HK 45: Postersession

Zeit: Mittwoch 18:30–20:30 Raum: S1/05 22-24

HK 45.1 Mi 18:30 S1/05 22-24

Coincidence studies of bremsstrahlung during electron-nucleus collisions — •Doris Jakubassa-Amundsen — LMU Muenchen, Germany

A precise knowledge of electron-nucleus bremsstrahlung is important for estimating its influence in the electron spectra from nuclear excitation. A photon recorded simultaneously with the inelastically scattered electron may thus result from elementary bremsstrahlung induced by an inert nucleus, in particular at angles where the probability for radiative decay into the nuclear ground state is small. In order to obtain reliable estimates for heavy nuclei the relativistic partial-wave bremsstrahlung code has been optimized to cover collision energies up to 30 MeV. For spin-polarized electrons the polarization transfer to the photon is also considered. For 208Pb nuclear size effects are found to be quite large at backward angles, exceeding 10 percent even at a collision energy of 5 MeV. Although such effects are included in the conventionally used Born approximation, the PWBA gives at most a qualitative prescription for bremsstrahlung intensities and polarization correlations when heavy nuclei are involved.

HK 45.2 Mi 18:30 S1/05 22-24

The energy dependence of photon-flux and efficiency in the NRF measurement* — •Osman Agar[1,2], Udo Gayer[1], Laura Merter[1], Haridas Pai[1], Norbert Pietralla[1], Philipp Ries[1], Christopher Romig[1], Volker Werner[1], Marcel Schillling[1], and Markus Zweidinger[1] — [1]nstitut für Kernphysik, Technische Universität Darmstadt, 64289 Darmstadt, Germany — [2]Karamanoglu Mehmetbey University, Department of Physics, 70100 Karaman, Turkey

The calibration of the detector efficiency and the photon-flux distribution play an important role during the analysis of nuclear resonance fluorescence (NRF) measurements. The nucleus ^{11}B is a frequently used calibration target with well-known photo-excitation cross sections. The product of photon flux and efficiency is determined exploiting γ-ray transitions of the ^{11}B monitoring target. Photon-flux calibrations from numerous measurements at the superconducting Darmstadt electron linear accelerator (S-DALINAC) are carried out up to the neutron separation threshold, in order to obtain a system check of influences of absorbers on the flux, and to check against different GEANT models as well as parametrizations of the Schiff formula.

*Supported by the TUBITAK-BIDEB 2214/A Program and DFG under contract No. SFB 634

HK 45.3 Mi 18:30 S1/05 22-24

Zehn-Spalt Modell eines neuen Alvarez DTL bei GSI — •Anja Seibel[1], Xiaonan Du[2], Lars Groening[2], Oliver Kester[1,2] und Sascha Mickat[2] — [1]IAP Universität Frankfurt, Deutschland — [2]GSI, Darmstadt, Deutschland

Um den Anforderungen des geplanten FAIR-Projektes (hohe Strahlintensitäten) an der GSI gerecht zu werden, ist ein Upgrade des bestehenden Universal Linear Accelerators (UNILAC) geplant. Die fünf bestehenden Alvarez-Kavitäten, die bei einer Resonanzfrequenz von 108 MHz arbeiten, sollen durch neue HF-Strukturen gleicher Frequenz ersetzt werden. Dazu wurden Simulationen durchgeführt, um die HF-Eigenschaften zu optimieren. Die Geometrie der Driftröhren erhält eine rundlichere Form, damit eine homogenere Oberflächenfeldverteilung und höhere Shuntimpedanzen erreicht werden. Um die Notwendigkeit und Platzierung von Kühlkanälen zu überprüfen, wurden Simulationen zur Temperaturverteilung an der Kavität durchgeführt. Ein Teststand mit einem kalten zehn-Spalt Aluminium Modell (Maßstab 1:3) wurde für erste HF-Messungen angefertigt. Der modulare mechanische Aufbau des Modells ermöglicht eine breite experimentelle Palette an unterschiedlichen Driftröhren- und Stem-Geometrien. Mit der Störkörpermessmethode wird die elektrische Feldverteilung sowie die Feldstabilität in Bezug auf parasitäre Moden bestimmt. Zusätzlich sind entlang der Kavität HF-Tuner platziert, um für jede gewählte Geometrie die Resonanzfrequenz einstellen zu können. Die Ergebnisse von Simulation und Messung werden vorgestellt.

HK 45.4 Mi 18:30 S1/05 22-24

TILDA - fast experiment control and data acquisition in collinear laser spectroscopy experiments. — •Simon Kaufmann for the TRIGA-SPEC-Collaboration — Inst. für Kernphysik, TU Darmstadt — Inst. für Kernchemie, Johannes Gutenberg-Universität Mainz

The TRIGA-Laser Data Acqusition (TILDA) is a custom development for the collinear laser spectroscopy (CLS) experiment TRIGA-Laser. Situated at the research reactor TRIGA Mainz, the TRIGA-Laser experiment benefits from the possibility to create short-lived nuclides by neutron-induced fission of a heavy actinide target, e.g. ^{249}Cf. The beam-line is equipped with a radio-frequency cooler and buncher emitting bunches with lengths in the order of 500 ns to 10 μs, which allows a drastical reduction of the background in CLS. In order to benefit from this bunched beam structure a time resolved data acquisition system is essential. The real time computing in TILDA is realized by field programmable gate arrays (FPGAs), which are synchronized via the backplane of a PXI-crate. This gives the user a great flexibility in adapting to different measurement schemes. This flexibility in hardware must therefore be given in equivalent way to the user in software. Due to that, high level programming languages were chosen (Labview and Python) and TILDA will provide the user with a solid framework around it. TILDAs main features, specifications, programming schematics and status will be presented.

HK 45.5 Mi 18:30 S1/05 22-24

Approaching unums — •Cora S. Lüdde and Udo Kebschull — Infrastructure and Computer Systems in Data Processing (IRI), Goethe-University Frankfurt, 60629 Frankfurt am Main, Germany

A new format for numbers has been proposed by John L. Gustafson with the aim to replace the IEEE standard. The new format called unums will be presented and its advantages over the IEEE format will be illustrated.

The use of unums is supposed to save energy, to support parallelism and to prevent rounding errors. This is possible due to a specific extension of the IEEE Format and the introduction of a special arithmetic.

First application of unums has been realised with Mathematica by Gustafson.

One of our aims is to implement this new format on FPGAs, to verify the statements Gustafson made and to reproduce and hopefully improve results of preceeding calculations. Finally we expect to use the new concept for a faster processing of large quantities of data which are accumulated in high energy experiments.

HK 45.6 Mi 18:30 S1/05 22-24

Identification of deuterons in $pd \to dX$ reactions at ANKE* — •Marcel Rump, Christopher Fritzsch, Alfons Khoukaz, and Daniel Schröer for the ANKE-Collaboration — Institut für Kernphysik, Westfälische Wilhelms-Universität, 48149 Münster, Germany

The collisions of protons and deuterons open up many interesting hadron physics topics, e.g., the interaction between pseudoscalar mesons and hadrons. In this regard a measurement of $pd \to d\eta p_{\mathrm{sp}}$ has been realized at the ANKE spectrometer at the COSY accelerator of the Forschungszentrum Jülich to investigate the production mechanism of η mesons as well as their interaction with nuclear matter. Another reaction that can be studied with the same dataset is the two-pion production $pd \to d\pi^+\pi^- p_{\mathrm{sp}}$. In both cases the deuteron acts as an effective neutron target while the proton is handled as a spectator particle. The Fermi motion of these particles combined with the two different beam momenta ($p_1 = 2.09$ GeV/c and $p_2 = 2.25$ GeV/c) allow to study the low and high-mass enhancement in isoscalar $M_{\pi\pi}$ spectra corresponding to the ABC effect as well as total and differential cross sections. To analyze these reactions an identification of the final deuteron is of high relevance. Recent results of the identification and detector calibration procedure will be presented and discussed.

*Supported by the FFE program of the Forschungszentrum Jülich

HK 45.7 Mi 18:30 S1/05 22-24

Lattice QCD Dslash Operator with Dataflow Computing — •Thomas Janson and Udo Kebschull — Infrastructure and Computer Systems for Data Processing, Goethe University Frankfurt

We investigate new methods in computational particle physics and high performance computing for applications in the field of Quantum Chromodynamic simulation with Dataflow Engines. We describe an algorithm as a directed graph using the high-level dataflow programming

language openSPL from Maxeler and others. Such a graph models the parallel flow of data and operations on an algorithmic abstraction level and exposes the highest possible parallelism and locality of a given algorithm in a natural way. In this concept, the data flows through pipelines of an FPGA with many arithmetic units which are all connected to perform the massive parallel computation of an algorithm.

We have shown and verified by simulation that we can describe the naive Dslash operator fully as a dataflow graph. Here, all multiplication and addition to update one spinor are computed in one clock cycle. The data flows over six DDR3 channels into the FPGA.

HK 45.8 Mi 18:30 S1/05 22-24

In-beam measurement of the ^{85}Rb(p,γ)^{86}Sr reaction cross section for the astrophysical γ process — •Lars Netterdon, Felix Heim, Jan Mayer, Philipp Scholz, and Andreas Zilges — Institute for Nuclear Physics, University of Cologne

The majority of the neutron-deficient p nuclei is believed to be produced during the so-called γ process. Other mechanisms for the production of these nuclei have been proposed, such as the rapid proton-capture process or the νp process. All processes have in common, that the involved reaction rates are calculated within the scope of the Hauser-Feshbach statistical model, as experimental data are rare. The quality of reaction rate predictions strongly depends on the underlying models for the nuclear-physics input parameters, such as particle+nucleus optical model potentials (OMP) or the γ-ray strength function. These models are tested and improved by comparing experimental total and partial cross sections with theoretical predictions.

In this contribution, first results of a cross-section measurement of the ^{85}Rb(p,γ)^{86}Sr reaction using in-beam γ-ray spectroscopy will be presented. The experiment was performed using the high-efficiency γ-ray spectrometer HORUS in Cologne. The experimental setup and preliminary data will be discussed and compared to statistical model predictions in order to test various models of the proton+nucleus OMP and the γ-ray strength functions.

Supported by the ULDETIS project within the UoC Excellence Initiative institutional strategy. P.S. and J.M. are supported by the Bonn-Cologne Graduate School for Physics and Astronomy.

HK 45.9 Mi 18:30 S1/05 22-24

The workflow of CBM-STS silicon strip sensor module-assembly — •Carmen Simons, Daniel Soyk, and Robert Visinka for the CBM-Collaboration — GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt

The Compressed Baryonic Matter Experiment at FAIR is designed to explore the QCD phase diagram of strongly interacting matter. The Silicon Tracking system (STS) is the core detector that provides track reconstruction and momentum determination of charged particles from beam-target interactions. The STS will consist of eight planar tracking stations that are built from different types of basic functional modules consisting of a double-sided silicon microstrip sensor that is connected via microcables to two front-end-electronics boards.

All in all 32 polyimide microcables, each with 64 aluminum traces, have to be connected on one side to 16-STS-XYTER-chips and on the other side to the P- and N-side of the sensor in two staggered layers with TAB-bonding. Additionally, the chips have to be wire-bonded to the front-end-electronics-boards, and shielding layers have to be fixed. This contribution will show the workflow of the module-assembly.

*Supported by EU-Horizon2020 CREMLIN.

HK 45.10 Mi 18:30 S1/05 22-24

Prospects for an energy determination of the ^{229m}Th nuclear isomer via IC electrons — •B. Seiferle[1], L. v.d. Wense[1], M. Laatiaoui[2,3], and P. G. Thirolf[1] — [1]LMU München, Garching. — [2]GSI, Darmstadt. — [3]Helmholtz Institut Mainz, Mainz.

Of all known nuclear excited states, the isomeric first excited state of ^{229}Th possesses the lowest excitation energy reported to be E*=7.6(5) eV ($\hat{=}$163(11) nm). This opens up the possibility to drive the transition with a laser and makes ^{229m}Th an interesting candidate for future developments linking nuclear and atomic physics, such as a nuclear optical clock or a nuclear γ-ray laser. Still, for a direct laser excitation, the knowledge on the energy and half-life of the isomer is not precise enough. In this work and for the expected transition energy, neutral ^{229}Th decays via the emission internal conversion (IC) electrons with an energy of 1.2 eV (*i.e.* difference between E* and the 1^{st} ionization potential). A ^{233}U α-recoil source is placed in a buffer-gas stopping cell. ^{229}Th ions, of which 2% are in the isomeric state are recoiled out of the source. RF- and DC electrode structures form an ion beam out of all the recoil ions. Afterwards, $^{229(m)}$Th ions are separated from other short-lived daughter isotopes with a quadrupole mass separator and can be prepared for further experiments. The poster gives prospects for an energy determination of the IC electrons emitted during the decay of the isomer and for a corresponding half-life determination with this experimental setup.

This work was supported by DFG grant (Th956/3-1) and by the EU Horizon 2020 grant agreement No. 664732 "nuClock".

HK 45.11 Mi 18:30 S1/05 22-24

γ-Zerfallsverhalten von J=1 Zuständen von ^{76}Ge — •Malte Cordts[1], Tobias Beck[1], Vera Derya[2], Udo Gayer[1], Bastian Löher[3], Norbert Pietralla[1], Christopher Romig[1], Deniz Savran[3], Werner Tornow[4], Henry R. Weller[4], Volker Werner[1] und Markus Zweidinger[1] — [1]IKP, TU Darmstadt — [2]IKP, Universität zu Köln — [3]GSI, Darmstadt — [4]Duke University, Durham, USA

Die Erforschung des neutrinolosen doppelten Betazerfalls ($0\nu\beta\beta$) ist eine der wichtigsten offenen Fragen der Teilchenphysik, da dieser im Standardmodell verboten ist und mit seiner Existenz das Neutrino den Majoranateilchen zuordnen würde. Im Rahmen dieser Forschung dient ^{76}Ge als Basisisotop. Mittels eines Kernresonanzfluoreszenzexperiments unter Verwendung des γ^3 Messaufbaus [1] wurde an der High Intensity γ-Ray Source (HIγS) in Durham, NC, USA, die Scherenmode in ^{76}Ge untersucht. Unter Nutzung der $\gamma\gamma$-Koinzidenzmethode wurde das Zerfallsverhalten von dipol-angeregten Zuständen, wie z.B. der Scherenmodenzustände analysiert. Dies ist von Bedeutung in Bezug auf möglichen Untergrund in ($0\nu\beta\beta$) Experimenten, wie etwa GERDA, sowie auch zum Test von relevanten Kernstrukturmodellen. Es werden die bisherigen Schritte der Analyse und erste Ergebnisse präsentiert.

[1] Löher *et al.*, Nucl. Instr. Meth. Phys. Res. A 723 (2013) 136.

⋆ Unterstützt durch die DFG (SFB 634 und ZI 510/7-1) und durch HA216/EMMI).

HK 45.12 Mi 18:30 S1/05 22-24

Lifetimes in ^{94}Zr extracted via the Doppler-shift attenuation method using pγ coincidences — •Sarah Prill[1], Vera Derya[1], Andreas Hennig[1], Pavel Petkov[1,2,3], Simon G. Pickstone[1], Mark Spieker[1], Vera Vielmetter[1], Julius Wilhelmy[1], and Andreas Zilges[1] — [1]Institute for Nuclear Physics, University of Cologne, Cologne (Germany) — [2]INRNE, Bulgarian Academy of Sciences, Sofia (Bulgaria) — [3]National Institute for Physics and Nuclear Engineering, Bucharest (Romania)

Lifetimes of excited states in ^{94}Zr were previously measured applying the Doppler-shift attenuation method (DSAM) following the (n,n$'\gamma$) reaction [1,2]. Since the two measurements were in conflict with each other, we remeasured 14 lifetimes of excited states in ^{94}Zr in a (p,p$'\gamma$) experiment utilizing the DSAM technique [3]. Centroid-energy shifts were extracted from proton-gated γ-ray spectra, yielding lifetime values that are independent of feeding contributions. The results were compared to the previously measured lifetimes and found to be in good agreement with the values reported in Ref. [2], thus confirming the correction procedure introduced in Ref. [2] for the (n,n$'\gamma$) data. This contribution will feature our new results and introduce the (p,p$'\gamma$) DSAM technique, which is now available in Cologne.

Supported by the DFG (ZI-510/7-1). S.P., S.G.P., M.S. and J.W. are supported by the Bonn-Cologne Graduate School of Physics and Astronomy. [1] E. Elhami et al., Phys. Rev. C **88** (2013) 024317, [2] E.E. Peters et al., Phys. Rev. C **78** (2008) 064303, [3] A. Hennig et al., NIM A **758**, 171 (2015)

HK 45.13 Mi 18:30 S1/05 22-24

Sensitive lifetime measurement of excited states of ^{98}Ru via the (p,p$'\gamma$) reaction — •Vera Vielmetter[1], Andreas Hennig[1], Vera Derya[1], Pavel Petkov[1,2,3], Simon G. Pickstone[1], Sarah Prill[1], Mark Spieker[1], and Andreas Zilges[1] — [1]Institute for Nuclear Physics, University of Cologne — [2]INRNE, Bulgarian Academy of Sciences, Sofia — [3]National Institute for Physics and Nuclear Engineering, Bucharest-Magurele

The one-phonon mixed-symmetry quadrupole excitation $2^+_{\rm ms}$ is a well established excitation mode in near-spherical nuclei, especially in the $A \approx 100$ mass region [1]. However, it is largely unknown how mixed-symmetry states evolve along shape-transitional paths, e.g. from spherical to deformed shapes. The chain of stable ruthenium isotopes is well suited for this study since it exhibits a smooth transition from spherical (^{96,98}Ru) to deformed shapes (^{104}Ru). To identify

the 2^+_{ms} state of ^{98}Ru on the basis of absolute $M1$ and $E2$ transition strengths, we performed a proton-scattering experiment on ^{98}Ru using the SONIC@HORUS setup at the University of Cologne. Lifetimes of excited states were measured via the Doppler-shift attenuation method (DSAM), which benefits from the acquired pγ-coincidence data [2]. First results of this experiment are presented and compared to the neighbouring nuclei ^{96}Ru and ^{100}Ru. Supported by the DFG (ZI-510/7-1). S.G.P., S.P., M.S. are supported by the Bonn-Cologne Graduate School for Physics and Astronomy.

[1] N. Pietralla *et al.*, Prog. Part. Nucl. Phys. **60** (2008) 225.
[2] A. Hennig *et al.*, Nucl. Instr. and Meth. A **794** (2015) 717.

HK 45.14 Mi 18:30 S1/05 22-24

Precision high voltage divider for the electron cooler at CRYRING — I. Denesjuk[1], V. Hannen[1], W. Nörtershäuser[2,3], H.-W. Ortjohann[1], O. Rest[1], Ch. Weinheimer[1], and •D. Winzen[1] — [1]Institut für Kernphysik, Uni Münster — [2]Institut für Kernchemie, Uni Mainz — [3]GSI, Darmstadt

The heavy ion storage ring CRYRING at GSI provides a unique possibility to test atomic structure calculations with slow exotic ion beams at energies in the range of 0.3 MeV/u up to 15 MeV/u. In order to cool the ions and thus achieve a low momentum spread of the stored beam, CRYRING features an electron cooler, where the ion beam is superimposed with a monoenergetic electron beam. In earlier measurements of hyperfine transitions in hydrogen- and lithiumlike ions at Experimental Storage Ring (ESR), the limiting uncertainty was the voltage measurement of the electron cooler which determines the velocity of the ions. That uncertainty could be removed by an in-situ precision measurement of the cooler voltage using a high voltage divider provided by PTB on a temporary basis. We therefore plan to construct a high-precision divider for voltages up to 35 kV which will be similar to the ultrahigh-precision voltage dividers which have been constructed for use at the KATRIN experiment. The precision of the divider will be in the low ppm range and will allow for measurement uncertainties in the $< 10^{-5}$ region. The concept and first characterization measurements of the precision components will be presented. This work is supported by BMBF under contract number 05P15PMFAA. Daniel Winzen thanks HGS-HIRe for FAIR for funding his scholarship.

HK 45.15 Mi 18:30 S1/05 22-24

Monte Carlo studies for direct photon measurement with the ALICE EMCAL detector — •Dominik Herzig for the ALICE-Collaboration — Institur für Kernphysik Frankfurt

Since direct photons are produced during all stages of a heavy-ion collision, they can probe the space-time evolution of the medium. Direct photons sources include hard scattering processes, thermal emission and interactions of fast partons with the medium. In proton-proton collisions, direct photons are a vital tool to test pQCD calculations of hard processes. Furthermore, the pp-measurement is needed as a baseline for interpreting the heavy-ion data.

In the ALICE experiment the EMCAL detector is used to measure high energetic photons. In this poster, we present Monte Carlo studies for the analysis of direct photon production using the ALICE EMCAL. The poster focuses on improving photon identification cuts that are studied in such Monte Carlo simulations in order to test their effects on the photon measurement.

HK 45.16 Mi 18:30 S1/05 22-24

Experimental access to Transition Distribution Amplitudes with the PANDA experiment at FAIR — •Manuel Zambrana[1,2], María Carmen Mora Espí[2], Frank Maas[1,2,3], Heybat Ahmadi[2], Samer Ahmed[1,2], Luigi Capozza[2], Alaa Dbeyssi[2], Malte Deiseroth[1,2], Bertold Fröhlich[1,2], Dmitry Khaneft[1,2], Dexu Lin[1,2], Cristina Morales[2], Oliver Noll[1,2], David Rodríguez Piñeiro[2], Roserio Valente[1,2], and Iris Zimmermann[1,2] for the PANDA-Collaboration — [1]Institut für Kernphysik, Johannes Gutenberg Universität, Mainz, Germany — [2]Helmholtz-Institut Mainz, Germany — [3]Prisma Cluster of Excellence, Mainz, Germany

We address the feasibility of accessing proton to pion Transition Distribution Amplitudes with the future PANDA detector at the FAIR facility. Assuming a factorized cross section, feasibility studies of measuring $\bar{p}p \to e^+e^-\pi^0$ with PANDA have been performed at the center of mass energy squared $s = 5$ GeV^2 and $s = 10$ GeV^2, in the kinematic region of four-momentum transfer $3.0 < q^2 < 4.3$ GeV^2 and $5 < q^2 < 9$ GeV^2, respectively,with a neutral pion scattered in the forward or backward cone $|\cos\theta_{\pi^0}| > 0.5$ in the $\bar{p}p$ center of mass frame. These include detailed simulations on signal reconstruction efficiency, rejection of the most severe background channel, i.e. $\bar{p}p \to \pi^+\pi^-\pi^0$, and the feasibility of the measurement using a sample of 2 fb^{-1} of integrated luminosity. The cross sections obtained with the simulations are used to test QCD factorization at the leading order by measuring scaling laws and fitting angular distributions.

HK 45.17 Mi 18:30 S1/05 22-24

Measurement of the $e^+e^- \to \bar{p}p$ cross section at BESIII using the untagged-initial state radiation technique — •Alaa Dbeyssi[1], Samer Ali Nasher Ahmed[1,2], Paul Larin[1,2], Dexu Lin[1,2], Christoph Rosner[1,2], Frank Maas[1,2,3], Cristina Morales[1], and Yadi Wang[1,2] for the BESIII-Collaboration — [1]Helmholtz-Institut Mainz, Mainz, Germany — [2]Institute of Nuclear Physics, Johannes Gutenberg-Universität Mainz, Germany — [3]PRISMA Cluster of Excellence, Johannes Gutenberg-Universität Mainz, Germany

Electromagnetic form factors (FFs) are fundamental quantities which parametrise the electric and magnetic structure of hadrons. In the time-like region, proton FFs can be accessed through the annihilation process $e^+e^- \to \bar{p}p$, assuming that the interaction takes place through the exchange of one virtual photon. Initial state radiation (ISR) is an effective tool to measure hadronic cross section at high luminosity e^+e^- storage rings, such as the Beijing Electron-Positron Collider II (BEPC-II). This contribution reports on the analysis of $e^+e^- \to \bar{p}p\gamma$ for proton FF measurements at the Beijing Spectrometer III (BESIII/BEPC- II). Data collected at 7 beam energies between 3.773 and 4.6 GeV, with a total luminosity of 7.408 fb^{-1}, are analysed. The case of untagged ISR photon in $e^+e^- \to \bar{p}p\gamma$ is presented.

HK 45.18 Mi 18:30 S1/05 22-24

Performance of the Cluster-Jet Target for $\bar{\text{P}}$ANDA — •Ann-Katrin Hergemöller, Daniel Bonaventura, Silke Grieser, Benjamin Hetz, Esperanza Köhler, and Alfons Khoukaz — Institut für Kernphysik, Westfälische Wilhelms-Universität Münster, 48149 Münster, Germany

The success of storage ring experiments strongly depends on the choice of the target. For this purpose, a very appropriate internal target for such an experiment is a cluster-jet target, which will be the first operated target at the $\bar{\text{P}}$ANDA experiment at FAIR. In this kind of target the cluster beam itself is formed due to the expansion of pre-cooled gases within a Laval nozzle and is prepared afterwards via two orifices, the skimmer and the collimator. The target prototype, operating successfully for years at the University of Münster, provides routinely target thicknesses of more than 2×10^{15} $\frac{\text{atoms}}{\text{cm}^2}$ in a distance of 2.1 m behind the nozzle. Based on the results of the performance of the cluster target prototype the final cluster-jet target source was designed and set into operation in Münster as well. Besides the monitoring of the cluster beam itself and the thickness with two different monitoring systems at this target, investigations on the cluster mass via Mie scattering will be performed. In this presentation an overview of the cluster target design, its performance and the Mie scattering method will be presented and discussed. Supported by BMBF, HGS HIRe and GSI F+E.

HK 45.19 Mi 18:30 S1/05 22-24

Laval Nozzles for Cluster-Jet Targets — •Silke Grieser, Daniel Bonaventura, Ann-Katrin Hergemöller, Benjamin Hetz, Esperanza Köhler, Lukas Lessmann, and Alfons Khoukaz — Institut für Kernphysik, Westfälische Wilhelms-Universität Münster, 48149 Münster, Germany

Cluster-jet targets are highly suited for storage ring experiments due to the fact that they provide high and constant beam densities. Therefore, a cluster-jet target is planned to be the first internal target for the $\bar{\text{P}}$ANDA experiment at FAIR. A cluster source generates a continuous flow of cryogenic solid clusters by the expansion of pre-cooled gases within fine Laval nozzles. For the production of clusters the geometry of the nozzle is crucial. The production of such nozzles with their complex inner geometry represents a major technical challenge. The possibility to produce new fine Laval nozzles ensures the operation of cluster-jet targets, e.g. for the $\bar{\text{P}}$ANDA experiment, and opens the way for future investigations on the cluster production process to match the required targets performance. Optimizations on the recently developed production process and the fabrication of new glass nozzles were done. Initial measurements of these nozzles at the $\bar{\text{P}}$ANDA cluster-jet target prototype and the investigation of the cluster beam origin within the nozzle will be presented and discussed.

Supported by BMBF, HGS-Hire and GSI F+E.

HK 45.20 Mi 18:30 S1/05 22-24

Bi-Phase CO_2 cooling of the CBM STS detector — •Evgeny Lavrik for the CBM-Collaboration — Physikalisches Institut der Universität Tübingen, Deutschland

The Compressed Baryonic Matter (CBM) experiment aims to study the properties of nuclear matter at high net-baryon densities. The Silicon Tracking System (STS) is the key detector to reconstruct charged particle tracks created in heavy-ion interactions. The foreseen interaction rate of up to 10 MHz requires radiation hard detectors as well as efficient cooling of the silicon sensors. To avoid thermal runaway the system must be kept at -5° C or below all the time. This is rather challenging because the overall thermal load in the $2m^3$ STS enclosure is up to 40 kW.

Because of these requirements liquid CO_2 is used as a cooling agent as it is superior in terms of volumetric heat transfer coefficient compared to other agents. This contribution shows the thermal simulations and measurement results of the STS front-end electronic boxes as well as an overview of 1kW TRACI-XL cooling plant developed at GSI and its use to perform thermal measurements of a fully heat loaded STS quarter station.

Work supported by BMBF under grant 05P12VTFCE.

HK 45.21 Mi 18:30 S1/05 22-24

Particle dependent tracking efficiency of the measurement of charged hadrons in ALICE — •Patrick Huhn for the ALICE-Collaboration — Institut für Kernphysik, Goethe-Universität Frankfurt

The ALICE experiment at the LHC is designed to study the properties of the Quark-Gluon-Plasma (QGP) based on high energy pp, p-Pb and Pb-Pb collisions. Certain properties of these collisions can be studied by measuring the production of charged hadrons. In ALICE charged hadrons are measured with the Time Projection Chamber (TPC) and are corrected for the tracking efficiency of the detector.
Here, tracking efficiencies are calculated based on two simulations: A Monte Carlo generator for the particle production and GEANT, to simulate the detector response. As the particle abundancies in Monte Carlo simulations differ from the measured yields of identified particles, the composition of the inclusive tracking efficiency has to be tuned.
We present a systematic study of the particle dependent tracking efficiency of the measurement of charged hadrons, especially in pp collisions at $\sqrt{s} = 13$ TeV.
Supported by BMBF and the Helmholtz Association.

HK 45.22 Mi 18:30 S1/05 22-24

Extraction of the $0_1^+ \rightarrow 0_2^+$ monopole matrix element in ^{150}Nd with high-resolution electron scattering at the S-DALINAC* — •Andreas Krugmann, Simela Aslanidou, Sergej Bassauer, Andreas Ebert, Michaela Hilcker, Tobias Klaus, Christoph Kremer, Peter von Neumann-Cosel, Norbert Pietralla, Vladimir Yu. Ponomarev, Maxim Singer, and Gerhart Steinhilber — IKP, TU Darmstadt

A high resolution electron scattering experiment on the deformed nucleus ^{150}Nd has been performed at the 169° spectrometer at the S-DALINAC. The aim of this investigation was the determination of the $\rho^2(E0; 0_1^+ \rightarrow 0_2^+)$ transition strength, which is a key signature of an IBM phase-shape transition. Spectra have been taken at various scattering angles with beam energies of 46 MeV and 73 MeV and a very good energy resolution of $4{\cdot}10^{-4}$ has been achieved, which was crucial for this experiment. The experimental form factor of this particular transition has been compared to a theoretical form factor, constructed by an effective density operator on a microscopic level with the help of the generator coordinate method. The required collective wave functions have been calculated in the Confined β soft rotor model. With this model-dependent analysis the $E0$ transition strength could be determined for the first time.

* Supported by the DFG under contract SFB 634.

HK 45.23 Mi 18:30 S1/05 22-24

Ein neuer Photonendetektor für den HADES RICH* — Mike Faul[3], •Jürgen Friese[1], Claudia Höhne[4], Tobias Kunz[1], Semen Lebedev[4], Christian Pauly[2], Dennis Pfeifer[2] und Michael Traxler für die HADES-Kollaboration[3] — [1]Technische Universität München, 85748 Garching — [2]Bergische Universität Wuppertal, 42119 Wuppertal — [3]GSI Helmholtzzentrum, 64291 Darmstadt — [4]Justus-Liebig-Universität Gießen, 35390 Gießen

Für den e^+e^-- Paarnachweis in Pionen- und Schwerionen-induzierten Kernreaktionen wird im HADES Experiment ein hadronenblinder RICH-Detektor verwendet. Der bisherige Photonendetektor weist das Cherenkovlicht mit einem photosensitiven Gasdetektor (CsI Kathode) nach. In Zusammnenarbeit mit der CBM Kollaboration wird z.Zt. ein neuer Photonendetektor (RICH700) mit Multianoden-Photomultipliern (MAPMT) aufgebaut. Die $2m^2$ große neue Kamera hat insgesamt 27904 Pixel ($\simeq 6 \cdot 6mm^2$) und wird mit bis zu 200 kHz/pixel Einzelphotonenrate bei einem Datenstrom bis zu 1 GB/s ausgelesen. Simulationen zeigen, daß eine Nachweiswahrscheinlichkeit bis zu $\simeq 90\%$ auch für e^+e^--Paare mit sehr kleinen Öffnungswinkeln erreicht wird. Konzept und Status des Detektoraufbaus werden neben Simulationsergebnissen vorgestellt.

* Unterstützt durch DFG Exc. Cluster Universe, BMBF 05P15RGFCA

HK 45.24 Mi 18:30 S1/05 22-24

Zeitsynchronisierung zwischen NeuLAND Modulen mit der Messung von kosmischen Strahlen — •Vadim Wagner[1,2] und Dmytro Kresan[2] für die R3B-Kollaboration — [1]TU Darmstadt - Institut für Kernphysik — [2]GSI Helmholtzzentrum für Schwerionenforschung

R3B (Reactions with Relativistic Radioactive Beams) ist ein zukünftiges Experiment bei der Facility for Antiproton and Ion Research (FAIR) zur Untersuchung von Struktur und Dynamik seltener Isotope in inverser Kinematik. Ein Schlüsselelement im Detektorsystem von R3B ist der New Large Area Neutron Detector (NeuLAND).

NeuLAND ist aus 60 Ebenen mit je 50 Szintillator-Modulen aufgebaut. An beiden Enden der 250 cm x 5 cm x 5 cm großen Module befindet sich jeweils ein Photomultiplier. Diese messen sowohl die im Modul deponierte Energie als auch den Zeitpunkt und die Koordinaten des Ereignisses. Die Energieauflösung hängt wesentlich von der Genauigkeit der Zeit- und Positionsmessungen ab. Um die angestrebte Genauigkeit der Flugzeitmessung von $\sigma < 150$ ps zu erreichen, müssen die 6000 Kanäle synchronisiert werden.

Die Durchführung der Synchronisierung mit kosmischer Strahlung und die Prüfung der Kalibrierung mit den experimentellen Daten werden präsentiert.

Teilweise unterstützt durch das LOEWE-Zentrum HIC for FAIR, den TU-Darmstadt-GSI-Kooperationsvertrag, und das BMBF (05P15RDFN1).

HK 45.25 Mi 18:30 S1/05 22-24

Studies on an Automated Gain Stabilisation for the new APD Read-Out of the Crystal Barrel Calorimeter — •Peter Pauli for the CBELSA/TAPS-Collaboration — HISKP Bonn, Germany

For the investigation of the nucleon spectrum it is not enough to measure only cross sections because of the large overlap of resonances. To disentangle these resonances, a partial wave analysis is needed. To find unambiguous solutions it is necessary to measure (double) polarisation observables. The CBELSA/TAPS experiment is an important tool to measure these observables in meson photoproduction off nucleons. To achieve a high efficiency in purely neutral reactions it is important to implement the main calorimeter into the first level trigger. To do so it is necessary to replace the current PIN photo diodes with new avalanche photo diodes (APDs). The new read-out is able to provide a timing signal that is fast enough to use it as a trigger while it does not impair the energy resolution of the calorimeter compared to the previous system. A drawback of APDs is their temperature dependency. To provide a stable gain throughout varying running conditions it is vital to monitor the temperature change and correct it if necessary.

The poster shows an approach to ensure temperature stability where the temperature is monitored via a temperature sensitive NTC thermistor and the gain is adjusted via changes of the high voltage supply of the APDs. This method proved successful while it is easy to implement in all 1320 CsI(Tl) crystals of the calorimeter.

Supported by the Deutsche Forschungsgemeinschaft (SFB/TR16) and Schweizerischer Nationalfonds.

HK 45.26 Mi 18:30 S1/05 22-24

Measurement of Time-Like Baryon Electro-Magnetic Form Factors in BESIII — •Cristina Morales Morales[1], Samer Ali Nasher Ahmed[1,2], Alaa Dbeyssi[1], Dexu Lin[1,2], Frank Maas[1,2,3], Christoph Rosner[1,2], and Yadi Wang[1,2] for the BESIII-Collaboration — [1]Helmholtz-Institut Mainz, 55128 Mainz — [2]Institut für Kernphysik, Johannes Gutenberg-Universität Mainz, 55099 Mainz, Germany — [3]PRISMA Cluster of Excellence, Johannes Gutenberg-Universität Mainz, 55099 Mainz, Germany

BEPCII is a symmetric electron-positron collider located in Beijing running at center-of-mass energies between 2.0 and 4.6 GeV. This energy range allows BESIII experiment to measure baryon form factors both from direct electron-positron annihilation and from initial state radiation processes. We present results on direct electron-positron annihilation into proton anti-proton and preliminary results on direct electron-positron annihilation into lambda anti-lambda based on data collected by BESIII in 2011 and 2012. Finally, expectations on the measurement of nucleon and hyperon electro-magnetic form factors from the BESIII high luminosity energy scan in 2015 and from initial state radiation processes at different center-of-mass energies are also shown.

HK 45.27 Mi 18:30 S1/05 22-24

Measurement of Neutral Pions in pp collisions at 8 TeV with the ALICE EMCAL — •Adrian Mechler — Institut für Kernphysik, Goethe-Universität Frankfurt

The ALICE experiment investigates the properties of the quark-gluon plasma (QGP) which is believed to be produced in Pb-Pb collisions at high center-of-mass energies. Hadron production measurements in pp collisions provide information about particle production through QCD processes. Furthermore, they provide an important baseline for heavy-ion collisions.

This analysis focuses on the measurement of neutral pions (π^0) which are reconstructed via their dominant two photon decay. In the ALICE experiment, the EMCAL calorimeter is used to measure the position and energy of these photons.

We will present the status of an ongoing π^0 analysis in pp collisions at $\sqrt{s}$=8 TeV. Different analysis steps such as the yield extraction and corrections for the detector response will be discussed.

HK 45.28 Mi 18:30 S1/05 22-24

Centrality Determination in Au-Au Collisions at 1.23 AGeV with HADES — •Maximilian Zuschke for the HADES-Collaboration — Institut für Kernphysik, Goethe-Universität Frankfurt

An important characterization of events in heavy-ion physics is the centrality. It classifies events by considering the collision's cross section relative to the total cross section of the system. This characteristics is needed for many analyses, as it provides indirect information about the initial geometrical reaction properties. As the production rate of particles is a function of the deposited energy, which itself depends on the centrality, quantities based on measured multiplicities allow to draw conclusions about the centrality of a collision.

Estimators used to determine the centrality for Au-Au collisions at 1.23 AGeV recorded with HADES include the charged particle multiplicity and hit multiplicities measured with various detectors, such as the TOF/RPC or forward wall.

Calibration methods accounting for variations in the acceptance of the detectors are introduced and verified by comparison with the theoretical expectations, as obtained by calculations with the Glauber-Model.

This work has been supported by BMBF (05P12RFGHJ,05P15RFFCA), GSI and HIC for FAIR.

HK 45.29 Mi 18:30 S1/05 22-24

P2 - A fused silica Cherenkov detector for the high precision determination of the weak mixing angle — •Kathrin Gerz[1], Dominik Becker[1], Thomas Jennewein[1], Sebastian Baunack[1], Krishna Kumar[3], and Frank Maas[1,2] — [1]Johannes Gutenberg Universität Mainz — [2]Helmholtz Institut Mainz — [3]Department of Physics and Astronomy, Stony Brook University, Stony Brook, USA

The weak mixing angle is a central parameter of the standard model and its high precision determination is tantamount to probing for new physics effects.

The P2 experiment at the MESA accelerator in Mainz will perform such a measurement of the weak mixing angle via parity violating electron-proton scattering. We aim to determine $sin^2(\Theta_W)$ to a relative precision of 0.13%. Since the weak charge of the proton is small compared to its electric charge, the measurable asymmetry is only 33ppb, requiring a challenging measurement to a precision of only 0.44ppb. In order to achieve this precision we need to collect very high statistics and carefully minimize interfering effects like apparatus induced false asymmetries.

We present the status of the development of an integrating fused-silica Cherenkov detector, which is suitable for a high precision and high intensity experiment like P2. The contribution will focus on the investigation of the detector's response to incoming signal and background particles both by simulations and by beam tests at the MAMI accelerator.

HK 45.30 Mi 18:30 S1/05 22-24

Calibration of the precision high voltage dividers of the KATRIN experiment — •Oliver Rest for the KATRIN-Collaboration — Institut für Kernphysik, Westfälische Wilhelms-Universität Münster

The KATRIN (KArlsruhe TRItium Neutrino) experiment will measure the endpoint region of the tritium β decay spectrum to determine the neutrino mass with a sensitivity of 200 meV/c^2. To achieve this sub-eV sensitivity the energy of the decay electrons will be analyzed using a MAC-E type spectrometer. The retarding potential of the MAC-E-filter (up to -35 kV) has to be monitored with a relative precision of $3 \cdot 10^{-6}$.
For this purpose the potential will be measured directly via two custom made precision high voltage dividers, which were developed and constructed in cooperation with the Physikalisch-Technische Bundesanstalt Braunschweig.
In order to determine the absolute values and the stability of the scale factors of the voltage dividers, regular calibration measurements are essential. Such measurements have been performed during the last years using several different methods.
The poster will give an overview of the methods and results of the calibration of the precision high voltage dividers.

This project is supported by BMBF under contract number 05A11PM2.

HK 45.31 Mi 18:30 S1/05 22-24

Meson production in pd fusion to ^{3}HeX at proton beam momenta between p_p = 1.60 GeV/c and p_p = 1.74 GeV/c with WASA-at-COSY* — •Nils Hüsken, Florian Bergmann, Kay Demmich, Alfons Khoukaz, Karsten Sitterberg, Juliane Von Wrangel, and Lisa Wölfer for the WASA-at-COSY collaboration — Institut für Kernphysik, Westfälische Wilhelms-Universität Münster, 48149 Münster, Deutschland

The production of pseudoscalar mesons in pd fusion to ^{3}HeX adresses a wide range of interesting hadron physics topics.
While the reaction $pd \rightarrow {}^3\mathrm{He}\eta$ has been studied in great detail in the near threshold region, there still remain open questions regarding the underlying production mechanism as well as recently observed unexpected cross section structures at higher excess energies. As the WASA-at-COSY experiment is perfectly suited to study the energy dependence of both total and differential cross sections, a beam time was realized in May 2014 in order to investigate the excess energy region of interest, covering 15 excess energies ranging from $Q \approx 13.6$ MeV to $Q \approx 80.9$ MeV. This dataset also allows the investigation of the energy dependence of various other $pd \rightarrow {}^3\mathrm{He}X$ reactions, like the one-, two- and three-pion production with high statistics. An overview of the possibilities this new dataset provides will be given as well as the current status of the analyses regarding these reactions.
*Supported by FFE program of the Forschungszentrum Jülich and the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n 283286.

HK 45.32 Mi 18:30 S1/05 22-24

Simulation der Detektionssignaturen von Neutroneneinfangsreaktionen an ^{83}Kr und ^{85}Kr — •Ashkan Taremi Zadeh[1], Stefan Fiebiger[1], Milan Krtička[2], René Reifarth[1], Mario Weigand[1] und Clemens Wolf[1] — [1]Goethe-Universität Frankfurt — [2]Charles University in Prague

^{85}Kr ist ein wichtiger Verzweigungspunkt des s-Prozesspfades. Deswegen ist die Kenntnis seines Neutroneneinfangsquerschnitts für die nukleare Astrophysik von großer Bedeutung. ^{85}Kr ist gasförmig und instabil mit einer Halbwertszeit von ca. 10,8 Jahren. Dies macht die Messung des Neutroneneinfangsquerschnittes von ^{85}Kr sehr schwierig, da zunächst eine möglichst reine und ausreichend große Probe hergestellt werden muss. Für ein geplantes Time-of-Flight-Experiment wird reaktorproduziertes Kr verwendet. Dieses besteht neben ^{85}Kr, auch aus anderen Kr-Isotopen, welche in der späteren Messung unerwünschten Untergrund verursachen könnten. Dabei ist das Isotop ^{83}Kr im Vergleich zu ^{85}Kr aufgrund seines größeren Q-Werts bei der (n,γ)-Messung die größte Herausforderung. Für eine Analyse wurden Zunächst γ-Kaskaden mit DICEBOX erzeugt. Anschließende Simulationen der kalorimetrischen Messung mit eine 4π-Detektoraufbau mit GEANT3 sollen zeigen ob es möglich ist, diese beiden Isotope in einer

(n,γ)-Messung voneinander zu unterscheiden.
Dieses Projekt wird unterstützt vom ERC Grant Agreement n. 615126.

HK 45.33 Mi 18:30 S1/05 22-24

Study of the spatial resolution of methods for photon interaction position determination in a monolithic scintillator — •A. Miani[1,2], S. Liprandi[1], S. Aldawood[1,3], T. Marinšek[1], L. Maier[4], C. Lang[1], H. van der Kolff[1,5], R. Lutter[1], R. Gernhäuser[4], D. R. Schaart[5], G. Dedes[1], K. Parodi[1], and P. G. Thirolf[1] — [1]LMU Munich, Germany — [2]Università degli Studi di Milano, Italy — [3]King Saud University, Riyadh, Saudi Arabia — [4]TU Munich, Germany — [5]Delft University of Technology, The Netherlands

At LMU Munich, a Compton camera prototype is being developed as a promising tool for ion-beam range verification for hadron therapy by detecting prompt γ rays induced by nuclear reactions between the particle beam and organic tissues. The camera is composed of a scatterer, consisting of six layers of double-sided Si-strip detectors, and an absorber, a monolithic $LaBr_3$:Ce crystal (50x50x30 mm^3) read out by a 256-segments multianode PMT. Key ingredient of the photon source reconstruction process is the determination of the γ ray interaction position in the monolithic scintillator. It has been determined by applying the k-Nearest Neighbor (k-NN) algorithm (van Dam et al., IEEE TNS 58 (2011)), which requires a large reference library of 2D scintillation light amplitude distributions, determined by scanning the scintillator with a 1 mm collimated ^{137}Cs source and a fine step size (0.5mm). The characterization of the spatial resolution of the k-NN method will be presented.
This work was supported by the DFG Cluster of Excellence Munich Centre for Advanced Photonics (MAP) and KSU, Saudi Arabia.

HK 45.34 Mi 18:30 S1/05 22-24

Studien zum Y(2175) bei BES III — •Jiaqi Li für die BESIII-Kollaboration — Ruhr-Universität Bochum, Institut für Experimentalphysik I, 44780 Bochum

Das BES III-Experiment am Elektron-Positron-Speicherring BEPCII des Institute of High Energy Physics (IHEP) in Peking zeichnet seit 2009 Elektron-Positron-Kollisionen bei einer Schwerpunktsenergie zwischen 2 und 4,6 GeV auf. Mit etwa 1,3 Millarden aufgezeichneten J/ψ-Ereignissen verfügt die BES III-Kollaboration über den weltweit größten Datensatz. Zerfälle des J/ψ stellen eine reichhaltige Quelle für die Erzeugung leichter Hadronen dar.

So konnte 2015 im Zerfallskanal $J/\psi \to \eta\phi f_0(980)$ vom BES-III Experiment das durch BaBar entdeckte Y(2175)-Meson mit hoher Statistik bestätigt werden. Um die Eigenschaften des $Y(2175)$-Mesons besser zu verstehen, wird dies im Rahmen der hier vorgestellten Analyse weiter studiert. Die Selektionsschritte sowie erste Ergebnisse der Analyse werden hier präsentiert.

Unterstützt durch die DFG.

HK 45.35 Mi 18:30 S1/05 22-24

Entwicklung eines neuen Datenaufnahmesystems für das QClam-Spektrometer * — •Maxim Singer, Antonio D'Alessio und Peter von Neumann-Cosel — Institut für Kernphysik, TU Darmstadt

Am supraleitenden Elektronenbeschleuniger S-DALINAC wird für das hochauflösende Magnetspektrometer QClam eine neue Datenaufnahme für Elektronenstreu- und insbesondere (e,e'x)-Experimente entwickelt. Durch eine Verdopplung der Zähldrähte in den neuen Driftkammern auf 896 und eine Zeitauflösung von 100 ps, soll eine Energieauflösung von 10^{-4} erreicht werden. Hierfür muss das bestehende Datenaufnahmesystem durch eine flexiblere Lösung ersetzt werden.
Um eine hohe Energieauflösung in (e,e')-Experimenten zu erreichen, muss der Durchstoßpunkt der Elektronenspur durch die Fokalebene möglichst genau bestimmt werden. Hierzu dienen die Driftzeiten der Sekundärelektronen in den drei Driftkammern und die Zeitinformation des Trigger-Szintillators als Datengrundlage. Ein Algorithmus, der aus diesen Informationen die Elektronenbahn rekonstruiert, wird vorgestellt. Der Einfluss von fehlerhaften Kanälen und zufälligen Ereignissen wird beleuchtet. Präsentiert wird auch ein Konzept des Aufbaus bestehend aus 19 TDC Modulen und deren zeitliche Synchronisation über mehrere VME-Crates, sowie eine Möglichkeit das System für Koinzidenzexperimente zu erweitern.
* Gefördert durch die DFG im Rahmen des SFB 1245.

HK 45.36 Mi 18:30 S1/05 22-24

Correlated random-phase approximation from densities and in-medium matrix elements — •Richard Trippel and Robert Roth — Institut für Kernphysik, Technische Universität Darmstadt

The random-phase approximation (RPA) as well as the second RPA (SRPA) are established tools for the study of collective excitations in nuclei. Addressing the well known lack of correlations, we derived a universal framework for a fully correlated RPA based on the use of one- and two-body densities. We apply densities from coupled cluster theory and investigate the impact of correlations. As an alternative approach to correlations we use matrix elements transformed via in-medium similarity renormalization group (IM-SRG) in combination with RPA and SRPA. We find that within SRPA the use of IM-SRG matrix elements leads to the disappearance of instabilities of low-lying states. For the calculations we use normal-ordered two- plus three-body interactions derived from chiral effective field theory. We apply different Hamiltonians to a number of doubly-magic nuclei and calculate electric transition strengths. Supported by DFG (SFB 1245), HIC for FAIR and BMBF (06DA7047I)

HK 45.37 Mi 18:30 S1/05 22-24

Position sensitive plastic scintillating fibre-detectors for heavy ion detection — •Sebastian Scholl, Joachim Tscheuschner, Stefanos Paschalis, Thomas Aumann, and Heiko Scheit — Institut für Kernphysik, Technische Universität, 64289 Darmstadt, Germany

The R^3B (**R**eactions with **R**elativistic **R**adioactive **B**eams) experiment at FAIR will be able to perform kinematically complete measurements of reactions with relativistic heavy-ion beams up to 1 AGeV. In order to track the beam before the target and to determine the mass number of the scattered nucleus after the reaction, five fibre detectors with sizes between 10.24 x 10.24 cm^2 and 120 x 80 cm^2 are going to be built for the R^3B setup. These fibre detectors will provide $x-y$-position of the trajectory of charged particles after the reaction target. The light from the fibre detector is sensed using MPPCs (Multi Pixel Photon Counter). For the readout of the MPPCs we will test different electronics. In this contribution we present results obtained using an α-source and a LED light source to generate light in the fibre and use the PADI-VFTX for readout. This work is supported by HIC for FAIR, GSI-TU Darmstadt cooperation and the BMBF project 05P15RDFN1.

HK 45.38 Mi 18:30 S1/05 22-24

Design eines Kollimators zur Charakterisierung des Gammastrahls von ELI-NP* — •Matthias Nicolay[1], Catalin Matei[2], Norbert Pietralla[1], Philipp Ries[1], Calin A. Ur[2], and Volker Werner[1] — [1]Institut für Kernphysik, TU Darmstadt, 64289 Darmstadt — [2]ELI-NP, 077125, Magurele, Rumänien

Die im Aufbau befindliche internationale Großforschungsanlage "Extreme Light Infrastructure - Nuclear Physics" (ELI-NP) umfasst u.a. einen hochbrillanten Niederenergiegammastrahl (ca. 0.5 - 3 MeV), der ab 2017 zur Verfügung stehen soll. Die geringe Bandbreite von ca. 1% seiner Energie wird neue Experimente und Anwendungen in der Kern-, Strahlungs-, Kernstruktur- und nuklearen Astrophysik ermöglichen. So soll in einem der ersten Experimente nach neuen Doorway-Zuständen zur elektromagnetischen Entvölkerung des seltensten natürlich vorkommenden Nuklids ^{180m}Ta geforscht und deren Eigenschaften vermessen werden. Dazu wird es nötig sein, den Strahl mit hoher Präzision in Echtzeit zu analysieren, was über Comptonstreuung des Strahls an einem Kupfertarget mit anschließender Aufnahme des Energiespektrums unter einem sehr kleinen Raumwinkel erfolgen soll. Der zur Raumwinkelfilterung verwendete Kollimator muss dabei so beschaffen sein, dass er das Energieprofil so wenig wie möglich verzerrt. Um zu einem optimalen Kollimatoraufbau zu finden, werden verschiedene Designs mit dem Programm Geant4 simuliert und anschließend real getestet. Erste Ergebnisse und Optimierungsmöglichkeiten werden vorgestellt.
* Gefördert vom BMBF unter 05P15RDENA

HK 45.39 Mi 18:30 S1/05 22-24

The new FPGA based discriminator board for the CBELSA/TAPS Experiment — •Eugenia Fix for the CBELSA/TAPS-Collaboration — HISKP, Universität Bonn

The Crystal Barrel calorimeter at ELSA, which consists of 1320 CsI(Tl) crystals has been upgraded by a new Avalanche Photo Diode (APD) crystal readout.The APD readout electronics will provide a fast trigger signal down to 10 MeV energy deposit per single crystal. The processing of these trigger signals requires the development of a previously not existent timing branch of the readout chain of the Crystal Barrel calorimeter. Core component of the timing branch is a newly devel-

oped, FPGA based discriminator board. Its firmware contains modules for time to digital conversion, rise time compensation and parts of a cluster finder. In addition the reference voltages and discriminator thresholds are controlled and monitored. This poster presents the design and the achievable accuracy of the new discriminator.

Supported by the Deutsche Forschungsgemeischaft (SFB/TR16) and Schweizerischer Nationalfonds.

HK 45.40 Mi 18:30 S1/05 22-24

Detection system for forward emitted XUV photons from relativistic ion beams at the ESR — •C. Egelkamp[1], V. Hannen[1], Th. Kühl[2,3,4], W. Nörtershäuser[2,3], H.-W. Ortjohann[1], R. Sánchez[3], Th. Stöhlker[3,4,5], J. Vollbrecht[1], Ch. Weinheimer[1], D. Winters[3], and D. Winzen[1] — [1]Institut für Kernphysik, Uni Münster — [2]Institut für Kernchemie, Uni Mainz — [3]GSI, Darmstadt — [4]Helmholtz Institut Jena — [5]Uni Jena

Highly charged heavy ions stored at relativistic velocities provide a unique possibility to test atomic structure calculations. A possibility to investigate electron-electron correlations is the study of the $^3P_0 \rightarrow ^3P_1$ fine structure transition in Be-like Krypton ($^{84}Kr^{32+}$) in laser spectroscopy experiments. For this purpose Be-like krypton ions are stored in the experimental storage ring (ESR) at GSI at a velocity of $\beta = 0.69$. Through an anticollinear arrangement of the excitation laser and the ions the wavelength in the rest frame of the ions can be matched. After the excitation to the $^3P_1$ level the ions immediately decay to the ground state, emitting $\lambda \approx 17$ nm photons. Due to the Lorentz boost, the photons are emitted mainly in the forward direction and experience a Doppler shift to wavelengths < 10 nm. To collect these photons a moveable cathode plate with a central slit is brought into the beam line. The XUV photons mostly produce low energy secondary electrons on the plate which are electromagnetically guided onto a MCP detector. The design and working principle, as well as simulations and test measurements of the detector will be presented. This work is supported by BMBF under contract number 05P15PMFAA.

HK 45.41 Mi 18:30 S1/05 22-24

Calibration of the proton detector used for the neutron life time experiment τSPECT — •Kim Ross[1], Marcus Beck[1,2], Jan Haack[1], Werner Heil[1], and Jan Karch[1] — [1]Johannes Gutenberg-Universität Mainz — [2]Helmholtz-Institut Mainz

In order to measure the lifetime of free neutrons, a decay curve will be measured by detecting the decay products proton and electron. Their energies range up to 750 eV (protons) respectively 780 keV (electrons). The protons are accelerated onto 15 keV, in order to pass the dead layer of the detector and to be distinguishable from electronic noise. For the measurement a silicon drift detector is used which needs to be calibrated. This is achieved with a ^{133}Ba source mounted on three source holders of different materials in a vacuum chamber. Thus not only four of the characteristic lines of the ^{133}Ba source were measured but also the characteristic lines of the three source holders which yield four more calibration lines in the area of the proton energy in the spectrum. We report the implementation and results of the calibration of the silicon drift detector used for the neutron lifetime measurement τSPECT.

HK 45.42 Mi 18:30 S1/05 22-24

Particle Tracking Simulation des QCLAM-Spektrometers — •Gerhart Steinhilber, Christoph Kremer und Peter von Neumann-Cosel — IKP TU Darmstadt

Am supraleitenden Darmstädter Elektronen-Linearbeschleuniger S-DALINC am Institut für Kernphysik der Technischen Universität Darmstadt werden Experimente zur Untersuchung der Kernstruktur durchgeführt. Es stehen verschiedene Experimentierplätze zur Verfügung, an denen Photonen- bzw. Elektronenstreuexperimente realisiert werden können. An einem der Experimentierplätze befindet sich das QCLAM-Spektrometer, welches über eine große Impuls- und Raumwinkelakzeptanz verfügt, wodurch eine vergleichsweise hohe Zählrate erreicht wird. Dadurch können auch Experimente mit kleinen Wirkungsquerschnitten wie etwa Koinzidenzexperimente und 180°-Streuung durchgeführt werden.

Es wird eine Simulation des QLCAM-Spektrometers inklusive des Separationsmagneten für die 180°-Streuung mit CST-Studio durchgeführt um die Abbildungseigenschaften untersuchen zu können. Das Gesamtsystem setzt sich aus drei Magneten - dem Separationsmagneten, einem Pentapol und einem Dipol - zusammen. Simuliert werden die Magnetfelder sowie die Trajektorien der gestreuten Elektronen. Dadurch wird in Zukunft ein Werkzeug zur Analyse unterschiedlicher Experimenttypen am QCLAM-Spektrometer zur Verfügung stehen.

HK 45.43 Mi 18:30 S1/05 22-24

Implementation of a control system for FRS in LSA — •Jan-Paul Alexander Hucka[1], Joachim Enders[1], Stephane Pietri[2], Helmut Weick[2], David Ondreka[2], Hanno Huether[2], Holger Liebermann[2], Raphael Mueller[2], and Jutta Fitzek[2] — [1]Institut für Kernphysik, TU Darmstadt — [2]GSI Helmholzzentrum für Schwerionenforschung

At the GSI facility the LSA [1] framework from CERN is used to implement a new control system for accelerators and beam transfers. This was already completed and tested for the SIS18 accelerator. The implementation of experimental rings such as CRYRING and ESR is currently under development. In addition, the Fragmentseparator FRS [2] and - in a later stage - also the superconducting Fragmentseparator S-FRS at FAIR will be controlled within this framework.

The challenge posed by the implementation of the control system for the FRS arises from the interaction of the beam with matter in the beamline and the beam's associated energy loss. This energy loss will be determined using input from ATIMA [3] and has to be included into the code of the LSA framework. The implemented control system will be later simulated and benchmarked by comparison to results of earlier measurements.

Work supported in part by the state of Hesse (LOEWE center HIC for FAIR) and BMBF (05P15RDFN1).

[1] M. Lamont et al., LHC Project Note 368 [2] H. Geissel et al., NIM B 70, 286 (1992) [3] H. Weick et al., NIM B 164/165 (2000) 168.

HK 45.44 Mi 18:30 S1/05 22-24

Neutron Time-Like Electromagnetic Form Factor Measurement with Direct Scan Method at BESIII — •Paul Larin[1,2], Samer Ali Nasher Ahmed[1,2], Alaa Dbeyssi[1], Dexu Lin[1,2], Frank Maas[1,2,3], Cristina Morales[1], Christoph Rosner[1,2], and Yadi Wang[1,2] for the BESIII-Collaboration — [1]Helmholtz-Institut Mainz, 55128 Mainz, Germany — [2]Institut für Kernphysik, Johannes Gutenberg-Universität Mainz, 55099 Mainz, Germany — [3]PRISMA Cluster of Excellence, Johannes Gutenberg-Universität Mainz, 55099 Mainz, Germany

The internal structure and dynamics of the neutron can be understood through the study of its electromagnetic (EM) form factors (FF). In comparison to proton FF measurements, less data on the neutron is available in the space-like as well as in the time-like region. None of the previous experiments were able to measure the ratio of the electric and the magnetic FF in the time-like region so far. The BESIII (Beijing Spectrometer III) experiment at BEPCII (Beijing Electron Positron Collider II) collected in 2014/15 a large sample of e^+e^- scan data in the region between 2.0 and 3.08 GeV with a total luminosity of 523.5 pb^{-1}. With this poster we show our efforts to measure the effective FF of the neutron in a large energy region and the possibility to measure for the first time the ratio of the neutron form factors in the time-like region.

HK 45.45 Mi 18:30 S1/05 22-24

Measurement of ppbar FFs at BESIII — •Yadi Wang[1,2], Christoph Rosner[1,2], Cristina Morales[1], Samer Ali Nasher Ahmed[1,2], Alaa Dbeyssi[1], Dexu Lin[1,2], and Frank Maas[1,2,3] for the BESIII-Collaboration — [1]Helmholtz Institute Mainz, 55128 Mainz, Germany — [2]Institute for Nuclear Physics, Johannes Gutenberg University Mainz, 55099 Mainz, Germany — [3]PRISMA Cluster of Excellence, Johannes Gutenberg University, Mainz, 55099 Mainz, Germany

The structure of the proton can be understood through the study of its electromagnetic (EM) form factors. Due to the low luminosity achieved up to now, few data exist on the proton form factors in the time-like region and only a very coarse determination of the individual electric and magnetic form factors (or its ratio) has been possible so far. BESIII (Beijing Spectrometer III) at BEPCII (Beijing Electron Positron Collider II) has a better performance in detecting ppbar, nnbar, ΛΛbar and so on. We studied the feasibility of measurement of form factors of proton at BESIII. In 2014 and 2015, BESIII has collected large e+e* scanning data samples with a total luminosity of 525.5 pb*1. With these data samples, the renovation of the status of proton form factors is foreseen.

HK 45.46 Mi 18:30 S1/05 22-24

Electron Identification and Hadron Contamination Studies in Proton-Proton Collisions with ALICE — •Anisa Dashi for the

ALICE-Collaboration — Technische Universität München

The continuum of electron-positron pairs, produced in heavy-ion collisions, provides an excellent probe of the quark-gluon plasma and a possible chiral symmetry restoration, since these particles do not undergo strong final state interactions and hence carry information about the in-medium properties of hadrons to the detectors. To extract possible signatures, it is important to work with an electron sample of high purity, i.e. not contaminated by other particles. Dielectrons are also studied in proton-proton collisions to provide a crucial reference for the measurement in heavy-ion collisions.

This poster presents an analysis performed on a data set of pp collisions at $\sqrt{s} = 7$ TeV measured with the ALICE detector at the Large Hadron Collider. The aim of this work is to optimize the electron identification and to reduce the hadron contamination. For that, three different combinations of particle identification (PID) criteria are compared regarding the statistical significance S/σ_S of their dielectron signals and their electron purities. The analysis shows that one can achieve good electron identification efficiencies and high electron purities by combining the specific energy loss signals measured in the Inner Tracking System and the Time Projection Chamber with the information of the Time of Flight detector. With such a PID selection one obtains a dielectron signal with a purity higher than 82% reaching up to 96%, depending on the invariant mass.

HK 45.47 Mi 18:30 S1/05 22-24

Like sign pion femtoscopy with HADES — •Barbara Schweisshelm for the HADES-Collaboration — Physik Department, TUM, Garching, Germany — Excellence Cluster "Universe", Garching, Germany

The results of a three dimensional correlation analysis for like sign pion pairs, which are produced in π- + W reactions at 1.7GeV/c at HADES, are presented. Different PID cuts allow the identification of like sign pion pairs, which are used to investigate the correlation between these pairs. In particular the size of the source of the pair can be determined after applying some corrections, which take e.g. the resolution of the detector into account. The analysis was performed in a longitudinally co-moving system to reveal differences of the source size for different emission directions.

HK 45.48 Mi 18:30 S1/05 22-24

Collective flow in heavy-ion collisions at $E_{\mathrm{lab}} = 1 - 2A$ GeV — •Markus Mayer[1,2], Longgang Pang[2], Dmytro Oliinychenko[1,3], and Hannah Petersen[1,2,4] — [1]Frankfurt Institute for Advanced Studies — [2]Goethe Universität Frankfurt — [3]Bogolyubov Institute for Theoretical Physics — [4]GSI Helmholtzzentrum für Schwerionenforschung

Collective flow represents an important opportunity to gain information about the characteristics of the fireball and insights about the equation of state. Flow can be analyzed by considering the momentum distribution of the particles which are emitted from the fireball. Collective flow is composed of radial flow and an azimuthally asymmetric expansion, the latter is corresponding to the anisotropic flow. In non-central collisions the fireball corresponds to an almond-shaped overlap area of the participants, which results in the anisotropic flow. The largest contributions to this anisotropic flow are provided by the elliptic and the directed flow. When the speed of the spectators is lower than the rate of expansion of the fireball, they block the emission of particles from the fireball. Hence the particles are squeezed out of the almond shape. In central collisions the fireball is circular resulting in a radial flow of matter. These flow-effects can be analyzed by investigating v_1 and v_2 as a function of the transverse momentum or the rapidity. In this work, the collective flow of nucleons and pions is studied within a hadronic transport approach at beam energies of $1 - 2A$ GeV.

HK 45.49 Mi 18:30 S1/05 22-24

Strahlenschäden in dotiertem Silizium aufgrund Neutronen-einfangs Bor als Erweiterung des NIEL-Modells* — •Tobias Bus für die CBM-MVD-Kollaboration — Goethe-Universität, Frankfurt

CMOS Monolithic Active Pixel Sensoren werden für die Vertexdetektoren der Schwerionenexperimente STAR, ALICE und CBM entwickelt. Die Verbesserung der Strahlenhärte dieser Sensoren ist das Ziel eines Forschungsprojektes des IKF Frankfurt und IPHC Straßburg.
In diesem Beitrag werden nicht-ionisierende Strahlenschäden in dotiertem Silizium untersucht. Ihnen liegt das NIEL-Modell zu Grunde, das quantitativ Strahlenschäden von Teilchen in Silizium beschreibt. Auf der Basis zwei bereits durchgeführter Studien langsamer Neutronen lässt sich vermuten, dass das NIEL-Modell im niederenergetischen Bereich für CMOS-Sensoren nicht vollständig ist. Das im dotiertem Silizium enthaltene Fremdatom Bor kann durch einen Neutroneneinfang zerfallen, wodurch langsame Neutronen zusätzliche Strahlenschäden generieren können. Deswegen wird eine Formel entwickelt, die diese Strahlenschäden berücksichtigt, um Aussagen bezüglich der Relevanz des Borzerfalls treffen zu können. Daran anknüpfend wird geprüft, ob das NIEL-Modell durch diesen zusätzlichen Beitrag ergänzt werden kann. Schließlich kann man zu der Schlussfolgerung kommen, dass der Borzerfalls nicht zu vernachlässigende Strahlenschadeneffekte hat und deswegen eine Ergänzung des NIEL-Modells im niederenergetischen Bereich sein kann.
*gefördert durch das BMBF (05P12RFFC7), HIC for FAIR und GSI.

HK 45.50 Mi 18:30 S1/05 22-24

Research and Development for the PANDA Backward End-Cap of the Electromagnetic Calorimeter — •David Rodríguez Piñeiro[1], Oliver Noll[1,2], Luigi Capozza[1], Samer Ahmed[1,2], Alaa Dbeyssi[1], Frank Maas[1,2], Heybat Ahmadi[2], and Alexander Aycock[2] for the PANDA-Collaboration — [1]Helmholtz-Institut Mainz — [2]Institut für Kernphysik Mainz

For the construction of the Backward End-Cap (BWEC) of the PANDA Electromagnetic Calorimeter (EMC) various tests regarding the mechanics and the monitoring system are necessary and will be discussed. In addition, a full prototype of the supporting system is under construction, comprising insertion rails, alignment feet, base and test arm supports, test mounting plates and basalt feet. This will allow testing the moving trajectory and insertion of the whole detector, including the specifications for the alignment. A customized solution for the monitoring and positioning of optical fibers for calibration and the insertion in the cold volume will be carried out. The status and the prospects of this development work will be shown and discussed.

HK 45.51 Mi 18:30 S1/05 22-24

Test of Radiation Hardness of pcCVD Detectors — •Steffen Schlemme[1,2], Joachim Enders[2], P. Figuera[3], J. Frühauf[1], Mladen Kis[1], A. Kratz[1], N. Kurz[1], S. Löchner[1], A. Musumarra[3,4], Chiara Nociforo[1], S. Salamone[3], Fabio Schirru[1], B. Szczepanczyk[1], M. Träger[1], and R. Visinka[1] — [1]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [2]Technische Universität Darmstadt, Germany — [3]LNS-INFN Catania, Italy — [4]University of Catania, Italy

The new in-flight separator Super-FRS is under construction at the Facility for Antiproton and Ion Research (FAIR, Darmstadt). Ion rates up to 3×10^{11} ^{238}U/spill demand an adaption of detectors to a high radiation enviroment. A test experiment to investigate the radiation hardness of polycrystalline diamond detectors (pcCVD) was performed at the LNS-INFN in Catania using a ^{12}C beam at 62 MeV/u and intensities of up to 1.5 pnA. The setup consisted of pcCVD strip detectors to measure the beam profile, a single crytal diamond detector to calibrate the ionisation chamber working in current mode as a beam intensity monitor and a pcCVD sample to be irradiated. The IC used was designed for FAIR and showed a stable counting rate allowing us to calibrate and perform beam intensity measurements with it. The total measured counts on the sample were 8.25×10^{11} counts/mm^2 over a period of 60 hours. Digital waveforms of the pcCVD signals were taken with an oscilloscope and analysed. The results showed no change of the pcCVD signal proprerties during the entire irradiation.

HK 45.52 Mi 18:30 S1/05 22-24

Efficiency Calculation for π^- + C and $\pi^- + H_2$ Reactions at HADES — •Steffen Maurus[1], Laura Fabbietti[1], Joana Wirth[1], and Alessandro Scordo[2] — [1]Technische Universität München, Germany — [2]Istituto nazionale di fisica nucleare, Italy

The study of strangeness production in hadronic matter is a major topic in the field of experimental nuclear physics, which requires modern and capable detector systems like the HADES detector. At SIS 18 at GSI Darmstadt this spectrometer provides excellent conditions to study rare states of matter like $\Phi, K^-, K^+, \bar{\omega}, \bar{K}^0_s$ in a precise way.

For the reconstruction of these states the detection efficiencies of all sub-detectors of the HADES setup has to be determined in an precise way. To do so, an correction procedure based on full physical quantities for the HADES detector was developed, using a secondary π^- beam in the momentum region of 690 MeV/c impinging on a Carbon and Polyethylen (C_2H_4) target. Explicitly the kinematic characteristics of elastic scattering of this system was used to obtain a correction map in

Φ, Θ and momentum, which allows to extract corrected cross sections and yields of the studied reactions in the target. In this poster the detailed procedure as well as the results are illustrated. This work is supported by a joint project of BMBF 05P2015 and 05P15WOFCA.

HK 45.53 Mi 18:30 S1/05 22-24

Full magnetic storage of ultra-cold neutrons in τSPECT — •Jan Haack[1], Marcus Beck[1,2], Klaus Eberhardt[1], Christopher Geppert[1], Werner Heil[1], Jan Kahlenberg[1], Jan Karch[1], Sergey Karpuk[1], Fabian Kories[1], Kim Ross[1], Christian Siemensen[1], Yuri Sobolev[1], and Norbert Trautmann[1] — [1]Johannes Gutenberg-Universität Mainz — [2]Helmholtz-Institut Mainz

τSPECT aims to measure the lifetime of free neutrons. This lifetime factors into the CKM-Matrix and thus a precise measurement allows for a test of the standard model as well as conclusions regarding the genesis of matter. To eliminate losses during the storage due to neutron capture in materials, a full magnetic storage is set up. The longitudinal magnetic reservoir field is provided by super conducting magnets previously used in the aSPECT experiment and several added correction coils. Radial magnetic storage is realized with a permanent magnet multipole Halbach array. So far neutrons with radial kinetic energies of up to roughly 60neV are projected to be storable. On this poster the multipole-array and its storage capabilities for ultra-cold neutrons will be presented.

HK 45.54 Mi 18:30 S1/05 22-24

P2 - A fused silica Cherenkov detector for the high precision determination of the weak mixing angle — •Kathrin Gerz[1], Dominik Becker[1], Thomas Jennewein[1], Sebastian Baunack[1], Krishna Kumar[3], and Frank Maas[1,2] — [1]Johannes Gutenberg Universität Mainz — [2]Helmholtz Institut Mainz — [3]Department of Physics and Astronomy, Stony Brook University, Stony Brook, USA

The weak mixing angle is a central parameter of the standard model and its high precision determination is tantamount to probing for new physics effects.

The P2 experiment at the MESA accelerator in Mainz will perform such a measurement of the weak mixing angle via parity violating electron-proton scattering. We aim to determine $sin^2(\Theta_W)$ to a relative precision of 0.15%. Since the weak charge of the proton is small compared to its electric charge, the measurable asymmetry is in the order of only 30ppb, requiring a challenging measurement to a precision of only 0.5ppb or below. In order to achieve this precision we need to collect very high statistics and carefully minimize interfering effects like apparatus induced false asymmetries.

We present the status of the development of an integrating fused-silica Cherenkov detector suitable for a high precision and high intensity experiment like P2. The contribution will focus on the investigation of the detector's response to incoming signal and background particles both by simulations and by beam tests at the MAMI accelerator.

HK 45.55 Mi 18:30 S1/05 22-24

Aufbau eines GEM-Kalibrationsstandes für das MAGIX-Experiment an MESA — •Mirco Christmann — Institut für Kernphysik, Johannes Gutenberg-Universität Mainz

Am Institut für Kernphysik der Johannes Gutenberg-Universität Mainz wird bald der neue Teilchenbeschleuniger MESA (Mainz Energy-Recovering Superconducting Accelerator) in Betrieb gehen. Im energierückgewinnenden Arm von MESA (105 MeV | 10 mA) soll das MAGIX-Experiment eingebaut werden. Ein Teil der beschleunigten Elektronen kollidiert dort mit einem Gasstrom und die Winkel und Impulse der gestreuten Elektronen können über zwei schwenkbare Magnetspektrometer bestimmt werden.

In der Fokalebene der Magnete wird ein präzises Detektorsystem mit einer aktiven Fläche von 1,20 m x 0,30 m und einer Ortsauflösung besser als 50 μm benötigt. Geplant sind auf GEMs (Gaseous Electron Multipliers) basierende Detektoren, um mit einer geringen Strahlungslänge der niedrigen Strahlenergie zu entgegnen. Dieses Poster zeigt die Entwicklung eines Prototypen mit einer aktiven Fläche von 100 cm^2 und dessen Kalibration. Eine konventionelle Bestimmung der Ortsauflösung soll mit einer Röntgenquelle und einem Aufbau aus Referenzdetektoren realisiert werden. Des Weiteren soll eine innovative Methode zur Bestimmung der Ortsauflösung mit Hilfe von UV-Licht entwickelt werden, mit welcher eine Kalibration während des laufenden Experiments möglich wäre.

HK 45.56 Mi 18:30 S1/05 22-24

Performance studies of ionisation chambers for photon-induced fisson experiments — •Marius Peck[1], Joachim Enders[1], Martin Freundenberger[1], Alf Göök[2], Andreas Oberstedt[3], and Stephan Oberstedt[2] — [1]Institut für Kernphysik, TU Darmstadt, Germany — [2]European Commission, JRC-IRMM, Geel, Belgium — [3]Fundamental Fysik, Chalmers teknsika högskola, Göteborg, Sweden

Angular and mass distributions as well as total kinetic energy of fission fragments in photon-induced fisson of ^{232}Th were obtained using a twin Frisch-grid ionization chamber at the superconducting Darmstadt electron accelerator S-DALINAC.
To improve the experimental luminosity, e.g. for future energy-resolved experiments at ELI-NP, while maintaining the overall resolution we are studying a multi-stack ionisation chamber.
We present investigations on the suitability of different gas-mixtures for optimizing the electrode design of said multi-stack chamber.
Supported in part by BMBF (05P15RDENA).

HK 45.57 Mi 18:30 S1/05 22-24

Erforschung eines neuartigen Injektionssystems für einen toroidalen Hochstromspeicherring — •Heiko Niebuhr, Adem Ates, Martin Droba, Oliver Meusel, Daniel Noll, Ulrich Ratzinger und Joschka Wagner — Institut für Angewandte Physik, Goethe-Universität Frankfurt

Zur Realisierung des angedachten supraleitenden magnetostatischen Speicherrings (F8SR) zur Speicherung hoher Ionenströme (bis zu 10 A) wird an der Universität Frankfurt ein herunterskaliertes Strahlexperiment mit zwei normalleitenden Toroidsegmenten (0,6 T) durchgeführt. Nachdem die Dynamik beim Transport eines Ionenstrahls durch einen solchen toroidalen Kanal erforscht wurde, wird im nächsten Schritt die seitliche Injektion mittels einer Injektionsspule bei gleichzeitigem Transport des Ringstrahls untersucht. Die niederenergetischen Wasserstoffionen werden dazu mittels zweier Volumenionenquellen bereitgestellt und dann mit Hilfe zweier Filterkanäle gefiltert, um Ionenstrahlen bestehend aus einer Spezies zu erhalten. Der eine Strahl wird in das erste Toroidsegment und der andere mittels einer Injektionsspule zwischen die beiden Toroidsegmente injiziert. Zur Untersuchung stehen verschiedene Strahldiagnosesysteme zur Verfügung. Zur Umsetzung des angedachten Experiments werden neben theoretischen und experimentellen Befunden auch Simulationen mit dem am IAP in Entwicklung befindlichen 3D-Simulationsprogramm bender genutzt. Dabei wird das aufzubauende Experiment und der Parameterraum zuvor mittels Simulationen weitläufig untersucht, um den optimalen Injektions- und Transportkanal für das Experiment zu finden.

HK 45.58 Mi 18:30 S1/05 22-24

Multiconfigurational Many-Body Perturbation Theory for Ab Initio Nuclear Structure — •Alexander Tichai and Robert Roth — Institut für Kernphysik, TU Darmstadt

Many-body perturbation theory provides a simple yet effective tool for ab initio calculations of nuclear observables. In the case of closed-shell systems the Hartree-Fock wave function defines an adequate starting point for the calculation of perturbative corrections. We have shown that the perturbation series converges exponentially fast and third-order partial sums yield a good approximation to the ground-state energy over the whole mass range up to ^{132}Sn. However, when proceeding to open-shell systems the ground-state wave function is no longer dominated by a single determinant. Therefore, we choose a multiconfigurational reference state arising from a diagonalization in a small model space. A recursive treatment allows for the calculation of energy corrections up to order 30 for small systems. Furthermore, we present second-order energy corrections for ground-state energies of the oxygen chain. We use two- and three-body interactions constructed from chiral effective field theory which are evolved via a similarity renormalization group transformation. All results are compared to configuration interaction and recent multireference in-medium similarity renormalization group calculations.

Supported by GSI, DFG (SFB 1245), HIC for FAIR, and BMBF (05P15RDFN1)

HK 45.59 Mi 18:30 S1/05 22-24

Das Kühlsystem für den PANDA-Luminositätsdetektor — •Heinrich Leithoff[1], Florian Feldbauer[1], Roman Klasen[1], Stephan Maldaner[1], Mathias Michel[1,2], Christof Motzko[1,2], Stefan Pflüger[1], Tobias Weber[2] und Miriam Fritsch[1,2] für die PANDA-Kollaboration — [1]Helmholtz-Institut Mainz — [2]Institut für Kernphysik, Johannes Gutenberg Universität Mainz

Der Luminositätsdetektor für das PANDA-Experiment, das als Teil der FAIR-Beschleunigeranlage in Darmstadt entsteht, wird die Luminosität anhand der Winkelverteilung elastisch gestreuter Antiprotonen bei sehr kleinen Winkeln bestimmen. Um die gewünschte Genauigkeit in der Spurbestimmung zu erreichen, werden die Spuren mit vier Lagen Silizium-Pixelsensoren (HV-MAPS) vermessen. Ausserdem müssen störende Einflüsse wie Vielfachstreuung minimiert werden. Dazu befindet sich das Detektorsystem im Vakuum. Da HV-MAPS aktive Sensoren sind und im Vakuum keine Kühlung über Konvektion möglich ist, muss aktiv gekühlt werden. Gleichzeitg musste darauf geachtet werden, dass für das Kühlsystem die Massenbelegung minimiert wird. Somit werden Kühlsystem und mechanische Halterung der Sensoren kombiniert und bestehen aus 200*m dünnen Diamantscheibchen, auf die die Sensoren aufgeklebt werden, sowie einer Aluminiumstruktur, in die für einen guten thermischen Übergang ein Edelstahlrohr für Kühlflüssigkeit eingeschmolzen wurde. Präsentiert wird ein Überblick über den Status des Kühlsystems und seine erwartete Leistungsfähigkeit.

HK 45.60 Mi 18:30 S1/05 22-24

In-Medium Similarity Renormalization Group for Nuclear Structure—Applications and Extensions — •Klaus Vobig and Robert Roth — Institut für Kernphysik, Technische Universität Darmstadt

The In-Medium Similarity Renormalization Group (IM-SRG) is a very flexible ab initio many-body method for the calculation of nuclear structure observables over a wide mass range.

We employ the IM-SRG for the study of a new generation of consistent interactions derived from chiral effective field theory within the LENPIC collaboration. Focussing on ground-state energies and charge radii for medium-mass nuclei, we study the order-by-order behavior of the chiral expansion.

Furthermore, we present a novel ab initio many-body approach that combines the IM-SRG with Configuration Interaction methods for targeting excited states and open-shell nuclei.
Supported by DFG (SFB1245), HIC for FAIR and BMBF (05P15RDFN1).

HK 45.61 Mi 18:30 S1/05 22-24

Status of the Development of a HPGe-BGO Pair Spectrometer for ELI-NP — •Ilja Homm, Alexander Ignatov, Stoyanka Ilieva, and Thorsten Kröll — Technische Universität Darmstadt, Darmstadt, Germany

At the moment, the new european research facility called ELI-NP (The **E**xtreme **L**ight **I**nfrastructure - **N**uclear **P**hysics) is being built in Bucharest-Magurele, Romania. It is one of three parts of the ELI project and offers applications for the investigation of questions concerning nuclear physics. The 8 HPGe (**H**igh-**P**urity **Ge**rmanium) CLOVER detectors of ELIADE (**ELI**-NP **A**rray of **DE**tectors) with four crystals each and high resolution are important components for the gamma spectroscopic study of photonuclear reactions. These detectors are surrounded by standard anti-Compton shields (AC shield). We investigate the possibility to operate for two of the ELIADE CLOVERS an advanced version of an AC shield as escape γ-rays pair spectrometers to extend the high-resolution spectroscopy to photon energies of several MeV where the pair production process dominates. The main tasks in this work are to develop and test such an AC shield: a pair spectrometer with BGO and CsI(Tl) crystals with APD (avalanche photodiode) or SPM (silicon photomultiplier) readout. The results of prototype testing are reported.
This work is supported by the German BMBF (05P15RDENA).

HK 45.62 Mi 18:30 S1/05 22-24

$\eta \to \pi^0 e^+ e^-$ with WASA-at-COSY: C-violation in electromagnetic meson decays* — •Kay Demmich, Florian Bergmann, Nils Hüsken, Karsten Sitterberg, and Alfons Khoukaz — Institut für Kernphysik, Westfälische Wilhelms-Universität Münster

The C-symmetry and the invariance of the electromagnetic and the strong interaction under a charge conjugation transformation are basic concepts of the standard model. The electromagnetic decay $\eta \to \pi^0 e^+ e^-$ via a virtual photon violates the C-parity and alternative C-conserving processes are strongly suppressed. Hence, studies on this η-decay are of high interest in order to test the conservation of the C-parity within the standard model and to search for physics beyond the standard model, e.g., for dark bosons. Since this decay has not yet been observed, only an upper limit of the branching ratio of 4×10^{-5} is quoted by the PDG. A huge data set of $\approx 5 \times 10^8$ η mesons dedicated for studies on rare and forbidden η-decays has been measured with the WASA-at-COSY setup, which allows for a determination of the relative branching ratio more sensitively than the recent upper limit. The current status of the analysis will be presented and discussed.

*Supported by FFE program of the Forschungszentrum Jülich.

HK 45.63 Mi 18:30 S1/05 22-24

Mechanical integration of the detector components for the CBM Silicon Tracking System — •Oleg Vasylyev and Wolfgang Niebur for the CBM-Collaboration — GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt

The Compressed Baryonic Matter experiment (CBM) at FAIR is designed to explore the QCD phase diagram in the region of high net-baryon densities. The central detector component, the Silicon Tracking System (STS) is based on double-sided micro-strip sensors. In order to achieve the physics performance, the detector mechanical structures should be developed taking into account the requirements of the CBM experiments: low material budget, high radiation environment, interaction rates, aperture for the silicon tracking, detector segmentation and mounting precision. A functional plan of the STS and its surrounding structural components is being worked out from which the STS system shape is derived and the power and cooling needs, the connector space requirements, life span of components and installation/repair aspects are determined.

The mechanical integration is at the point of finalizing the design stage and moving towards production readiness. This contribution shows the current processing state of the following engineering tasks: construction space definition, carbon ladder shape and manufacturability, beam-pipe feedthrough structure, prototype construction, cable routing and modeling of the electronic components. *Supported by EU-Horizon2020 CREMLIN.

HK 45.64 Mi 18:30 S1/05 22-24

Entwicklung des Slow Control Systems für das MAGIX-Experiment am MESA. — •Stefan Lunkenheimer für die Magix/MESA-Kollaboration — Institut für Kernphysik, Johannes Gutenberg-Universität Mainz, germany

Das MAGIX-Experiment hat das Ziel hochpräzise Messungen bei niedrigen Energien und hohen Strahlintensitäten am Elektronenbeschleuniger MESA durchzuführen. MESA soll in wenigen Jahren in Mainz in Betrieb genommen werden und ermöglicht es, mit Hilfe der Energierückgewinnung, einen sehr hohen Teilchenstrom zu erreichen. Mit der Verwendung eines Gas-Targets kann nun eine hohe Luminosität erreicht werden, sofern dieses fensterlos aufgebaut ist und die Elektronen nur mit dem Gas interagieren können. Hierbei beschäftigen wir uns mit dem Jet Target, wobei Gas durch eine Laval Düse beschleunigt und mit einer hohen Geschwindigkeit durch das Vakuum der Streukammer in einen „catcher“ bewegt wird, um dort direkt abgepumpt zu werden. Für das MAGIX-Experiment bedarf es eines komplexen Slow Control Systems.

Ziel ist es die Vielzahl an Messgeräten und Steuerelementen, welche zum Betrieb des Jet Targets benötigt werden, zu steuern und zu überwachen. Der generelle Aufbau sowie die Funktionsweise des Slow Controls soll auf diesem Poster veranschaulicht werden. Zusätzlich werden wir hier näher auf den Aufbau des Prototyp-Systems eingehen, welches für den Teststand des Jet Targets entwickelt wird.

HK 45.65 Mi 18:30 S1/05 22-24

Interferometrische Methode zur Bestimmung eines Gas-Jet-Dichteprofils — •Julian Rausch für die Magix/MESA-Kollaboration — Institut für Kernphysik, Johannes Gutenberg-Universität Mainz

MESA "Mainz Energy-Recovering Superconducting Accelerator" wird 2017 an der Johannes Gutenberg Universität Mainz als neuer Elektronenbeschleuniger in Betrieb gehen. Dieser ermöglicht hochpräzise Messungen bei niedrigen Energien und hoher Strahlintensität am MAGIX-Experiment. MAGIX verfügt über ein sogenanntes Gas-Jet-Target, welches die energierückgewinnende Eigenschaft des MESA-Beschleunigers zu nutzen ermöglicht. Außerdem wird es fensterlos betrieben, wodurch zusätzlich eine hohe Luminosität erreicht wird.

Die genaueren Eigenschaften des Targets wollen wir mithilfe einer interferometrischen Methode zur Bestimmung des Gas-Jet-Dichteprofils genauer überprüfen. Wir illustrieren den Aufbau des Targets, erläutern die Messmethode im Detail und stellen einige vorläufige Ergebnisse vor.

HK 45.66 Mi 18:30 S1/05 22-24

Entwicklungen für den $\overline{\text{P}}$ANDA MVD Silizium-Streifen-

Detektor* — •Robert Schnell, Kai-Thomas Brinkmann, Valentino Di Pietro, Tommaso Quagli, Alberto Riccardi und Hans-Georg Zaunick für die PANDA-Kollaboration — II. Physikalisches Institut, Justus-Liebig-Universität Gießen

Das $\overline{\text{P}}$ANDA-Experiment am zukünftigen Beschleunigerzentrum FAIR in Darmstadt wird Reaktionen von Antiprotonen mit stationären Targets (Wasserstoff und schwere Kerne) untersuchen. Dadurch sollen wesentliche Erkenntnise zur starken Wechselwirkung erlangt werden. Der Mikro-Vertex-Detektor (MVD) als zentraler Tracking-Detektor soll hoch aufgelöste Spurvermessung und das Erkennen sekundärer Vertizes mit einer Auflösung von bis zu 100 μm ermöglichen. Dazu werden Hybrid-Pixel-Sensoren und doppelseitige Silizium-Streifen-Sensoren eingesetzt.

Vorgestellt werden aktuelle Entwicklungen und Ergebnisse. Dies beinhaltet Tests der ersten Lieferung finaler Sensoren für den MVD Detektor. Diese Messungen zur Charakterisierung werden zum Zwecke der Qualitätssicherung durchgeführt. Desweiteren werden erste Ergebnisse des speziell für den $\overline{\text{P}}$ANDA MVD entwickelten selbst-triggernden Front-End Chips zur Auslese der Streifen-Sensoren - PASTA (**P**ANDA **ST**rip **A**SIC) - präsentiert.
Unterstützt vom BMBF, HICforFAIR und JCHP.

HK 45.67 Mi 18:30 S1/05 22-24

Construction of a Test Stand for the Measurement of the Light Output Uniformity of CALIFA Crystals — •Markus Susenburger, Alexander Ignatov, and Thorsten Kröll — Technische Universität Darmstadt, Darmstadt, Germany

Currently, the **F**acility for **A**ntiproton and **I**on **R**esearch (FAIR) at GSI in Darmstadt is under construction. One experiment at GSI and FAIR is called **R**eactions with **R**elativistic **R**adioactive **B**eams (R^3B). A key component of the R^3B is the **CAL**orimeter for **I**n **F**light detection of γ-rays and light charged p**A**rticles (CALIFA), which will surround the R^3B target chamber and will be capable of the detection of γ-rays in a wide energy range from 100 keV to 30 MeV as well as of light charged particles. CALIFA is built out of two parts, the so called CALIFA barrel and CALIFA endcap. The barrel consists of 1952 CsI(Tl) detector crystals which have to fulfill several specifications. One of these specifications is the uniformity of the light output. Depending on the location of the deposited energy, the crystal's light output varies due to optical focusing effects. This behavior can be manipulated by lapping the crystal's surface. The aim of this work is the development of a test stand which will check if the crystals match the requirements according to the light output uniformity. Because of the large number of crystals needed to be tested, the stand automates the test procedure, which guarantees comparable test measurement for all crystals. The development and construction of this stand is reported.

Work supported by the German BMBF (05P15RDFN1).

HK 45.68 Mi 18:30 S1/05 22-24

The primary target for the hypernuclear experiment at $\overline{\text{P}}$ANDA — Sebastian Bleser[1], Felice Iazzi[2], •Marta Martinez Rojo[1], Josef Pochodzalla[1,3], Nicolas Rausch[3], Alicia Sanchez Lorente[1], and Marcell Steinen[1] for the PANDA-Collaboration — [1]Helmholtz-Inst. Mainz — [2]Politec. and INFN, Torino — [3]Inst. für Kernphysik, JGU Mainz

A key aspect of the $\overline{\text{P}}$ANDA experiment at the future FAIR facility is the production and spectroscopy of $\Lambda\Lambda$ hypernuclei. The double hypernuclei are produced in a two-stage target system consisting of a primary in-beam filament to produce low momentum Ξ^- hyperons which are stopped and converted into two Λ hyperons in a secondary external target.
A system of piezo motors will be used to steer the primary target in two dimensions. This allows to achieve a constant luminosity by adjusting the position and provides the replacement of eventually broken target wires.
The poster shows the mechanical integration of this system within the vacuum chamber attached to the beampipe. Its motion is controlled using the EPICS framework as planned for $\overline{\text{P}}$ANDA. In addition the results of radiation tests with foreseen target wires will be presented.

HK 45.69 Mi 18:30 S1/05 22-24

Experimental study of nuclear vorticity with the ^{12}C(e,e'γ) reaction at the QCLAM electron spectrometer* — •Tobias Klaus, Simela Aslanidou, Sergej Bassauer, Andreas Krugmann, Peter von Neumann-Cosel, Norbert Pietralla, Vladimir Ponomarev, Maxim Singer, and Jochen Wambach — Institut für Kernphysik, TU Darmstadt

Experiments of inelastically scattered electrons in coincidence with real photons have the big advantage that the probe is purely electromagnetic and hence allow for nuclear structure studies of highest precision. We plan electron-γ-ray coincidence spectroscopy at the QCLAM electron spectrometer at the S-DALINAC. The first experiment is a study of γ-decay angular distributions in ^{12}C in order to infer the vorticity of nuclear velocity fields in low-lying exited states. We present the experimental setup and discuss theoretical predictions for the velocity field distributions for the 2_1^+ and 3_1^- state. The $1_{T=1}^+$ state at 15.11 MeV will be used to calibrate the setup for further experimental campaigns.

*Supported by the DFG within the SFB 1245.

HK 45.70 Mi 18:30 S1/05 22-24

Development of an event builder for the new SADC-readout of the Crystal Barrel calorimeter — •Jan Schultes and Johannes Müllers for the CBELSA/TAPS-Collaboration — Helmholtz-Institut für Strahlen- und Kernphysik, Bonn, Germany

The CBELSA/TAPS experiment at the electron accelerator ELSA in Bonn investigates the photoproduction of mesons off nucleons.

Presently the readout of the CsI(Tl)-crystals of the Crystal Barrel calorimeter is being upgraded from a PIN-diode readout to an APD readout to create a fast signal for first-level-triggering. Furthermore, an entirely new setup consisting of Sampling-ADCs (SADC) with FPGA-based readout is being prepared to increase the possible data rate achievable.

The SADC is capable of sampling pulses from the detector with 80 MHz, extracting features by FPGA-logic and transferring this data via UDP. To improve package-handling, a server-client structure will be provided. It is foreseen to receive packages from each of the 48 SADC units (32 channels each), detect and handle possible package losses, distribute the received information further via TCP and control the SADC-behaviour. In addition and to assist the FPGA firmware development, a tool to monitor outgoing pulses and to extract important features, such as the deposited energy, timing information and pile-up detection to cross-check the information given by the FPGA is being developed.

Supported by the Deutsche Forschungsgemeinschaft (SFB/TR16).

HK 45.71 Mi 18:30 S1/05 22-24

Superconducting Shielding for a Polarized Target in $\bar{\text{P}}$ANDA — •María Carmen Mora Espí[1], Bertold Fröhlich[1], Alaa Dbeyssi[1], Patricia Aguar Bartolomé[1], Kathrin Gerz[1], Samer Ahmed[1], Yadi Wang[1], Dexu Lin[1], Ana Peñuelas[2], and Florian Feldbauer[1] for the PANDA-Collaboration — [1]Helmholtz-Institut Mainz — [2]Universitat de València

The measurement of the phase between the electric and the magnetic form factors of the proton can be measured using a polarized interaction. A feasible possibility to allow this kind of reactions would be to develop a transversely polarized proton target to be used in the $\bar{\text{P}}$ANDA experiment. The first step to achieve the transverse target polarization is to study the feasibility of shielding the target region from the external 2 T longitudinal magnetic field generated by the $\bar{\text{P}}$ANDA solenoid.

BSCOO-2212, a new high-temperature superconductor material, has been identified as a possible candidate to be used for shielding this external magnetic field. Tests at 4 K have taken place in the Helmholtz Institute Mainz with this material, and the first preliminary results will be shown here.

HK 45.72 Mi 18:30 S1/05 22-24

An FPGA-based Slowcontrol Module and a Baseline shifting extension card for the Sampling-ADC Readout of the Crystal Barrel Calorimeter — •Georg Urff and Timo Poller for the CBELSA/TAPS-Collaboration — Helmholtz-Institut für Strahlen- und Kernphysik, Bonn, Germany

At the electron accelerator ELSA (Bonn) the CBELSA/TAPS experiment investigates the photoproduction of mesons off protons and neutrons. The CsI(Tl)-crystals of the Crystal Barrel calorimeter are being upgraded from a PIN-diode readout to an APD readout. In the context of this upgrade, an FPGA-based Sampling-ADC (SADC) is presently being developed (HK 304).

A Slowcontrol Module for the SADC with TCP/Telnet access has been developed on the basis of a Spartan6 FPGA. Control and monitoring of the SADC's power supply as well as control of parameters of the analog and digital data processing in the SADC is realized via PMBus/I^{2}C. The prototype as well as an overview of its functionality will be presented.

In order to fully utilize the dynamic input range of the SADCs, an interfacing extension board was designed. It receives the differential signal generated by previous amplification stages and adds an individual DC offset voltage to each channel supplied by a digital-to-analog converter. The circuit and the used techniques as well as simulations and measurements will be presented.

Supported by the Deutsche Forschungsgemeinschaft (SFB/TR16).

HK 45.73 Mi 18:30 S1/05 22-24

Event reconstruction for the RICH prototype beamtest data 2012 and 2014. — •Semen Lebedev for the CBM-Collaboration — II. Physikalisches Institut JLU Giessen

The Compressed Baryonic Matter (CBM) experiment at the future FAIR facility will investigate the QCD phase diagram at high net baryon densities and moderate temperatures in A+A collisions from 2-11 AGeV (SIS100). Electron identification in CBM will be performed by a Ring Imaging Cherenkov (RICH) detector and Transition Radiation Detectors (TRD).

A real size prototype of the RICH detector was tested together with other CBM prototypes (TRD, TOF) at the CERN PS/T9 beam line in 2012 and 2014. In 2014 for the first time the data format used the FLESnet protocol from CBM delivering free streaming data. The analysis was fully performed within the CBMROOT framework. In this contribution the event reconstruction methods which were used for obtained data are discussed. Rings were reconstructed using an algorithm based on the Hough Transform method and their parameters were derived with high accuracy by circle and ellipse fitting procedures. Results of the application of the presented algorithms will be also presented.

HK 45.74 Mi 18:30 S1/05 22-24

Feasibility studies for the open-charm production in proton-antiproton reactions for the PANDA experiment — •Solmaz Vejdani for the PANDA-Collaboration — KVI-CART, University of Groningen, The Netherlands — Forschungszentrum Jülich, Jülich, Germany

The PANDA experiment is one of the pillars of the future Facility for Antiproton and Ion Research (FAIR) in Darmstadt, Germany. The PANDA physics program is focused on answering fundamental questions related to Quantum Chromodynamics (QCD), mostly in the non-perturbative energy regime. Spectroscopy exploiting Λc -baryons that are composed of a heavy charm valence quark and two light valence quarks is an integral part of the PANDA physics program. Such systems can systematically provide information on various key features of QCD, such as heavy-quark symmetry, chiral symmetry breaking, and the nature of exotic states. In this work, the experimental feasibility of studying the production mechanisms of associative open-charm baryons in antiproton-proton annihilations is investigated by using Monte Carlo simulations. I present results obtained for the channel $p\bar{p} \to \bar{\Lambda}_c\Lambda_c$, highlighting the detector performances (efficiencies and resolutions) and the statistical significance that can be achieved with the foreseen luminosities.

HK 45.75 Mi 18:30 S1/05 22-24

Test of a PCIe based readout option for PANDA — •Simon Reiter[1], Heiko Engel[2], Sören Lange[1], and Wolfgang Kühn[1] for the PANDA-Collaboration — [1]Justus-Liebig-Universität Giessen, Germany — [2]Goethe-Universität Frankfurt, Germany

The future PANDA detector will achieve an event rate at about 20 MHz resulting in a high data load of up to 200 GB/s. The data acquisition system will be based on a triggerless readout concept, leading to the requirement of large data bandwidths. The data reduction will be guaranteed on the rst level by an array of FPGAs running a full online reconstruction followed by the second level of a CPU/GPU cluster to achieve a reduction factor more than 1000.

The C-RORC (Common Readout Receiver Card), originally developed for ALICE (A. Borga et al., JINST 10 (2015) 02, C02022), provides on the one hand 12 optical links with 6.25 Gbps each, and on the other hand a PCIe interface with up to 40 Gbps.

The receiver card has been installed and tested, and the rmware has been adjusted for the Panda data format. Test results will be presented.

*This work is supported by BMBF(05P12RGFPF).