

Minutes PANDA Collaboration Meeting (October 2021 - online)

Monday, October 25, 2021

Oct 25, 2021	
10:00 AM	Plenary - Per-Erik Tegner (Stockholm University(STU)) (until 12:30 PM) (online)
10:00 AM	Report from the Speaker - Ulrich Wiedner (Ruhr-Universität Bochum(RUB)) (online)
10:30 AM	News from Outreach - Dr Tobias Triffterer (Ruhr-Universität Bochum(RUB)) (online)
11:00 AM	Report from the Technical Coordinator - Lars Schmitt (GSI, Darmstadt) (online)
12:00 PM	Alignment of PANDA subdetectors - Roman Klasen (Johannes Gutenberg-Universität Mainz) (online)
12:30 PM	Collaboration Board (closed) - Frank Goldenbaum (Forschungszentrum Jülich(FZJ)) (until 2:30 PM) (online)
12:30 PM	--- Lunch break ---
2:30 PM	Hyperon Symposium - Michael Papenbrock (Uppsala University(UU)) (until 5:50 PM) (online)

Plenary session, October 25, 10:00 – 12:30

Chair: Per-Erik Tegnér (Stockholm University(STU))

10:00 Report from the Speaker - Ulrich Wiedner (Ruhr-Universität Bochum(RUB)) (online)

The speaker reported that

- There is an interest from groups in China to joining the PANDA collaboration in the future.
- On Thursday there will be a talk by the FAIR technical director
- Lars will tell us about the technical progress today.
- Czech Republic will contribute with 70 crystals for the EMC as in-kind.
- Reported from committees:
 - Joint Scientific Council: Focus on an “Early Science” programme
 - ECSG: Endors the present version of the construction MoU. The speaker stresses that the MoU should be regarded as an intent for e.g. applying for money, i.e. no obligation. The MoU will be discussed and decided upon in the CB this week.
 - JPAC (GSI) has identified the hyperon programme as a cross pillar for HADES, NUSTAR; CBM and PANDA.
- The speaker is (again) urging all PANDA members to announce their CM talks early in order to facilitate the scheduling.

10:30 News from Outreach - Dr Tobias Triffterer (Ruhr-Universität Bochum(RUB)) (online)

Tobias presented several outreach activities (details in the pdf documents):

- On October 3 an Open-door-day (Maus-Türöffner-Tag 2021) was held at Bochum University, with lectures and laboratory visits, aimed for children.
- In November an on-line event “I’m a scientist – get me out of here”, also aimed for children will take place.
- A web-page in German, aimed for the general public, is under construction, supported by German Ministry of Education. Publication date early 2022. Regarding this item it was discussed about possibilities to translate and spread this wider.

11:00 Report from the Technical Coordinator - [Lars Schmitt \(GSI, Darmstadt\)](#) (online)
[lschmitt_panda_tc_status_20211025.pdf](#)

Lars reported from FAIR that

- the SIS100 tunnel will be completed in time. The SIS100 dipoles have been tested,
- there is progress in area south - the APPA and R3B hall now are visible at the construction site,
- at the FAIR AFC meeting in October, cost increase due to civil construction was presented.

For PANDA Lars concluded the following achievements:

- Solenoid construction in full swing, first SC strands, cryostat production
- Barrel DIRC procurement progressing, PMT delivery starting
- Barrel EMC first slice assembled, finalisation of cooling, readout PCBs
- Cluster Jet Target: Tests at COSY with HESR beam cooling successful
- DAQT TDR approved by FAIR Forward Tracker component procurement
- GEM Tracker TDR reviewed, testbeam at RD51/CERN
- Upcoming milestones: Solenoid: - Delivery of cryostat and cold mass spring 2022 - Super-conductor production to finish by 5/2022 GEM Tracker TDR 2022 Construction MoU and Common Fund

12:00 Alignment of PANDA subdetectors - [Roman Klasen \(Johannes Gutenberg-Universität Mainz\)](#) (online)

[Klasen-2021-SubdetectorAlignment.pdf](#)

Roman described tools and procedures for the alignment of PANDA detector subsystems, here visualized for the Luminosity Monitor Detector (LMD) with an impressive precision.

Hyperon Symposium – Michael Papenbrock

We had presentations from the different experiments at FAIR that have hyperons, hypernuclei, or hyperatoms as part of their scientific ambitions. The aim of this symposium was to learn more about the specific activities of the different experiments in this area and identify common interests and synergies. Some of these common interests included gaining a better understanding of the Equation of State for neutron stars as well as working towards ab initio descriptions of hypernuclei. The common approach to these topics lies in studying the two-body and three-body forces in systems made up of hyperons and nucleons.

HADES – Rafal Lalik

Lalik gave a broad overview of the hyperon activities at HADES in recent years. This included the production of single- and double-strange hyperons in pp, pA, and AA collisions. In particular, HADES will be able to provide large amounts of pp data to study the structure of the $\Lambda(1405)$ as well as in-medium modifications of the $\Lambda(1520)$. Furthermore, the

measurement of electromagnetic transition form factors provides an additional approach to learn about the internal structure of hyperons.

On the topic of the neutron star puzzle, Lalik presented the femtoscopy measurements by HADES to investigate ΛN interactions.

The forward detector upgrade, including the Straw Tube Stations at small angles, will significantly increase the physics potential of the upcoming pp beam time in February 2022.

CBM – Ilya Selyuzhenkov

Selyuzhenkov presented the unique physics program of CBM, allowing a precision study of the QCD phase diagram at extremely high net-baryon densities. Femtoscopy measurements will provide a better understanding of the hyperon-hyperon interaction, whereas the many-body forces can be studied in light hypernuclei containing one or several single-strange hyperons. Selyuzhenkov presented extensive studies on the physics performance with respect to many different physics observables.

While a major goal of the FAIR Phase 0 program for CBM is to gain a better understanding of the major components and their integration, there will also be physics results with CBM devices. This will include, for example, the production of hypernuclei at STAR FXT as well as the subthreshold excitation function for the Λ at mCBM.

R3B – Alexandre Obertelli

Obertelli showed the possibilities of R3B for light hypernuclei. Herein, the hypertriton puzzle, where there is an inconsistency between analyses of the binding energy and lifetime, is one of the highlights. A precise measurement of its size will give the hypertriton a key role in potentially ruling out coalescence models for the cluster formation in heavy ion collisions. Furthermore, measurements of three-body forces involving hyperons will serve as a probe for nuclear structure and help in the ab initio description of light hypernuclei.

Obertelli also presented HYDRA, a high-resolution TPC for determining invariant masses of hypernuclei with high precision. The prototype is currently under construction and will be ready in 2023.

WASA-FRS and beyond – Takehiko Saito

Staying on the topic of the hypertriton, Saito presented the plans for upcoming measurements with WASA-FRS as part of FAIR Phase 0 in early 2022. The aim is to measure the lifetimes of ${}^3_{\Lambda}H$ and ${}^4_{\Lambda}H$ with excellent precision, while also investigating a possible $nn\Lambda$ bound state. New machine learning approaches will also provide access to the hypertriton binding energy in emulsion experiments at J-PARC E07.

Future experiments beyond WASA-FRS will enable the production of very neutron-rich hypernuclei via charge exchange reactions in heavy ion collisions, offering a novel method to produce exotic hypernuclei.

PANDA – Karin Schönning

Schönning gave an overview of the hyperon-related activities at PANDA, with an emphasis on Phase 1. The topics involve the production, spectroscopy, structure, and decays of hyperons as well as studies of (anti-)hyperons in nuclei. Hyperons will serve as a probe to investigate some of the major questions in the field. This includes gaining a better understanding of the strong interaction, measuring hyperon spin observables to investigate the matter-antimatter asymmetry in the Universe, and address the hyperon puzzle of neutron stars. Already in the early years, PANDA will be a strangeness factory with a rich hyperon physics program.

Tuesday, October 26, 2021

Oct 26, 2021		1:00	4:00
9:00 AM	Computing - Tobias Stockmanns (FZ Jülich) (until 10:30 AM) (online) agenda	--- Lunch break ---	--- Coffee break ---
10:30 AM	--- Coffee break ---	2:00 PM Micro Vertex Detector - Daniela Calvo (INFN Torino) (until 4:00 PM) (online) agenda	4:30 PM PID Cherenkov - Carsten Schwarz (GSI, Darmstadt) (until 6:30 PM) (online) agenda
11:00 AM	Computing - Tobias Stockmanns (FZ Jülich) (until 1:00 PM) (online) agenda	2:00 PM PID Cherenkov - Carsten Schwarz (GSI, Darmstadt) (until 4:00 PM) (online) agenda	4:30 PM Physics - Hyperons & hypernuclei - Josef Pochodzalla (GSI, Darmstadt) Michael Papenbrock (Uppsala University(UU)) (until 6:30 PM) (online) agenda
11:00 AM	Mechanics - Lars Schmitt (GSI, Darmstadt) (until 1:00 PM) (online) agenda	2:00 PM Physics - Electromagnetic Processes - Alaa Dbeyssi (GSI, Darmstadt) (until 4:00 PM) (online) agenda	4:30 PM Tracking - Peter Wintz (FZ Jülich) (until 6:30 PM) (online) agenda

Minutes of the Computing Session of the PANDA Meeting 21/3

The computing session consisted of six presentations from various fields within the PANDA computing environment.

One of the long-standing open points in PandaRoot is a track finding algorithm with high efficiency for particles with a displaced point of origin. In the first presentation, Anna Aliche presented a new approach based on triplets generated out of STT hits. From 1000 simulated $\lambda\bar{\lambda}$ pairs she could reconstruct 96 % resp. 100 % of the lambdas if the proton/pion tracks were going through the STT and the transversal beam momentum was high enough. If she also took curling tracks into account, her efficiency for lambdas dropped to 80.6 % which is still a good value. This code will be merged in the development branch of PandaRoot soon and an update is planned to better address curling tracks.

In the second presentation Adeel Akram studied the same decay channel of lambda-pairs into charged particles and investigated how good the performance of the existing PandaRoot track finders for this channel are. For this he performed a complete analysis of the decay channel and compared the performance of the BarrelTrackFinder, optimized for primary tracks, the SttCellTrackFinder and the IdealTrackFinder as reference. In his test the reconstruction efficiency dropped from 20 % for the ideal case down to 1 % for the BarrelTrackFinder and down to 0.064 % for the SttCellTrackFinder. Further investigations are ongoing why the performance of the SttCellTrackFinder is much lower than expected. This test should also be repeated with the new track finder presented in the previous presentation.

A problem of the EMC reconstruction are those showers which happen at the boundaries of the detector. Here parts of the shower leave the crystals and are not detected which causes an energy shift and a bad resolution. Hang Qi showed in his presentation how the current energy calibration of the EMC is working and how much it is suffering from the leakage at the edges of the detector. He then introduced his new leakage correction algorithm which significantly improved the reconstruction quality especially for the edge crystals.

A complete time-based simulation and reconstruction chain was developed and presented by Viktor Rodin in the fourth presentation of the computing session. He mixed several signal channels with background data and applied a time structure to the data matching the phase-

1 scenario of PANDA. He then generated event candidates from the different sub-detectors, based on their time structure. He applied tracking and particle identification and further subdivided the event candidates with the higher precision after complete reconstruction. He then used the fully reconstructed events for physics analysis and compared the time-based results with the event-based ones which showed very good agreement although some small losses in efficiency could be observed.

One essential component to achieve the required spatial resolution of the PANDA detector is its capability to perform an alignment of the sensors based on the measured track parameters. The mechanism to misalign and re-align the various sub-detectors in PandaRoot was presented in the talk by Roman Klasen who then showed how this concept is applied on the Luminosity Detector. Without alignment already small, misaligned components could have significant impact on the luminosity measurement resolution. With the applied alignment mechanism deteriorations of up to 150 μm could be compensated which is sufficient for the operation of the detector.

In the last presentation of the session also from Roman Klasen, he introduced the usage of docker containers for the installation process of PandaRoot and its dependencies. Using containers would significantly simplify the installation procedure and would provide every user with the same working environment to run PandaRoot. After some modifications which are still necessary it is planned to regularly provide containers with the latest PandaRoot releases for the users.

Minutes of the Mechanics Session

** A. Derichs, Constructive Operational Safety on the STT Detector*

Two versions of mock-ups of the STT on-detector FE electronics to study the cooling with air were presented. The first version included the old size of the FE boards, the second one the smaller final size of the latest FE board design. Each dummy board had resistors to mimic the realistic power consumption. The smaller boards allow well for space needed for cabling in the readout volume. The whole readout volume was enclosed and supplied with an air stream for cooling. With this new version a temperature of 40°C could be reached with a realistic air flow of 100 l/min for the half STT barrel.

Further design work regarded the STT cable channel where all services like gas, HV, LV and signals are routed. A prototype made with 0.5mm thick Aluminum covers was produced. The space is sufficient to route all services. Furthermore, the routing of the gas pipes between service channel and straw layers was optimized.

** S. Koch, Mounting device for Forward Endcap installation*

A first detailed design of the installation device for the forward endcap EMC was presented. The device attaches to 8 thread holes of size M16 present at the backplate of the FEC EMC for fixation. The load of the EMC has to be supported on two locations on 45° holding plates. The installation device consists of four parts, the base frame, the lifting frame, the console and two grippers left and right. The base frame is fixed to precision rails with rollers that allow forces both in up and down directions to allow for the cantilever operation of the installation device. The lifting frame allows for the vertical adjustment. The console holds the FEC EMC and can be adjusted with three spindles in 3 dimensions. The gripper flips up from below to

hold the weight and releases it when in the system is installed in its place. With a different console the device shall be also employed for the installation of the GEM tracker.

** J. Lühning, PANDA Beamline Update*

The work presented regards the integration of the beampipe of HESR in PANDA along all its sections. At FZ Jülich the prototyping and design of the vacuum system itself are done. A first prototype of the target-beam cross made from Aluminum was done featuring an optimized cross section of a conical pipe with a straight pipe. The real pipe will be done from Titanium. There are four places that have to be opened when the TS and FS platform are moving to the maintenance position. Further flanges are interfacing the cryo-pump section at the rear, the pumping port between FT1 and FT2 and the vacuum of the Luminosity Detector in the very front. Details of the design of the pumping port between FT1 and FT2 were shown. Tolerances are very tight, but a small modification of the connection of FE boards may release some more space. A further point of discussion is the design of flange connection either as standard CF flanges, chain-like QCF flanges or an individual horse-shoe design.

** D. Glaab, Design changes on gas tank fundament, room 40.310_&_adaption inside the MVD-Pit*

The first part of the presentation covered the necessary changes to the service routing and civil construction parts regarding the cryogenic infrastructure for PANDA. At the outside of the hall a foundation will hold two large vertical tanks, one for liquid nitrogen, the other for gaseous helium. The liquid nitrogen will be used to cool gaseous helium from inside the cryogenic system of the PANDA Solenoid at the parking position via a heat exchanger. This allows to keep the temperature of the shield and SC coil of the magnet below 100 K at all times to avoid mechanical stress. The evaporating nitrogen generated in this process can be used to flush detectors. This is needed for keeping gaseous detectors clean during the shutdown period and to keep the volumes of the TS EMC and the Barrel DIRC in a dry atmosphere. A second component is an evaporator operated for the generation of gaseous nitrogen when the Solenoid is in its operating position. The foundation of the gas tanks has to be enlarged to host also the heat exchanger and the evaporator. The inventory placement of the Kryo room E40.310 of the PANDA hall and the routing of the cooled helium line and the gaseous nitrogen line was shown as well. In this design routing of liquid nitrogen through the hall was avoided in order to reduce the safety requirements.

The second topic was the extension of the cooling pit that was previously designed to hold the reservoirs of the under-pressure cooling systems of MVD and EMC. The newly designed under-pressure cooling for the electronics racks in the PANDA hall also requires a reservoir below ground level. For this reason, the cooling pit has to be extended by a factor two in size.

** L. Capozza, BWE EMC Safety Risk Assessment*

Luigi presented the BWE EMC Risk Assessment with an emphasis on the differences to previously shown risk assessments. The mindset is that of an iterative process updating information towards the realization of safety instructions for each system to avoid hazards to people. All phases of the life cycle of a system from preparation through commissioning and regular operation up to decommissioning should be covered and should include all relevant hazard factors and hazard descriptions.

** A. Belias, Status of Rack Occupancy*

A brief account of the current status of the inquiries on the required occupancy of racks in PANDA was given. The missing information has to be collected until the end of the year as it is required for a refined assessment of the power consumption within the hall which is needed for the planners of the Technical Building Infrastructure. They will resume their work on the PANDA hall at the beginning of 2022 based on this input.

MVD Session

In the presentation by Ralf Schmitz for the ZEA department of the Research Center Jülich four topics were addressed. The first one was the production of a prototype of the beam target cross of the vacuum chamber around the interaction point and an evaluation of the necessary wall thicknesses for the different parts of the hole vacuum chamber.

In the second part the results of a thermal test of the barrel layer 4 staves was shown. A prototype was equipped with heating resistors at the position of the front-end electronics. They were then powered with a current compatible with the expected power dissipation of the real electronics and the temperature profile and the thermal expansion of the support structure was measured for different flows of the cooling water. For 400 ml/min flow the maximum temperature increase was below 1° K and the largest expansion, along the z-axis was 35 µm. For lower coolant flows of 250 ml/min and 120 ml/min the temperature increase was below 2° K resp. 3.4°K and an expansion of 50 µm resp. 75 µm.

Without cooling the temperature increase was rapidly rising to 15° K within 15 s which implies that an operation of the MVD without cooling has to be avoided.

A new laminating form for the production of the BL-4 staves was produced which improved the production process.

In the last topic of the presentation the results of the measurement of the half cylinder support structure were presented. The deviations of the radius at the positions of the saw teeth structures are between 1 mm to 1.4 mm with an overall variation of 3 mm.

In the presentation by Daniela, the development status of ToASt project is presented. The ASIC was submitted to the foundry in April 28 2021.

The foundry shipped the prototypes on September 30 and the chips were delivered on October 15 to INFN-Torino.

Due to the radiation tolerance design, the ASIC was declared as dual use design (in Italy and Germany).

Only one PCB for the chip ToASt has been completed, for this goal some level translator circuits were unsoldered from cards of another activity in Torino, in fact the delivery of the SN74AUP1T34DCKR components is scheduled for Feb. 2022 !

The test board is now connected to the DAQ system developed in Torino and based on a Kintex 7 FPGA and LABView software.

No high power consumption values have been measured, neither for the PCB nor for the chip operated with the clock signal and without any register configuration.

The register configuration test is now in progress.

PID-Cherenkov group

Simon Bodenschatz, Uni Giessen, DIRC and GCS status update. The first prototype readout card for arrived. Its power consumption of about 10 Watts is mainly driven by the infrastructure for the 5 TOFPET2 asics, like the FPGA, optical transceiver, and others. Each TOFPET2 asics has a power consumption of 10 mW/channel and 64 channels. Also, the last activities for the Giessen Cosmic Station were shown.

Carsten Schwarz, GSI Darmstadt, Status of the Barrel DIRC DAQ Carsten showed the next plans for the Barrel DIRC readout. It is planned to study the cooling of the DIRICH cards by air and to measure the amount of needed air. Also, the power routing for the many low voltages and large currents was discussed. The best solution would be to get with 48 Volts into the solenoid and to regulate down the voltages with magnetic hard DC-DC converters like the FEAST from CERN.

Greg Kalicy, CUA Washington, Mapping the focal plane for a 3-layer lens Greg showed the optical measurement setup in Washington, where the shape of the focal plane of lenses immersed in oil can be measured. The measurements are not only for the Barrel DIRC at PANDA but also for the planned one at EIC. He showed measurements which agree well with Geant4 simulations.

Daniel Miehling, FAU Erlangen, Update on Lifetime Measurements and the strange behavior of the latest Photonic tubes the latest results for the aging studies of MCP-PMTs were shown. Most sensors with ALD coated MCPs have lifetime larger than 5 C/cm \leq . He discussed the so-called escalations, the intermittent wild firing of tubes, which the latest PHOTONIS tubes have shown. Photonic is aware of this effect and the tube 105P541 was sent back for further tests of these escalations.

Steffen Krauss, FAU Erlangen, first results of the B-field measurements Measurements of MCP-PMTs within a dipole magnet in Juelich were done in a magnetic field up to 1 Tesla. As expected, recoil distributions change significantly at high B-fields and the pixel position is better defined. For the measurement of after-pulsing there is a difference between scope data and TDC-measurements due to the finite deadtime of the TDC channels. This effect needs more investigations.

Merlin Boehm, FAU Erlangen, TRB/DIRICH in the magnetic field He measured inside a 3T MRI scanner the behavior of the readout cards. Besides of the expected failure of DC-DC converters a drop in the amplification of the analog part was observed. The input transformer of the amplifier is not the reason. The inductance in the collector path of the HF-transistor is the next most probable suspect.

Tracking Session

Presentations can be downloaded from the session indico page (<https://indico.gsi.de/event/13299/>)

Aleksandra Molenda, Miroslav Firley, Marek Idzik (AGH Krakow) – Verification of front-end electronics boards for the FT and STT detectors

Aleksandra summarized the status of the setups, measurements and procedures for the PASTTREC-ASIC and Front-End boards QA foreseen for the STT and FT. The setup allows to measure the characteristics of eight FE-boards in parallel and in a fully automatic way (via python scripts) by PC-controlled signal generation and injection to the boards and ASIC-control and signal readout by a TRB3. The QA procedure includes DAC function tests, baseline measurements, threshold scan, TOT scan versus input charge and optionally a more time-consuming complete S-curve scan measurement (number of counts vs. input charge) for a full ASIC characterization. All scan results are stored in a database for later use and a summary measurement report containing the most important numbers is printout for each FEB.

From 140 FEBs tested up to now, a high number of 132 (94%) passed the QA tests as considered good and ready for use. Eight FEBs showed DAC setting or ASIC communication problems. 97% of the 280 PASTTREC-ASICs are classified as good. Input from the STT and FT detector groups is requested to decide on the required final set of QA tests.

Gabriela Perez Andrade (FZ Jülich) – Results of the STS at HADES calibration.

Gabriela reported about the calibration methods and results for both STS1 and STS2 straw detectors for the commissioning beam time data from February this year. After a time-of-flight correction of the STS hits with the fRPC information and individual STS time offset determination clean drift time spectra are obtained. The shape of the spectra is in very good agreement with a simulation (Garfield) of the electron drift spectrum.

The isochrones radius – drift time relation $r(t)$ is extracted from an integration of the drift time spectrum and parametrized by a 4th order polynomial function. The results show for the individual channels in STS1 and STS2 very similar drift time spectra, e.g., same maximum drift times of 162ns, so that a common calibration and $r(t)$ relation for STS1 and STS2 seems feasible.

The obtained $r(t)$ relations were also compared for data sets taken with different ASIC settings to decide on the best setting for the upcoming experiment beam time in February 2022. It was seen that changing the PASTTREC gain setting from 1 mV/fC to 4 mV/fC allows to reduce the high voltage in the straws from 1800V down to 1650V.

Peter Wintz (FZ Jülich) – Status Updates for HADES-STS1 and PANDA-STT

Peter reported about the ongoing preparations for the upcoming phase-0 HADES experiment beam time in February 2022. After a few days maintenance work in September the STS1 and STS2 systems are ready for operation. A few FEBs which showed single channel failures were exchanged by new boards which were delivered in summer and QA tested by the AGH group in Krakow before installation.

The analysis results presented by Gabriela showed that the high voltage in the straws can be lowered from 1800V down to 1650V if the PASTTREC amplification setting is changed from 1 mV/fC to 4 mV/fC without seeing a loss in data quality for the drift time and time-over-threshold measurements. Gas gain measurements show that then the gas gain in the straws is reduced by about a factor of five from 5×10^4 down to 1×10^4 . Consequently, the charge load and possible aging effects can be up to a factor of five lower which is a great improvement considering operation stability. The 1800V voltage setting was used so far for the straw test systems as default and was also considered in the PANDA-STT TDR.

As a conclusion, the high PASTTREC sensitivity and low noise levels which were demonstrated by both STS systems with high intensity proton beam at HADES give high confidence for a robust PANDA-STT operation and high detection efficiency.

Wednesday, October 27, 2021

Oct 27, 2021	
9:00 AM	Physics - Hyperons & hypernuclei - Josef Pochodzalla (GSI, Darmstadt) Michael Papenbrock (Uppsala University(UU)) (until 10:30 AM) (online) agenda
9:00 AM	TEC Meeting (closed) (until 10:30 AM) (online) agenda
10:30 AM	--- Coffee break ---
11:00 AM	Electromagnetic Calorimeter - Fritz-Herbert Heinsius (U Bochum) (until 1:00 PM) (online) agenda
11:00 AM	Magnet (until 1:00 PM) (online) agenda
11:00 AM	Physics - Charmonium/Exotics - Marc Pelizäus (U Bochum) Frank Nerling (GSI, Darmstadt) (until 1:00 PM) (online) agenda
1:00 PM	--- Lunch break ---
2:00 PM	Electromagnetic Calorimeter - Fritz-Herbert Heinsius (U Bochum) (until 4:00 PM) (online) agenda
2:00 PM	Target - Alfons Khoukaz (U Münster) (until 4:00 PM) (online) agenda
4:00 PM	--- Coffee break ---
4:30 PM	Data Acquisition - Grzegorz Korcyl (Jagiellonian University) (until 6:30 PM) (online) agenda
4:30 PM	Young Scientist Convent (until 6:30 PM) (online) agenda

Hyperons & hypernuclei – M. Papenbrock and J. Pochodzalla

In contrast to earlier meeting, the sessions on hyperons and hypernuclei were combined in an effort to promote exchange between the groups and identify synergies. Even though there were three hyperon-related plenary talks and the Hyperon Symposium, there were still enough contributions to fill sessions at the collaboration meeting.

Investigating Σ^0 Production mechanism in p(3.5 GeV)+p Collisions – W. Esmail

Waleed showed his investigation of the Σ^0 production mechanism in p+p collisions with the HADES / PANDA Phase 0 experiment. Data suggests the production occurs via a pion exchange mechanism. The Σ^0 is produced both by resonant and non-resonant reaction. However, due to limited amounts of data, it is difficult to quantify the relative contributions. Nevertheless, the partial wave analysis favours resonances with masses around 1.710 GeV/c² and 1.900 GeV/c², respectively. This is a first step towards measurements of radiative decays of excited hyperons with the upcoming beam time in February 2022.

Progress of the Hyperatom and Hypernuclei experiments – M. Steinen

Marcell gave a comprehensive overview and status update regarding the experiments on hyperatoms and hypernuclei. There is ongoing work to speed up the data generation with the GiBUU framework and include heavier nuclei. First tests with PandaRoot on Himster2 had some minor issues related to Singularity but showed promising reconstruction efficiencies for the $\bar{\Lambda}\Lambda$ production.

Regarding the hyperatom studies, a redesign of the target system is in progress. A part of the first prototype has been ordered.

For PANGEA, a different cold head system was required. It was decided to switch to LN2 cooling, which shows a good performance. A redesign of the frame to accommodate the system is ongoing.

The program on hyperatoms will be extended to Σ^- and $\bar{\Sigma}^-$.

Update on the Λ analysis using kinematic fitting – J. Regina

Jenny presented her progress on the analysis method based on kinematic fitting of neutral hyperons with the HADES / PANDA Phase 0 experiment. After the final selection, the reconstruction efficiencies are high, and the suppression of combinatorial background is excellent. The fitting work for older data taken during an earlier beam time.

In the future, background will be added to the simulation, allowing to calculate the signal to background ratios.

Three-body interactions in Hypermatter and Hypernuclei – H. Lenske

Horst provided a theoretical view on the three-body interaction involving hyperons and nuclear matter, as well as their origins and their interpretation. Furthermore, the covariant GI-DHBF description of in-medium interactions was presented, in which 2-body methods describe the Equation of State. This was followed by SU(3) meson-baryon octet interactions. It was shown how the different approaches describe hypernuclei. Finally, Horst discussed the $\Lambda - \Sigma$ mixing by isovector interactions and the induced three-body self-energies.

Status update on hyperons – M. Papenbrock

Michael gave a short overview of the recent activities in the hyperon working group, many of which had release presentations during the plenary sessions. These included the $\bar{\Omega}\Omega$ spin observables, hyperon detector signatures, and excited hyperon spectroscopy. There is an ongoing analysis by Jana Rieger on the Σ^0 Dalitz decay with HADES / PANDA Phase 0 to determine $\Sigma^0\Lambda$ transition form factors. This work can later be extended to the corresponding anti-particles with PANDA. Furthermore, there are several ongoing simulation studies to determine the feasibility of near-threshold hyperon production with the aim to measure final state interactions, including the $\Lambda(1405)$.

Discussion

Both sessions had a dedicated timeslot for discussion. The common questions to be addressed related to defining simulation standards for release notes and publications as well as requirements and priorities for the software development. The information gathered here should educate the ongoing discussion in the physics and publication committees.

TEC Session

* L. Schmitt, TC Report

General news regarding some details from the DAQT/FEE workshop Oct 6-7, 2021, were given, as well as on the recent and the next reporting campaigns. The meaning and details of the FAIR Project Completion Parameters for first beams at FAIR useful for physics measurements were presented. For PANDA 1E9 stored anti-protons in HESR are the threshold for first physics campaigns.

Upcoming milestones that either require feedback from the system managers regarding necessary shifts or a notification of completion were communicated. The data is to be entered via the PANDA web-frontend for project reporting.

News on experiment cooling comprised the layout of the under-pressure cooling systems for racks, MVD and EMC and the discussion of using dedicated turbines for air cooling rather than pressurized air from the hall. The pressurized air is meant for short term pulses for valve control and is not safe for a continuous large flow. The layout of the nitrogen supply plant was presented. The plant serves for cooling the Solenoid coil when the magnet is in the parking position and for supplying gaseous nitrogen for flushing detectors and keeping sensitive volumes dry.

The recent activities on installation planning of the FS were reported along with the expected further steps of planning for both TS and FS in the coming year. A major topic for discussion is the subject of alignment and survey of detectors. In the subsequent general discussion, the following systems were touched: The Luminosity Detector and the MVD have the highest requirements towards alignment and are measured with a high precision CMM internally. The STT and FT are aligned via their support frames to a reasonably high precision in the order of the track resolution. The more robust equipment attached directly to the Solenoid, like the muon chambers or the cluster jet target are measured with respect to the solenoid yoke. The yoke itself is precisely aligned by laser trackers already in the course of its installation.

MAG Session

** Evgeniy Antokhin, HESR PANDA Chicane Dipole Status*

The main specifications of the large dipole magnet were recalled. The latest results on the FEM simulations regarding the stability of the magnet support structure were shown. The support will be protected by mechanical fuses against deformation at too large shear stress from seismic events.

The overall status of the work on the magnet construction was presented: The steel for the yoke and further materials for the yoke were ordered. The manufacturing of the yoke will commence soon in Krasnodar. The copper for the coil was ordered at the company Luvata. Tooling manufacturing for coil winding and impregnation was ordered at the BINP workshop.

The current design of the magnet field mapping device was presented. A carbon fibre rail insensitive to magnetic fields shall carry the arm with the hall sensors and laser reflectors performing the measurement. Drawings are in preparation and a prototype shall be produced soon.

** Evgeniy Pyata, PANDA Solenoid Status*

The main milestones and components of the system were recalled. The components shall be ready in the course of 2022 for an assembly of the full magnet for testing and field mapping during 2023. Transport to FAIR and start of assembly at the PANDA hall are planned for mid 2024 with final acceptance tests finishing in mid 2025.

The yoke is complete and stored at BINP. Preparations for the assembly at BINP have started. The cryostat and cold mass are in production in Votkinsk and shall be delivered in Q1/2022. The quality of welding work was checked by the BINP QA team during a visit to Votkinsk.

More details were given on the status of the super-conductor production. The production of strands started at VNIKP, a first sample of 1600m was tested at both ends. The test results are encouraging as not only all specs were kept, but the decisive values of conductor RRR and n-value are even twice better than specified indicating a high-quality super-conductor. With the strands a braided 2x4 Rutherford cable will be produced VNIINM. A further step is the preparation of pure Aluminum wires for the co-extrusion process. Optimizing the extrusion temperature range between 350°C and 380°C allows to reach an overall conductor RRR above 1000 as shown by tests with the available raw material. The extrusion of the Aluminum stabilized conductor will be done at the company SarKO in Saransk. All contracts are prepared and either signed or close to signature in order to complete manufacturing of the PANDA conductor by May 2022.

The devices for the coil winding were designed and are in production. The parts of the tooling will be delivered to BINP in December 2021, photos of ready coil formers were shown.

The final design of the Control Dewar with the local cryogenics of the magnet is progressing. An outside company prepares construction drawings that need to be checked by TÜV as a notified body for the examination of safety as the device is a pressurized vessel. The Final Design Review will be held in Q1 2022.

Regarding the preparation of tests of the Solenoid magnet a new location inside BINP was selected. This place has a better foundation for the heavy weight and more overall space around. The drawback compared to the originally planned location close to the superconducting KEDR magnet is the missing Helium refrigerator. Therefore, operation of the PANDA solenoid for the tests shall be done using a 1000 l LHe reservoir supplied by dewars directly from BINP's own Helium production plant.

Parallel Sessions 27/3

We had this time just one (CCE related) talk on our agenda:

- o Status of the hybrid charmonium candidate analysis Aron Kripko (JLU Giessen)

Short Summary:

0) Communications by Marc and Frank:

The issue of collecting and documenting missing or mal-functioning reconstruction parts in PandaRoot from our view of physics analysis was reminded. This is explicitly asked for by the Physics Conveners in order to bring those up to a common discussion with the Computing Coordinators at upcoming PhysCom meetings. The goal is to discuss and come up with a prioritised list, taking into account the different activities and topics being worked on especially in view of the planned Panda Phase-2 paper.

1) Aron Kripko, Status of the hybrid charmonium candidate analysis

Aron presented an update of his analysis of the spin-exotic hybrid candidate η_{c1} . The decay channels being most probable according to theoretical predictions, namely to $2\pi^0\chi_{c1}$ and to $\eta\chi_{c1}$ are rather challenging as they comprise seven and five final state photons, respectively. With the previous assumption of 33 nb signal production cross section, the resultant estimate of needed data taking time for this channel is unreasonably long. Therefore Aron added meanwhile and studied further decay channels, namely $\phi J/\psi$ and $\omega J/\psi$ as well as a further cross section assumptions.

Aron also provided a list of four items of shortcomings in PandaRoot for his analysis, namely problems with charged particle reconstruction in the forward direction (he finds a gap at about $\theta = 20$ deg), a missing recovery of photons that did pair production and the anyhow too low photon detection efficiency (order 50% instead of >90% as expected), and he found the MC-match numbers inconsistent. Some of the found problems he fixed by himself, and the items will be discussed with the Computing Coordinators at the next PhysCom meeting. After his fixes he gained a factor of about two in detection efficiency.

Electromagnetic Calorimeters – Fritz-Herbert Heinsius

Status Forward Endcap EMC - Thomas Held

By now 136 out of 214 APD submodules are built. They are produced and shipped to Bonn with a rate of 5 modules every two weeks. Currently 27 submodules are ready to be glued. The temperature sensor calibration resumed after fixing the sensor clamping in the set up. The two cooling lines for the front lid are prepared. The seal Sikaflex 295UV plus activator, primer was radiation tested at Strahlenzentrum Giessen. The first 3x15-SADC crate was built. Its cooling will be tested. For the full tests the power supply is required. It is designed by Pawel; the production is ongoing. Tom also presented a rough time scale for finishing the FWEC. It foresees the transport of the endcap mounting plate and frame in March next year, followed by the mounting of the submodules. The readiness for COSY beam is envisaged in March 2023.

Backward Endcap Status Report - Luigi Capozza

The submodule components are fully acquired for several units such that the production of the submodules can start. The mounting plate and support structure is manufactured, and mounting tests were done with empty submodules. In the second half of his presentation Luigi documented the successful identification of the HV input capacitor as the reason for the problem of the ringing after APFEL pulses. This was not observed in the pre-production. The reason was a different production of the capacitor. For the backward endcap enough capacitors of the old type were purchased. In further tests another capacitor (VISHAY 1 nF) was found by the Mainz group, which will be used in the ongoing production of the flex-PCBs for the barrel EMC.

Energy Calibration of the PANDA Electromagnetic Calorimeter – Hang Qi

A dedicated calibration algorithm is developed for the PANDA EMC and tested for the barrel part. The algorithm suffers from the energy leakage in the three rows at the up- and downstream part of the barrel EMC. He presented a function to correct for the energy leakage. This resulted both in an improved energy mean value and energy resolution.

Status Barrel EMC of the PANDA Target Spectrometer – Markus Moritz

With the help of the Russian colleagues (currently at Giessen) the slice was moved into the rotation frame such the insulation box could be mounted. First cooling tests of the complete slice are scheduled for the week after the meeting. The delivery of all APFEL FlexPCBs is expected beginning of next year. The final front-end electronics can be mounted in spring 2022. Further parts of the presentation covered the temperature dependent calibration of the HV backplane and the status of the crystal production. Discussion: Milestone M8 will be shifted to autumn 2022. The missing 199 crystals for the third slice exclude the upcoming production of 70 crystals (Czech Republic order).

Geometry and Position Measurements of Forward Endcap Submodules – Christian Hammann

All full size VPTT submodules are measured and glued. The 8 crystal (half) submodules show larger deviations. Once the submodules are mounted and only the front face is visible, the position can still be measured to a precision of 0.2 mm. Holder for reflectors on the detector will be needed to determine the position of the crystals to each other and in the global reference frame.

Discussions

Alignment of EMC: The precision of the photon position reconstruction is about 1 mm. It is difficult to precisely determine the position of the crystals due to the covers of the insulation. Final crystal positions will be determined in situ by a calibration with charged particles. The requirements on the alignment of the EMC are more than an order of magnitude less stringent than for the tracking detectors. For the alignment and coordination within the PANDA alignment system the following persons are assigned: Tom/Christoph for the BWEC, Luigi for the FWEC and Markus for the barrel.

Target Meeting

1.) Status Report for the PANDA Cluster-Jet Target (S. Vestrick)
Very recently, the galvanic production of monolithic copper nozzles got significantly improved by the introduction of an additional process electrode. The exact geometry and position of this electrode was obtained using numerical simulations on the galvanic deposition of copper. In addition to the typically imprecise electrical discharge machining or laser drilling for the preparation of the minimum inner diameters of new nozzles, micro drilling using drills of 30 μm diameter are planned. Cluster generators similar to the one for PANDA are currently in operation at both the ARCTURUS laser of the University of Düsseldorf and the MAMI accelerator in Mainz. At Düsseldorf, shadowgraphy measurements using hydrogen clusters are performed in order to determine the size and size distribution of clusters for the operation at highest target thicknesses. Cluster with sizes of $>2 \mu\text{m}$ are observable using this setup and clusters of several μm diameter have been observed. The analysis is currently in progress. At MAMI, experiments using Argon clusters are performed, which are also of high interest for a possible operation of the PANDA target using heavier gases. A new nozzle with a special cup-shape has been designed and build, which results in well-defined Argon beams. The design studies on a cryopump for the HESR beam line at PANDA are in progress and a prototype setup will be prepared at WWU. In addition, a significantly modified beam dump for the PANDA target is currently in preparation at WWU, which will allow for several diagnostic systems as well as for adjustable orifices. Design studies towards the installation of this system are ongoing.

2.) The Residual Gas Contribution of Clusters and Pellets in Vacuum (B. Hetz) Calculations and measurements for a detailed understanding of the vacuum situation at PANDA are in progress. Recent results show that gas evaporation from individual clusters or pellets dominates the gas load and by this the residual gas pressure at the IP. Numerical simulations on gas evaporation due to heat radiation as well as ion-beam heating, and evaporation cooling are performed in order to estimate the gas load at different vacuum chambers along the PANDA target pipe. The results of these calculations are found to describe experimental vacuum pressure data within 10%. Based on these results, a comparison is made between the gas load at the PANDA IP originating from a cluster target and a pellet target. The results differ only by a factor of ~ 2.3 .

3.) Highlights of the Cluster-Jet Target Control Program (J. Tarasiuk) The recent concept of the implementation of the cluster target slow control program on a CompactRIO system is presented. The idea is to install a virtual MicroBlaze processor on the FPGA part of the CRIO system in order to allow for a conventional C-programming instead of a graphical LabView code. The concept of the structure of such a program is presented.

4.) Developments on the Pellet Target system (P. Fedorets) Main goal of the recent activities is the transfer of droplets/pellets from the triple point chamber into the first vacuum chamber via the thin sluice. The temperature of this sluice shall be reduced from roughly 240 K to ~ 100 K or below by flanges made of stainless steel instead of copper, in order to allow for better pellets stream parameters. Since October 2021, the experimental activities are slowed down due to recent Cov-19 working restrictions.

DAQ Session

- Discussion on Data Concentrators: agreement on the development of two versions of Data Concentrator hardware platform, one equipped with Kintex FPGA, the other with Zynq MPSoC. It will give more flexibility to the users while maintaining uniformity in basic operation mechanisms and firmware.

- Discussion on proposed 3 stages DAQ development strategy:

1. Sim-daq: hardware implementation of time-based simulations from PandaRoot by Viktor Rodin on dummy hardware. Successive introduction of target components into the system.
2. DAQ-0: system constructed out of target hardware and firmware components on small scale (part of a subsystem) with basic functionality, capable to transport data from the Front-end Electronics to storage. Successive enlargement into full scale system
3. DAQ-1: system capable to accommodate all subsystems

- Viktor Rodin: a framework for simulating PANDA DAQ system based on PandaRoot has been developed and evaluated. The performance of the framework was cross-checked with regular event based PandaRoot simulations. Despite some discrepancies, all the benchmark channels have been positively detected.

Thursday, October 28, 2021

Oct 28, 2021			
9:00 AM	Technical Forum (until 10:30 AM) (online) Agenda	2:30 PM	Digital Signal Processing for the Measurement of Particle Properties with the PANDA Electromagnetic Calorimeter - Oliver Noll (online) Plenary_talk_oct_2021_split.pdf
10:30 AM	--- Coffee break ---	3:00 PM	News from FAIR - Jörg Blaurock (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)) (online) PANDA-Week_FAIR_ProjectStatus_v02_final.pdf
11:00 AM	Technical Forum (until 12:30 PM) (online) Agenda	3:45 PM	Release talk: Simulation studies on realistic target scenarios - Adeel Akram (Uppsala University(UU)) (online) Akram_CM_2021_3_Plenary.pdf
12:30 PM	Collaboration Board (closed) - Frank Goldenbaum (Forschungszentrum Jülich(FZJ)) (until 2:30 PM) (online)	4:05 PM	--- Coffee break ---
12:30 PM	--- Lunch break ---	4:30 PM	Plenary - Achim Denig (Johannes Gutenberg University Mainz) (until 5:30 PM) (online)
2:30 PM	Plenary - Achim Denig (Johannes Gutenberg University Mainz) (until 4:05 PM) (online)	4:30 PM	PANDA Crystals - Jindrich Houzvika (online)
		5:00 PM	Paper release talk - Jennifer Pütz (GSI / FZ Jülich) (online) Prospects_PWA.pdf

TECHNICAL FORUM

L. Schmitt, TC Report

General news regarding some details from the DAQT/FEE workshop Oct 6-7, 2021, were given, as well as on the recent and the next reporting campaigns. The meaning and details of the FAIR Project Completion Parameters for first beams at FAIR useful for physics measurements were presented. For PANDA 1E9 stored anti-protons in HESR are the threshold for first physics campaigns.

Upcoming milestones that either require feedback from the system managers regarding necessary shifts or a notification of completion were communicated. The data is to be entered via the PANDA web-frontend for project reporting.

News on experiment cooling comprised the layout of the under-pressure cooling systems for racks, MVD and EMC and the discussion of using dedicated turbines for air cooling rather than pressurized air from the hall. The pressurized air is meant for short term pulses for valve control and is not safe for a continuous large flow. The layout of the nitrogen supply plant was presented. The plant serves for cooling the Solenoid coil when the magnet is in the parking position and for supplying gaseous nitrogen for flushing detectors and keeping sensitive volumes dry.

The recent activities on installation planning of the FS were reported along with the expected further steps of planning for both TS and FS in the coming year. A major topic for discussion is the subject of alignment and survey of detectors. In the subsequent general discussion, the following systems were touched: The Luminosity Detector and the MVD have the highest requirements towards alignment and are measured with a high precision CMM internally. The STT and FT are aligned via their support frames to a reasonably high precision in the order of the track resolution. The more robust equipments attached directly to the Solenoid, like the muon chambers or the cluster jet target are measured with respect to the solenoid yoke. The yoke itself is precisely aligned by laser trackers already during its installation.

** L. Capozza, BWE EMC Safety Risk Assessment*

Luigi presented the BWE EMC Risk Assessment with an emphasis on the differences to previously shown risk assessments. The mindset is that of an iterative process updating

information towards the realization of safety instructions for each system to avoid hazards to people. All phases of the life cycle of a system from preparation through commissioning and regular operation up to decommissioning should be covered and should include all relevant hazard factors and hazard descriptions.

** A. Belias, Status of Rack Occupancy*

A brief account of the current status of the inquiries on the required occupancy of racks in PANDA was given. The missing information has to be collected until the end of the year as it is required for a refined assessment of the power consumption within the hall which is needed for the planners of the Technical Building Infrastructure. They will resume their work on the PANDA hall at the beginning of 2022 based on this input.

Oliver Noll (HIM Mainz), the recipient of the 2021 PANDA PhD Prize, presented the results of his PhD thesis, which was concerned with the digital signal processing for the measurement of particle properties with the PANDA Electromagnetic Calorimeter as well as preparatory studies for the FAIR-Phase-1 experiment at MAMI/Mainz.

PLENARY

Jörg Blaurock (GSI/FAIR) has given a comprehensive overview of the status as well as the timeline of the FAIR construction, both regarding the accelerator and the construction sites. The full completion of the IO (intermediate objective) is foreseen for 2027.

Adeel Akram (Uppsala, release talk) has studied the impact of residual gas from the gas jet target on the measurement of the p pbar to Lambda Anti-Lambda benchmark channel. The possible improvement by an additional cryo pump has been investigated.

The status of the production plant for PbWO₄ crystals at Crytur/Czech Republic, has been presented by the chief executive officer of the company, Jindrich Houzvika. The production line will need to be dissembled in case of no additional orders from PANDA in 2022.

The prospects for spin-parity determinations of excited baryon states using the PAWIAN partial wave analysis framework have been presented by Jennifer Pütz (GSI, release talk). A memo as well as a paper draft for EPJA are currently being prepared.

Friday, October 29, 2021

Oct 29, 2021	
9:00 AM	Plenary - Anna Skachkova (Joint Institute for Nuclear Research (JINR)(JINR)) (until 10:30 AM) (online) 
9:00 AM	Release talk: Detector signatures in hyperon reactions - Jenny Regina (Uppsala University(UU)) (online)  DetactorSignatureStudies_JennyRegina.pdf 
9:30 AM	Updates on computing - Ralf Kliemt (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)) (online)  2021-10-Computing2.pdf 
10:30 AM	--- Coffee break ---
11:00 AM	Plenary - Anna Skachkova (Joint Institute for Nuclear Research (JINR)(JINR)) (until 12:30 PM) (online) 
11:00 AM	Updates from the Technical Coordinator - Lars Schmitt (GSI, Darmstadt) (online) 
11:30 AM	News from the ThAG - Sinead Ryan (online)  SRyan_TAG.pdf 
12:00 PM	Summary from the Collaboration Board - Frank Goldenbaum (Forschungszentrum Jülich(FZJ)) (online)  CB_291021_open.pdf 

Plenary minutes: Anna Skachkova

Release talk: Detector signatures in hyperon reactions - Jenny Regina (Uppsala University (UU))

Jenny gave a final update on her studies of “Detector Signatures from Lambdabar-Lambda, Cascadebar-Cascade and Omegabar-Omega Events in the PANDA Target Spectrometer and Outline of a reaction-specific Track an Event Building Scheme” and the corresponding Release Note RN-DET-2019-003, based on the latest software version and increased statistics. Detector signature results were considered for different ($\Lambda\bar{\Lambda}$, $\Xi^+\bar{\Xi}^-$ and $\Omega^+\bar{\Omega}^-$) channels and several beam energy values. A systematic approach for evaluating the detector response from physics channels have been developed, based on distributions of hits per track combined with total number of tracks fulfilling certain hit conditions. Comparison between software versions have shown some improvement of events reconstruction connected with development of detector descriptions and updates of software.

Updates on computing - Ralf Kliemt (GSI Helmholtzzentrum für Schwerionenforschung GmbH (GSI))

Ralf summarized the computing session. First, he described code development which includes the new track propagation interface, track extrapolation package and PID infrastructure overhaul, as well as bug fixes and build tools adjustments for Fairsoft, FairRoot and GSI cluster. Then some short overview of the given talks was given. Please refer to the computing session for more details. Then Ralf reported about the meeting of Computing Committee. The discussed issues were extension of members by expert advisors from the other experiments, improvement user knowledge by best practice document and beginners’ guidance, missing feature overview and improvement person-power/computing commitment. Finally, the issue of PandaRoot License was raised.

News from the ThAG - Sinead Ryan

Sinead gave a report from Theory Advisory group. She touched 3 topics on the TAG activity, that she studied recently, such as scattering analysis in lattice calculation, radiative transitions in charmonium, hybrids. Christian Fischer was elected and will replace Sinead Ryan at the post of TAG chair.

Updates from the Technical Coordinator - Lars Schmitt (GSI, Darmstadt)

In addition to Lars's presentation on Monday and the Technical Forum on Thursday, he emphasized on importance of further work, unified cooling coordination and risk awareness, survey of alignment for all subsystems. The corresponding TEC Workshop is planned to December 3 and the Installation Workshop is planned for Spring 2022. Another raised for the next year topic is specs for magnet safety and field-mapping. Lars also noticed progress in civil construction and accelerators, strong interest, and commitment of the FAIR management for PANDA. The last message was the reference to the talk of Jindrich Houzvika who reported about the potential threat of PWO crystals plant closure that may lead to problems with PANDA EMC barrel production.

Summary from the Collaboration Board - Frank Goldenbaum (Forschungszentrum Jülich (FZJ))

Frank summarized the results of the CB meeting on Monday and Thursday. The major topic inside the CB was the voting for PANDA Construction MoU. For the timely construction of the PANDA setup, the respective work packages and responsibilities, which include contributions to a construction common fund, are detailed by the PANDA C-MoU. An extraordinary CB-meeting for extensive discussion proceeded on PANDA construction-MoU and Construction Common Fund took place September 22, 2021 before the PANDA CM. The updated content and status of this document was presented by Ralph Böhm at the current session. The present draft of the PANDA C-MoU will be the basis to approach the funding agencies involved in PANDA. A final vote with the intention to agree on the C-MoU in its form presented to the PANDA Collaboration Board on Oct. 28, 2021 took place on Thursday and the CB accepted to put forward the PANDA C-MoU to the relevant FAIR bodies.

The Computing Coordination Report was presented by Tobias Stockmanns. Tobias gave an overview of missing features in PandaROOT, stressed the remaining person power lack for software development and discussed the status of detector implementation. It was brought up the subject of the missing license of PandaROOT causing no way of official sharing of code and problems on protecting against liabilities.

The Resource Coordination Report was presented by Ralph Böhm. Ralph reported on funding status, recent developments in terms of costs and resources, and in particular on the next steps for the Construction MoU and CCF, i.e., the aim to present the documents to FAIR bodies, RRB#11 in Feb 2022.

News from young scientist convent was summarized by Gabriela Perez Andrade. Elections took place in the Young Scientist Convent resulting in Adeel Akram as the Chair and Yannic Wolf as the Co-Chair of the YScC.

Elections have taken place also in:

Publication Committee - 6 new members Maria Doncel Monasterio, Mark Lattery, Guangshun Huang, Sean Dobbs, Markus Moritz and Piotr Salabura have been elected for 2y term (1.1.2022-31.12.2023)

Speakers Committee - 5 new members Fritz-Herbert Heinsius, Susan Schadmand, Peter Wintz, Achim Denig, Alfons Khoukaz have been elected for 2y term (1.1.2022-31.12.2023)

Membership Committee - 3 new members Michael Papenbrock, Udo Kurilla, Aida Galoyan have been elected for 2y term (1.1.2022-31.12.2023).

The collaboration board thanks all committee members ending their term on 31.12.2021 for their valuable and appreciated work in Publication-, Speakers-, and Membership Committees.

The new Outreach Commissioner (2y term, 1.1.2022-31.12.2023) Tobias Triffterer was proposed by the Spokesperson (the term of our current Outreach Commissioner Mustafa Schmidt will end 31.12.2021) and ratified by CB. Acknowledgements are expressed on behalf of the CB for Mustafa's excellent achievements.

CB expressed its support for Resource Coordinator position at FAIR GmbH. The Collaboration Board acknowledges the competent Resource Coordination Ralph Böhm has done in the past 7 years and strongly supports his application for the permanent position for the PANDA Resource Coordination that will be advertised by the FAIR GmbH probably early 2022. The CB endorses Ralph to continue the position as our PANDA Resource Coordinator.