannika. In his recent update he showed a more realistic straw detector scenario with curved tracks, which yielded up to 90% in track completeness and 96% in track purity. The challenges now are to include the isochrone radii of the straw measurements for more precise tracking as well as the considerably increasing computing time to train the neural networks.

FEE-session

Holger Flemming from GSI Darmstadt: Two presentations were scheduled for the front end electronics (FEE) session. After a welcome by the FEE coordinator the first presentation was given by Ilknur Köseoglu from JLU Giessen. She presented an update on the Endcap Disc DIRC (EDD) FEE.

A new batch of ASICs arrived which are compatible to both signal polarities. These ASICs were implemented into the Giessen Cosmic Station for testing and characterization. Just 2 weeks ago new PCBs arrived which were specially designed for the EDD-FEE by the company PETSys.

The second presentation was by Holger Flemming from GSI about the transient recorder ASICs which are foreseen for the EMC barrel readout as well as for the GEM tracker readout. Two variants are under development which only differ in the front end. Some highlights of the chips were presented. Both designed are ready for tape out.

*Florian Feldbauer from Ruhr-University Bochum for the **DCS Session**:*

Stand-Alone CAN Controller used for the low-cost high performance CAN adapter for Raspberry Pi is discontinued. New adapter PCB utilizing new CAN FD standard is being developed and currently awaiting delivery of the new chips to test backward compatibility with THMP, EMC LED pulser and other CAN bus devices used in PANDA.

MEC Session – Summary

The MEC session hosted 4 talks (a) Update Central Space Frame (CSF) and (b) Positions of the racks in the maintenance area both by S. Koch (GSI), (c) Leakless cooling system – Update by D. Glaab (GSI) and (d) FWE EMC - Mechanics Updates by T. Held (RUB). Regarding the CSF design appropriate changes and optimizations are made in cooperation with colleagues at FZJ, wrt the target cross and beam pipe. The design is advanced and production of a prototype CSF is being considered in discussions with potential manufacturers.

The position of the racks for the electronics in the maintenance area, on and around the TS and FS have been shown again which triggered a few discussions on availability and accessibility for various subsystems. Accessibility to exchange a pump at the beam dump area has been noted as crucial to avoid down times.

The talk by Daniel Glaab included the Kryogenic Shack and main gas piping for gaseous Nitrogen and updates On the leakless cooling system.

The Global Layout of the N₂ Main Supply system concept has been shown, choices and alternatives noted and obstacle interventions discussed. Among other, transfer and recovery lines operating modes were shown for the maintenance and in-beam positions.

On the leakless cooling system for the racks, design considerations require the tank to be placed in the pit, which hosts the EMC and MVD systems. These new constraints for the pit are being assessed, to avoid a change request to the FAIR Site & Buildings construction for adjustment of the pit size. Work is in progress in cooperation with MVD and EMC colleagues.

FWE EMC - Mechanics Updates concerned mainly the cooling and in great detail the tests made with various methods to arrive at a gluing and sealing concept for the aluminum lid, of 0.8 mm plate to 1 cm aluminum frame.

The aluminum lid to be glued in upright position, held in place by studs, which will serve as tool during build-up of lid sealing, front lid installation aid (subsequently replaced by special flathead screws). By use of M5 washers on the studs the seal height is defined, leaving completely cured seals after 24h. Probes of the test seal are currently at Strahlencentrum Gießen for radiation hardness checks.

In addition, the 1st half of cooling lines finished and the 2nd half are under construction, ordering of cooling system components started such as cooling pipe heaters, thyristor actuators, flow sensors, adaptors and the all parts for a SADC crate mad by an external company have been delivered to RUB.

MVD Session

Daniela Calvo: Three contributions are presented in the MVD session.

The first one (from INFN Torino) informs that the design of ToASt in CMOS 110 um UMC technology was completed. The chip was submitted to a MPW in April 28 and it is expected to be delivered in the second part of July. Due to the implemented radiation tolerance design, the chip was declared as dual use design in Italy and Germany. The PCB design, for the test of this prototype, was developed and the production is ongoing. Besides the first version of the acquisition system for tests in laboratory is ready. In the slides there are the requirements for the chip, the requirements as well. The chip design meets all the requirements except the power consumption. The power consumption values in the three different power domains were

evaluated: analog, digital and digital pads. The digital power value ranges from about 300 mW, with full TMR, down to about 80 mW, without full TMR. In the submitted version of the chip it was implemented an intermediate circuit, the triplication in the channel leading and trailing edge registers and in the region FIFO is removed. Of course, a trade-off between power consumption and SEU protection has to be carefully evaluated. However, during the test of prototype, the power consumption values will be measured.

The second presentation is about the present status of the strip sensor (from Giessen University). The sensor QA criteria are defined (see slides). From 2018/19 the delivered sensors are fine without any wafer material problems. On the latest production, the constraint on resistivity had to be relaxed by 10%. This impacts the point of type inversion slightly. Up to now there are 115 over 184 S1 sensors accepted (yield 35%) and 133/64 S2 sensors accepted (yield 41%). The 2020/2021 production is under acceptance tests.

The third presentation (from Giessen University) presents a system for LCR measurements based on one for all devices program. It controls multiple devices simultaneously, a C++ script send commands and it saves the received data in selected files. An easy access on Github is possible and the evaluation of the measurements can be obtained with Gnuplot and Python. Currently it runs on Raspberry PiOS, but it has been also tested with Windows and Ubuntu. First CV measurement was performed on a diode using a dedicated bias box. Next step is to carry out measurements in the test station in the clean room.

To remind that Michele Caselle sent the rack information (in the experimental hall and in the counting room) for MVD to Belias. Michele will present about that in the next MVD meeting.

EMP session at CM 21/2 (Tuesday 15 June 2021, 14:00-16:00)

GPD measurements with antiproton scattering (Stefan Diehl)

An update on the feasibility measurements of GPDs at PANDA, using the lepton-pair (electrons and muons) production in hard exclusive proton-antiproton collision, is given. PANDARoot simulations are performed at three center of mass energies between 10 and 30 GeV². The kinematical regions where a description of the process based on the handbag approach is expected are studied. Two topologies for event selection, where all final state particles are detected with a 4C kinematic fit, or where the antiproton is reconstructed from the missing antiproton mass, are investigated. The main background process is the exclusive production of the 4 particles final state consisting of proton, antiproton and pion pair. Background suppression at the order of 10⁶ is needed. Simple PID cuts provides promising results on the signal to background ratios larger than 20. The rate estimates and the uncertainties on the reconstructed cross section of the signal processes are presented. It is shown that GPDs can be well studied at PANDA, in particular at large center of mass energies with an undetected antiproton. Background will be investigated more in details.

Update on feasibility measurements of GDAs based on pi0-gamma and gamma-gamma final states (Faiza Khaleed)

A study of the annihilation process of proton-antiproton into two real photons is considered in this talk. The PANDARoot simulations are performed at 3 beam momenta between 2.5 and 10 GeV/c. The acceptance of the signal is studied and used for efficiency correction of the reconstructed angular distributions. The differential and integrated cross sections for signal and background channels from the previous Fermilab E760 measurements have been plotted and fitted. They give estimations for the signal and background cross sections needed in the current studies. In addition, an update on the feasibility studies for the process proton-antiproton annihilation into a real photon and a neutral pion is given. The combinatorial background in

the reconstruction of the neutral pion from the detected two photon is studied. A selection condition using the average reconstructed energy of the photon pair versus its opening angle can reduce the combinatorial background to a few percent level. The signals to background ratios using this cut are checked. This work is in progress.

Updates for background study of Drell-Yan process ($\mu^+\mu^-$ case) (Anna Skachkova)

The issue related to the background rejection in the measurement of the muon Drell-Yan process at PANDA is addressed in this talk. The PANDARoot simulations are performed at the beam momentum of 15 GeV/c. The estimated initial signal to background ratio using PYTHIA and DPM event generators is about 10^{-7} . Different selection conditions have been investigated and their effects on the signal and background efficiencies are shown. These conditions are based on the distributions of the PID probability, the energies and momenta of the muons, the invariant mass of the muon pair, and the isolation criteria. Two cases where all muons, or with only muons with good momentum resolution, are considered. The best achievable signal to background ratio is 10^{-3} , which is about 4 orders of magnitude worse than what has been expected from the fast generation. These results make the measurement of Drell-Yan at PANDA doubtful and they will be discussed later with the Phys.Com. and within the EMP working group.

Spin Physics Detector at NICA (Alexey Guskov)

Alexey Guskov from JINR Dubna has been invited to present the SPD project in the EMP session. The SPD at NICA is a universal facility to study gluon content of proton and deuteron based on polarized proton-proton, deuteron-deuteron and proton-deuteron collisions at the center of mass energies up to 27 GeV. The physics program and the capabilities for precise measurements that can be performed by SPD are presented. An overview on the detector setup and performance is also given. The running plan based on at least 5 years of data taking is shown. Discussions on the complementarity of the physics goals of SPD, PANDA and other facilities take also place.

Tracking Session

Presentations can be downloaded from the session [indico page \(https://indico.gsi.de/event/12756/\)](https://indico.gsi.de/event/12756/)

Peter Wintz (FZ Jülich) – News and Updates

Peter informed the group about the phase out of the COSY accelerator operation after 2024. The STT group tentatively plans with few weeks of proton and deuteron testbeams in 2023 and 2024. Next he gave a brief overview about the upcoming phase 0 activities at HADES with a scheduled four weeks experiment proton beamtime in February/March 2022.

Mirosław Firley (AGH Krakow) – Development of System for Evaluation of FEB Quality for Straw Tube Readout

Mirek reported about the test procedures for the quality assurance of the PASTTREC front-end boards (FEB). A specific charge injector board was developed by the AGH group to test the full functionality of the PASTTREC ASIC and FEB and to determine the channel-individual baselines and noise levels. Currently, eight FEBs can be tested simultaneously in the setup. The test results will be collected in a database, e.g. containing FEB number, channel number, individual baseline, noise level, gain variation. The first measurements show a low and

homogenous noise level (equivalent to about 1300 times electron charge) and good baseline determination.

Gabriela Perez (FZ Jülich) – Status of STS Time Calibration

Gabriela gave an update of the ongoing analysis of the STS data from the phase 0 commissioning beamtime. After a correction of the particles' time-of-flight using the hits in the forward RPC and a time offset subtraction, clean drift time spectra are obtained for both straw stations STS1 and STS2. The next step will be the precise isochrone radius – drift time calibration $r(t)$.

Jana Rieger (Uppsala University) – pp Elastic Scattering Studies for Phase 0 at HADES

Jana showed the results of a Pluto simulation of proton-proton elastic scattering for the 4.2 GeV kinetic beam energy in the phase 0 commissioning beamtime. The geometrical acceptance for having one proton track in the STS1/2 forward detectors (polar angle range: $0.5^\circ < \theta < 7^\circ$), the other proton in the HADES spectrometer ($\sim 18^\circ < \theta < 88^\circ$) is about 70%. The reaction is of interest for the experiment normalization and the reconstructed coplanar proton tracks can be used to check the relative alignment of the detector systems.

Pawel Kulesa (FZ Jülich) – News from the ADC Readout System

Pawel gave an update about the status of the ADC readout system. In a recent proton beamtime at COSY for various detector system tests, also data was taken for further analysis with a parasitic straw setup connected to the ADC readout system.

Wednesday, June 16, 2021

9:00 AM	Physics - Hyperons - Karin Schönning (U Uppsala) (until 10:30 AM) (Online)	agenda Zoom links
9:00 AM	TEC Meeting (closed) (until 10:30 AM) (Online)	agenda
10:30 AM	Plenary (until 11:30 AM) (Online)	Zoom link
10:30 AM	"News from FAIR" - Paolo Giubellino - Ulrich Wiedner (Ruhr-Universität Bochum(RUB)) (Online)	
11:30 AM	Electromagnetic Calorimeter - Fritz-Herbert Heinsius (U Bochum) (until 1:00 PM) (Online)	agenda Zoom link
11:30 AM	Magnet (until 1:00 PM) (Online)	agenda Zoom link
11:30 AM	Physics - Charmonium/Exotics - Frank Nerling (GSI, Darmstadt) Marc Pelizäus (U Bochum) (until 1:00 PM) (Online)	agenda Zoom link
2:00 PM	Electromagnetic Calorimeter - Fritz-Herbert Heinsius (U Bochum) (until 4:00 PM) (Online)	agenda Zoom link
2:00 PM	Target - Alfons Khoukaz (U Münster) (until 4:00 PM) (Online)	agenda Zoom link
4:30 PM	Data Acquisition - Myroslav Kavatsyuk (KVI / U Groningen) (until 6:30 PM) (Online)	agenda Zoom link
4:30 PM	Cafeteria (Online)	
4:30 PM	PID - ToF (until 6:30 PM) (Online)	agenda Zoom link
4:30 PM	Young Scientist Convent (until 6:30 PM) (Online)	agenda Zoom link

Hyperon session – M. Papenbrock

Maximum Log-Likelihood Estimation in Python for Decay Parameters of Spin ½ Hyperons – B. Verbeek

Benjamin developed a Python tool for parameter estimation in decays of spin ½ hyperon pairs produced in e^+e^- collisions at BESIII. The aim was to improve usability and maintainability while preserving numerical and computational performance when compared with an earlier ROOT/C++-based version. The program could be adapted to studies on CP violation with PANDA in the future. The project was very successful, yielding consistent numerical results and passing statistical bias checks. The computational performance was improved through just-in-time compilation and parallelisation with numba, leading to a runtime that is an order of magnitude faster than the present C++ version.

Final results on $p\bar{p} \rightarrow \Lambda\bar{\Lambda}$ reconstruction with extended target – A. Akram

Adeel gave a final update on his studies of $\bar{p}p \rightarrow \bar{\Lambda}\Lambda$ reconstruction efficiencies when using realistic gas density distributions instead of a point-like interaction region. Since this affects the spatial distribution of primary and secondary vertices, this is of particular relevance for reaction channels that use vertex displacement as a means to suppress background. He defined a figure of merit that reflects the efficacy of the background suppression compared several realistic vacuum scenarios to the point-like case. While the scenarios give similar results, the figure of merit is generally reduced by a factor of two in the realistic case for the studied channel, highlighting the importance of incorporating this PandaRoot feature in future simulation studies. A release note with the results will be submitted soon.

Update on the Analysis of Lambda in the $p(3.5 \text{ GeV})p \rightarrow \Lambda p K^+$ Reaction at HADES Using Kinematic Fitting – J. Regina

Jenny reported on the latest updates for the Λ analysis with PANDA / HADES Phase 0 upgrade, using the kinematic fitter she developed earlier. The newly developed analysis procedure now includes vertex finding of both the primary and decay vertex. It constructs a neutral particle candidate and performs a 3C fit with momentum conservation in the decay vertex. The current results show a high efficiency for the GeantPID selection and a high proton selection purity in the vertices. The parameters of the neutral candidates after the final selection look reasonable. Next, there will be tests on data with realistic particle identification. This will likely lead to further optimisations on performed cuts and covariance matrices.

Application of Kinematic Fitters to reconstruct the Σ^0 Dalitz Decay with HADES – J. Rieger

Jana found that her development on the kinematic fitter for HADES enables the reconstruction of Σ^0 Dalitz decays. The 3C fit leads to a correct assignment of protons to vertices. The correct e^- are then selected by a missing particle fit. The Forward Detector, part of the Phase 0 upgrade, increases the acceptance significantly, and the selection efficiency is quite high after the fitting procedure. There are some yet unresolved issues. A peak at high values in the fitting probability could be a hint at overestimated uncertainties. Furthermore, it was found that the Σ^0 has a tail towards higher masses. This will be investigated further in the near future together with a refinement of the selection procedure, uncertainty estimation, and consideration of background channels. This study will then be extended to PANDA simulation of $\bar{p}p \rightarrow \bar{\Sigma}^0\Lambda$.

Discussion – M. Papenbrock

The discussion was skipped due to time constraints.

Minutes of TEC Meeting at PANDA CM 21/2

Lars Schmitt gave the TC report with topics covering reporting of milestones and risks, installation planning and safety risk assessment in general.

Within the re-baselining exercise at the beginning of the year the reporting base was extended from systems to work packages of systems covering a set of more than 1100 milestones. These milestones have to be monitored and updated regularly either reporting progress or adjusting them in the planning. The next reporting campaign where all updates need to be given via the PANDA reporting web frontend started and runs until July 15. Upcoming or past milestones were shown - these require particular attention and updates.

At the same time updates to the risk registered are requested which need to be collected until July 5th. FAIR PMO has sent a list of comments and requests for improvements that need to be addressed by the respective system managers.

Detailed installation planning of the target spectrometer was done in an interactive workshop in summer 2019 for the target spectrometer, where experts were able to discuss the sequence of the individual installation steps. This resulted in fairly solid installation schedule and the estimate of external labour resources for installation. The installation of the forward spectrometer was not covered by this. A similar workshop was planned in 2020 but could not take place due to the pandemic. With additional online tools a similar workshop is in preparation to be held via Zoom on July 16.

As a repetition of previous meetings the general procedure of safety risk assessments was described. These are necessary from all systems to obtain the permission for installation and operation. In the first, the risk analysis the limits of machinery, i.e. physical description, operation phases are described, the hazard identification is done and the risk are estimated in terms of frequency and severity. The next step is to perform the risk evaluation to identify measures to reduce risks.

Peter Wintz presented in the meeting the draft of the safety risk assessment considering the identification of risk items for the STT with particular attention to the injury of persons and the mitigation of these risks. In total 31 risk items were identified reaching from mechanical and electrical hazards to environment, thermal, fire, ergonomics and radiation hazards. With feedback from the discussion the assessment will be further improved and may serve as input for the assessment of other gaseous detectors in PANDA.

As final topic of the TEC meeting Tassos Belias reported on the progress of the inquiry on the rack occupancy with crates and modules to assess power and cooling requirements. These data are of importance for the planning of the technical building infrastructure with regard to electrical supplies and cooling water. The current, updated layout of racks in the PANDA area was shown. Some example of detailed answers were presented, in particular the work on the MVD rack requirements with complete module lists and power requirements. In a summary table the overall status of replies was shown. Individual discussions of details with the respective system managers who are contacted one by one where more information is needed.

Electromagnetic Calorimeters

News / Updated TDR Review Committee Report – Fritz-Herbert Heinsius

At FAIR it is being investigated to use nitrogen from the liquid nitrogen supply instead of pressurized air for the flushing of the EMC. The leak less cooling system for the PANDA crates needs space in the cooling pit, therefore a detailed planning of the cooling pit for the EMC is required urgently. The updated EMC TDR was accepted by the ECE: “The overall feeling of the Committee was that the EMCAL project was in excellent shape from a technical point of view and that there were no serious issues or ‘show-stoppers’ in any of the areas that were reviewed.” The results of the external review can be found in the presentation.

PWO Crystal Production - Valery Dormenev

By now 729 crystals with the PANDA EMC geometry are produced by Crytur. Only 15 crystals had to be rejected after tests at Gießen. For the compensation of raw material 59 more crystals will be produced in the next few months. To keep the production running intermediate financing is required. To complete the 3rd slice 215 crystals are required. For the whole barrel 6186 crystals are to be produced.

Status of the Backward Endcap - Luigi Capozza

Most submodule components are available. However, there are delays in the delivery of connectors for the light fibre bundles. The mounting plate for phase 0 was delivered and mounting tests were successful. Tests of the HV distribution board were completed, thus series production can start. Luigi observed for the final flex PCB boards ringing after the APFEL signals. The reason is being investigated.

Status of the Forward Endcap - Thomas Held

So far 103 out of 193 APD submodules are built. They are produced and shipped to Bonn with a rate of 5 modules every two weeks. Shipment of finally tested and glued VPTT submodules to Jülich started in March (current status 24). The test procedures during the production in Bochum were enhanced after switching of HV cables to the APDs were observed for some submodules during tests at Bonn. APD screening is ongoing (3000 out of 4500 APDs are delivered from the current Hamamatsu production run). Tom also presented the progress for the cooling and the SADC crates.

Leakless Cooling System for the EMC - Lennart Ahrens

Lennart discussed the concept for the leakless cooling system for the target spectrometer EMC. The original prototype setup does not fit all requirements. A reservoir of about 1 m³ needs to be placed inside the cooling pit in the PANDA hall. He will order valves and sensors to test the system as part of his bachelor thesis.

Mechanical Integration of the Barrel-Front End - Aniko Tim Falk

Aniko presented the measurements to define the different APFEL flex PCB lengths, the screw lengths and the spacer tower heights.

Barrel Slice Cooling - Thorsten Erlen

Thorsten gave an overview on the barrel slice cooling and the monitoring parts. A cooling performance test will be done next.

Barrel Back-plane Status - Christopher Hahn

Christopher presented the results of his test of the final prototype of the high-voltage board. After switching on the primary HV he observed a drift of the onboard measurements with a time constant in the order of 100 h to 150 h. The temperature dependence of the onboard HV measurement was studied by comparisons with an external measurement. Finally, he proposed a calibration procedure for the HV boards.

Simulations for the Dynamic Range of the EMC - Kim Tabea Giebenhain

For the determination of the optimal gain for the APDs Kim Tabea simulated the reaction $p\bar{p} \rightarrow gg$ at 15 GeV antiproton momentum. She proposed to use three different gain ranges: $M=150$ for $q > 26^\circ$, $M=300$ for $q > 47^\circ$ and $M=500$ for $q > 66^\circ$. A 20% margin is included.

Status and Update on Irradiation Tests of the High Voltage Board - Christoph Schmidt

Christoph gave a detailed presentation concerning the irradiation tests of the high voltage boards for the forward endcap EMC. A longer discussion evolved about the correct method to determine the dose during irradiation with the photon source.

Target Meeting

1.) Investigations on the Pellet Target system (P. Fedorets)

The production of hydrogen droplets at ITEP works fine with nozzle diameters of roughly 25 μm . Different sluice geometries are studied with inner diameters of 400 μm . In this sluice, which transfers droplets from the triple point chamber to the first vacuum stage, the droplets get accelerated and freeze to pellets. First photos from pellets directly behind the sluice were taken. The adjustment system required for the nozzle-sluice alignment is currently optimized.

2.) Status of preparations of the "Cluster Jet Target Control Final Design Report" (B. Zwiegliniski)

A first part of the cluster-jet target control design report was prepared by the NCBJ group. For the preparation of the second part, a general control logic has to be designed and programs have to be prepared in order to prove the required functionality and compatibility with the PANDA control. The NCBJ group expects the corresponding milestone to be reached by September 2021. In addition, a NCBJ team will prepare a beam dump emulator for reaching milestone M8.

3.) Progress of the Cryopump for PANDA (C. Mannweiler)

Test measurements towards a special PANDA cryopump for the HESR beam pipe have been started successfully at Münster. In recent measurements with a newly prepared cold sheet, covered with activated charcoal, it could be shown, that both the pumping speed, the capacity as well as the regeneration interval agree nicely with estimations based on data from literature. The estimated regeneration interval will be in the order of weeks to months, which will be sufficiently large. Based on these results, the design of a prototype cryopump with a modular design is currently in progress. Special care will be put on the HESR boundary conditions as well as on a slow regeneration mode.

4.) Update on the PANDA Cluster-Jet Target Activities in Münster and at COSY (P. Brand)

Very recently a COSY beam time with the PANDA cluster-jet target has been performed very successfully. Data on the beam-target interaction have been taken at target thickness of up to 2.5×10^{15} atoms as well as at beam intensities of up to 1.5×10^{10} stored protons at a beam momentum of 3.0 GeV/c. For these measurements, a part of the HESR stochastic cooling elements could be used in combination with a barrier bucket and Schottky devices. In parallel to these measurements, ion beam Monte Carlo studies have been started at Münster using the MAD-X program. By the inclusion of small angle scattering as well as energy loss effects, these

programs will allow to simulate the measured COSY beam properties in presence of a thick target. Based on this, predictions for HESR will be possible. The status of simulation studies on cluster/droplet/pellet evaporation and evaporation cooling are presented, considering different particle sizes in vacuum. With these calculations in combination with vacuum Monte Carlo simulations considering the molecular flow in real vacuum chambers, it is possible to reproduce and to predict, e.g., vacuum pressure distributions along the beam pipes. The galvanic nozzle production technique is further improved and new measurements on cluster velocity distributions are started at Münster.

PID - ToF

PANDA FRICH status, Sergey Kononov, BINP

The FRRC funding finished in 2017, small NSU funding stopped in 2020, therefore, there is no active work on FRICH TDR. Other FARICH R&D connected to the Super Charm-Tau factory is ongoing. Sergey showed some results about a neural network approach for reconstruction. He also showed a FEE for the FARICH with SiPM, cooled down to -40 degree Celsius.

The Giessen Cosmic Station Status Update, Simon Bodenschatz, JLU-Giessen

Measurements with the prototype radiator were done in a light tight box within the GCS. The single photon resolution is estimated to be around 10 mrad. The trigger efficiency is about 2300 events in half an hour. There is a problem with condensation at the cooled parts of the detector not present in the later PANDA setup.

The EDD electronics update, Ilknur Koeseoglu, JLU-Giessen

Ilknur showed the historical development of the TOFPET ASIC which meanwhile can measure positive and negative signals and the development of the customized FPGA and ASIC boards. Latter boards arrived two weeks ago and she showed the plans for testing them.

The Custom PCB cooling system for Magnet Box design, Lisa Brueck, JLU-Giessen

The magnet box for testing magnetic fields effects on the FEE-PCBs serves also for liquid cooling studies. The requirement is a target temperature of 18-20 degree with an heat generation of ~40 Watts. The measured temperatures are in good agreement with simulations.

The magnetic field measurements for FEE, Leonard Welde, JLU-Giessen

The study of the magnetic fields in the magnetic box between two layers of permanent magnets show a maximum attainable field of 0.26 Tesla at a distance of 60 mm between the plates. Larger distances yield lower fields and better field homogeneity.

Update on the quality of radiation bars, Georg Schepers, GSI

Georg gave a short oral report about activities and improvements of the quality assessment of the radiator bars, all already delivered to GSI.

Update on MCP-PMT production and further plans, Jochen Schwiening, GSI

Also a short oral report about the status of MCP-ordering from PHOTONIS.

Update on 3x100 MCP-PMTs, Katja Jumbert, FAU-Erlangen

Katja presented results on the PHOTONIS-MCPs with a 3x100 strip arrangement of the type xxP541 and ES440. The formerly observed drop of QE of 943P541 and 946P541 without illumination has stopped. The timing precision for those tubes was in the order of 30 ps (RMS

~100 ps), the after pulse probability .09% per pixel. A recently received 105P541 shows good QE but has problems with the anode current at high gain or illumination. This needs further studies.

Results of the B-field measurements, Steffen Krauss, FAU-Erlangen

Steffen showed results from the study of two MCP-PMTs, one a PHOTEK A1200116, the other one a PHOTONIS 9002192. The PHOTEK showed 42 ps (200 ps RMS) timing precision without magnetic field and 59 ps (200 ps RMS) precision in a field of 1 Tesla. The PHOTONIS tube showed a similar behavior. The charge sharing between pixels decreases with the increase in the magnetic field.

Update on Lifetime Measurements, CE and rate stability with TRB system, Daniel Miehling, FAU-Erlangen

Most sensors with ALD coating have lifetime > 5C/cm2. He showed collection efficiencies which show different values when measured at different times. The extraction of this quantity uses a fit of the measured charge spectrum which had an issue. This is meanwhile solved. Measuring the rate stability of sensors offered a surprise when looking to areas with differing QE (one half already aged, the other not). The sides with the higher QE show a better rate stability. There is already a little model to describe this effect.

Thursday, June 17, 2021

9:00 AM	Technical Forum (until 10:30 AM) (Online)	agenda	Zoom link
10:30 AM	Cafeteria (Online)	Cafeteria Access (PWD: atBochun	
10:30 AM	--- Coffee break ---		
11:00 AM	Technical Forum (until 12:30 PM) (Online)	agenda	Zoom link
12:30 PM	Collaboration Board (closed) (until 2:30 PM) (Online)		
12:30 PM	--- Lunch break ---		
2:30 PM	Plenary - Karin Schönning (until 3:45 PM) (Online)	Zoom link	
2:30 PM	"Applying neural networks for the software trigger" - Jiang Peiyong (GSI) (Online)		
2:55 PM	"Activities at J-PARC for S=-2 baryons" - Kiyoshi Tanida (JAEA) (Online)		
4:15 PM	Plenary - Karin Schönning (until 5:45 PM) (Online)	Zoom link	
4:15 PM	"Report on the XYZ-Workshop" - Frank Nerling (GSI) / Christoph Hanhardt (FZ-Jülich) (Online)		
5:00 PM	"Barrel DIRC and GlueX DIRC (FAIR Phase 0)" - Roman Dzhygadlo (GSI) (Online)		

TEC Forum PANDA CM21/2 - 17 June 2021 Summary

Pellet Target (Pavel Fedorets)

Various tests at low temperatures conducted successfully in April and May 2021, with the already solved issues of nozzle blocking since last year, over many days of continuous operations. Continued updates and improvements of adjustment systems of nozzles and sluice

are ongoing to optimize transport of droplets to the 2nd vacuum chamber. Flow parameters are not yet fully satisfactory. The TDR writing continues.

Cluster Target (Alfons Khoukaz)

Recent beam time, May 2021, of Cluster-Jet target at COSY with several tests of HESR related beam components successfully concluded and being validated with beam simulations (MAD-X). Continued vacuum studies on target gas/particles formation and evaporations. At WWU Münster nozzle production developments progressing and also a new beam dump design with advanced monitoring systems. Progress on a prototype cryopump with a first design of active charcoal on a cold head is being build and tested.

MVD (Hans-G. Zaunick)

The ToASt ASIC, submitted in April 2021, is expected by end of July 2021, ahead of schedule. The PCB design was done and purchase order submitted at the beginning of June. Also the first version of acquisition system for lab tests is ready. Remaining issue of the ASIC prototype is the somewhat higher power consumption due to triple redundancy. The remaining strip sensors for the MVD barrel part were ordered by Giessen (JLU) and acceptance tests at the factory are in progress. A system developed for LCR-measurements, commonly usable for all semiconductor devices is ready, will be used in the clean room.

STT (Peter Wintz)

On QA for PASTTREC –FEBs (for STT & FT), charge injector boards were developed which allow measurements for baseline determination, noise levels and S-curves, on 8 boards simultaneously. First results show noise level ~ 1300 e⁻.

Based on successful Phase 0 commissioning beam time in Feb 2021 at HADES the analysis continues with FWDet: STS1, STS2 and fRPC including calibrations of STS1+STS2. In particular, the drift time measurements for all straw channels (STS1 + STS2) are found constant with about the same drifttime –isochrone relation which makes calibrations easier and verifies the good ASIC BL tuning. In Phase 0 simulations the use of pp elast. scattering events are investigated for experiment normalization and FWDet calibration.

GEM Tracker (Bernd Voss)

The internal review of the GEM Tracker TDR took place on 16.04.2021 and on 21.05.2021, with reviewers Peter Wintz (FZJ) and Bernhard Ketzer (University Bonn) (PANDA colleagues) and Leszek Ropelewski (CERN) and Gianluigi Cibinetto (INFN), as external experts. After the first meeting a list of questions regarding various aspects of the GEM Tracker were sent by the reviewers which were addressed and answered at the second meeting.

The final report of this internal review has been received with includes findings, issues, summaries and recommendations. Once all considerations are implemented and addressed the TDR will be prepared for release to the FAIR ECE review. Main issues are additional simulations to obtain stable rates for the layout of the GEM HV system, tests of the pad plane with r/o electronics and ExB effects to be addressed in the simulations. The most severe issue is the limited personnel.

Barrel DIRC (Jochen Schwiening)

Please consider the summary of the Barrel DIRC talk at the plenary session on Thursday, 17-June-2021.

Barrel ToF (Carsten Schwarz)

No news since last CM. The project was closed in Vienna but there is ample documentation of recent developments for the project to be handed over to a new partner.

Forward Tracker (Jerzy Smyrski)

In addition, to the news on the QA for the FEBs for the ASICs, as reported for the STT, the mechanical design of the FT1/2 planes has progressed and is almost ready. The studies of straw-tube ageing continue and the next step are tests with different glues due to be conducted this summer. Two promising glues recommended by CERN will be tested in addition to the previously used ones.

Outer Tracker (Tassos Belias)

The interface board PCBs are ready, yet procurement of some components is delayed. The mechanics for the modules support are being addressed, possibly with mock-ups this summer.

Disc DIRC

No news reported here. Please consider the summary of the PID Cherenkov session on Tuesday, 15-June-2021.

Forward RICH

No news reported here. Please consider the summary of the PID Cherenkov session on Tuesday, 15-June-2021.

Forward ToF (Gleb Fedotov)

Tests are in progress on the use of a LED light, rather than LASER, calibration system based on developments by the PNPI electronics group. First measurements on a scintillator slab are encouraging (LED: 65ps, LASER: 45ps) and further tests continue with a system of many fibers from a single, multi-LED source.

Barrel EMC

Assembly of the 1st slice is nearing completion after the modifications of the pre-series support beam and progress in cooling & thermal insulation, backplanes and light pulser fiber coupling.

To maintain cooling openings in the support beam will be filled with custom 2 piece profiles and o-rings and a silicone inlay.

In the latest APFEL flex-boards ringing has been observed for large pulses, not seen before, and reasons are under investigation.

In the HV backplane, a long-term drift of the internal measurement was seen, the reason is under investigation, yet the APD HV is stable, as determined with an external measurement. This will require calibration for future operations but is no further problem.

New simulation using ppbar→gamma gamma instead of DPM propose APD gain optimizations grouped in three angular regions of the barrel with three different gains possibly.

Regarding Crystal production, more than 50% for 3rd slice are available, with the Prague contract finished. Ovens need to keep ruining with PANDA raw Material, otherwise these will be refurbished, and personnel may migrate to other projects.

BWE EMC (Luigi Capozza)

Component procurement and production continue, alveoli are completed, FEE line-driver and HV distribution boards were tested, there are delays with fibre bundles. Mounting tests of empty submodules show it all fits on the phase 0 plate. APFEL flex boards show signal

ringing after pulses, not observed in pre-series tests. Investigations on the cause not successful yet, are ongoing.

FWE EMC (Tom Held)

There are 103 (of 193) APD submodules built and glued so far and close to 100 submodules shipped to Bonn for cosmic tests. APD screening is ongoing regularly again, back in (mostly) standard mode. New APDs from Hamamatsu (3000 pieces) arrived in March, 4500 ordered. So far, APDs screened - irradiated - screened: 19875 - 67% of whole target calorimeter and matched (on demand): 5000, enough for 100+ FWE EMC APD submodules plus complete BWE EMC.

Colleagues at Bonn University observed problems: 'mixups of readout', which were found in-time in order to fix it and now appropriate mitigation measures are in place for further production.

Cooling tests are in preparation, the 1st half of cooling line is ready, the front lid w/ frame with build-up of permanent seals was glued to the stiffener ring, a mockup of the seal currently at Strahlencentrum Gießen for irradiation tests. Further parts are being ordered. A complete set of the 15 parts for an SADC Crates delivered to Bochum (by an external company), with new thermal coupling pads.

FS Calorimeter (Pavel Semenov)

Recently a new round of activities started to plan for the construction of components such as for production of scintillators.

Luminosity Detector (Miriam Fritsch)

Box surveys were performed with the CMM, using SMR nests and balls on the box and capacitive sensors within, which have shown reproducible results between vacuum and non-vacuum in the box.

Currently DAQ with kintex7 board and MuPix8 sensor works, with State machine configurations, incl. injections, data receiver incl. data alignment and decoding. Next step is data transmission to PC. For the LMD prototype, two Kintex7 boards are needed and a Kintex ultrascale+, as a concentrator with firmware to be tested.

The beam time at COSY with MuPix8 went well albeit with a smaller acceptance and efficiencies due to DAQ and operational settings, yet the data analysis is ongoing. Transition to MuPix10 with new flex-cable design is in progress, there new settings are required as currently investigate at U Heidelberg.

Towards milestone M7, notes on mechanics, cooling and vacuum are in preparation.

Muon System (Gena Alexeev)

As part of the preparations for the contract with FAIR contacts are being reestablished with companies for the production of major components: The company doing extrusion of Al profiles are ready to work and waits for drawings to provide an offer. Analog electronics will be again produced by Integral Semiconductors in Minsk with some minor improvements. The company producing plastic furnishings has undergone changes, but contacts were reestablished. Once all offers are there the details of the contract can be formulated.

Digital boards for the FEE with Artix FPGA were tested at CERN with cosmic and will be tested at JINR with beam. Synergies with the NICA SPD experiment are optimally used and it was agreed in the Nuclear Physics Lab to start MDT production for both NICA SPD and PANDA.

Hypernuclear Setup

No news reported here.

Solenoid

No news reported here. Please consider the summary of the Magnet session on Wednesday, 16-June-2021.

Dipole

No news reported here. Please consider the summary of the Magnet session on Wednesday, 16-June-2021.

Controls

Developments at RUB on a new CAN bus Hat (Adaptor PCB) for RasPi 2/3/4 as earlier (classic CAN) components are discontinued and replaced with newer released standard CAN FD. While design is ready, production is delayed by long delivery times of automotive electronics ~30 weeks. Once assembled tests will show if the new standard is backwards compatible to our CAN devices like THMP boards etc.

DAQ

As reported by Lars (TC), regarding the FAIR ECE review, the replies by the DAQ group to questions have been received and the review report is expected in summer 2021.

Plenary minutes: Karin Schönning

1. Jiang Peyong (GSI), *Application of Deep Machine Learning for PANDA Software Trigger*
A deep learning method has been implemented for the PANDA software trigger system. A number of benchmark channels, covering the major part of the PANDA physics program have been studied. Different dense (DNN) and convolutional (CNN) neural networks as well as language models (LSTM) were tested, and a CNN with four residual blocks was chosen for further studies. It was shown that neural networks can increase the efficiency by up to 145% compared to conventional methods. The flatness of the Dalitz plot was also studied. The results are being documented in a memo and a paper will be written.
2. Kiyoshi Tanida (JAEA), *Study of Doubly-Strange Systems at J-PARC*
The Hadron Hall at JPARC have a heavy focus on double-strange systems. The physics program comprises ΞA interactions, $\Lambda\Lambda$ interactions and search for the H dibaryon. The E07 experiment has observed events of Ξ absorption in ^{14}N nuclei followed by the emission of two Λ hypernuclei which has been taken as the first indication of a $^{15}_{\Xi}C$ hypernucleus, though the Ξ absorption is very weak. Other hyperatom and hypernuclear studies are ongoing in the E03 and the E70 experiments, respectively, where the latter offers high resolution γ spectroscopy. The E42 experiment is searching for the predicted doubly-strange H dibaryon in ΞN , $\Lambda\Lambda$ and $\Sigma\Sigma$ systems.
3. Christoph Hanhart (FZJ) and Frank Nerling (GSI), *Report from the XYZ workshop*
An online ExtreMe Matter Institute (EMMI) workshop has taken place, with focus on XYZ states. The workshop was given in the honor of the recently deceased Mikhail Voloshin and attracted 128 researchers. There were 18 invited talks and 22 contributed talks, fairly evenly distributed between theory and experiment. Of special interest for PANDA was the LHCb talk on the recent measurement of the X(3872) width. Klaus Götzen gave a talk on the future

prosepects for PANDA to finally establish the nature of this state through a precision measurement of its lineshape parameters. On the theory side, recent results from predictions of *e.g.* tetraquark spectra and hadronic molecules, using different approaches such as Lattice QCD, EFTs and dispersion theory.

4. Roman Dzhygadlo, *Barrel DIRC and GlueX DIRC (FAIR Phase-0)*

The PANDA Barrel DIRC (Detection of Internally Reflected Cherenkov Light) was presented. Components such as bars, lenses, photon sensor and readout electronics are currently being constructed. Reconstruction algorithms are in an advanced state and a detector demonstrator has been evaluated with a test beam at CERN. In addition, the GlueX DIRC, that belongs to the FAIR Phase-0 programme, has been successfully commissioned and even been a part of the GlueX physics beam time in 2020. Reconstruction algorithms for PID were developed at the GSI and tested using the first GlueX data.

Friday, June 18, 2021

Jun 18, 2021	
9:00 AM	Plenary - Klaus Peters (until 10:30 AM) (Online) Zoom link
9:00 AM	"Report from the Young Scientist Convent" - Gabriela Perez (FZ-Jülich) - Gabriela Perez Andrade (Forschungszentrum Jülich(FZJ)) (Online) Young_scientists_report.pdf
9:30 AM	"News from Outreach Activities" - Mustafa Schmidt (Giessen) - Mustafa Schmidt (JLU) (Online)
10:00 AM	"Updates on computing" - Ralf Kliemt (GSI) - Ralf Kliemt (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)) (Online) 2021-06-Computing2.pdf
10:30 AM	Cafeteria (Online) Cafeteria Access (PWD: atBochum)
11:00 AM	Plenary - Klaus Peters (until 12:00 PM) (Online) Zoom link
11:00 AM	"Update from the Technical Coordination" - Lars Schmitt (GSI) - Lars Schmitt (GSI, Darmstadt) (Online) lschmitt_panda_tec_update_20210618.pdf
11:30 AM	"Update on Physics" - Johan Messchendorp (KVI) - Johan Messchendorp (University of Groningen) (Online) Physics_Report_June2021.pdf
12:00 PM	"Summary from the Collaboration Board" - Frank Goldenbaum (FZ-Jülich) (Online) CB_180621_open.pdf

Plenary minutes: Klaus Peters:

Report from the Young Scientist Convent - Gabriela Perez (FZ Jülich)

Garbiela gave a report from YS Convent and how to get started as a Young PANDA. at the convent there was an invited talk by M. Papenbroek about Linux containers for analysis. Web-wise the Young Scientist wiki has been updated and contact to the CBM young scientist has been established. An important topic was the discussion about a new lecture week sind the last one was more than 3 years ago.

News from Outreach Activities - Mustafa Schmidt (JLU Giessen)

Mustafa summarized the progress of the outreach activities, namely the different models, the master class and the card game as well as virtual detectors. He also mentioned that M. Kuemmel who was very activity in outreach left the group and the field. But there was also a

new member in the outreach team, which is M. Lafferty from Oshkosh U.

Updates on computing - Ralf Kliemt (GSI)

Ralf summarized the computing sessions. Please refer to the computing session for more details.

Update from the Technical Coordination - Lars Schmitt (FAIR)

In addition to Lars's presentation on Monday and the Technical Forum on Thursday, he emphasized on the GEM TDR Feedback from the referees. he talked about the rack planning for the PANDA hall and the planning for an interactive installation workshop of the system managers like in 2019: it'll take place on July 16, 2021 10h – 13h with Zoom, breakout rooms, and a concept board.

Update on Physics - Johan Messchendorp (KVI)

Johan touched the topics on the TAG and its new composition (there were also some works from Sinead who will step back as chair of the TAG and will organize an election over the summer for her replacement), the ambitions about Phase-2 simulations and publications, and a summary of the various physics working groups (please refer for more info to the respective sessions). He finished with a summary from the PubCom and some concerns/open issues.

Summary from the Collaboration Board - Frank Goldenbaum (FZ-Jülich)

Frank summarized the results of the CB meeting on Monday and Thursday: The annexes B1-3 of the Governance Rules have passed all steps and are now in place and active. Since the term end of the CB Chair and Deputy Chair, elections have taken place and the term from F. Goldenbaum was renewed and Anna Skachkova was elected as new CB Deputy Chair. Finally the Theory Advisory Group has been enlarged: Feng-Kun Guo (CAS Beijing) and Daniel Mohler (GSI Darmstadt) have been added. Another major topic inside the CB was the PANDA Construction MoU and there will be a follow-up CB Meeting on Sep 22, 2021 well before the next PANDA CM in Fall 2021.