

Draft Minutes of the 60th Meeting of the PRC DESY November 10th and 11th 2005

PRC members present:

G. Anton (Erlangen), J. Brau (Oregon), J. Buchholz (Siegen), R. Forty (CERN), U. Gensch (DESY), R. Heuer (DESY/U Hamburg), W. Hollik (MPI Munich), Y.K. Kim (Chicago), J. Kühn (Karlsruhe), T. Lohse (HU Berlin), R. Milner (MIT), N. Saito (Kyoto U), J. Schneider (DESY), B. Spaan (TU Dresden), J. Timmermans (NIKHEF), D. Trines (DESY), A. Wagner (DESY), S. Riemann (DESY, scientific secretary), U. Schneekloth (DESY, HERA experiment coordinator), D. Pitzl (DESY, next HERA experiment coordinator)

Non PRC members attending closed session items:

HERA: F. Willeke, (DESY), M. Bieler (DESY), A. Gamp (DESY)

Pol2000: T. Behnke (DESY), S. Baudrand (Orsay)

ILC R&D: C. Damerell, T. Behnke, J. Mnich

Theory: W. Buchmüller (DESY), F. Schrempp (DESY), J. Blümlein (DESY), S. Moch (DESY), T. Riemann (DESY)

Representatives from the Experiments:

H1: M. Klein (DESY), C. Diaconu (Marseille CNRS/IN2P3), G. Eckerlin (DESY), E. Perez (Saclay), O. Behnke (U Heidelberg)

ZEUS: R. Yoshida (Argonne), M. Wing (U College London), Y. Yamazaki (DESY), W. Zeuner (DESY), E. Gallo (U Florence and INFN)

HERMES: EC Aschenauer (DESY), J. Stewart (DESY), B. Zihlmann (DESY), P. DiNezza (INFN Frascati)

HERA-B: M. Medinnes (DESY), J. Spengler (DESY), A. Zoccoli (INFN, U Bologna)

IceCube: R. Nahnauer (DESY), S. Schlenstedt (DESY)

CALICE: JC Brient, F. Sefkow (DESY), JC Vanel (LLR-Ecole Polytechnique)

LCCAL: phone conference: M. Margoni (INFN)

External Referee: D. Pitzl

The PRC received the following documents:

Update Reports from existing R&D projects:

PRC R&D 00/02 update 02(05)

PRC R&D 01/02 update 02(05)

Agenda

Open session: November 10th 2005, Main Auditorium

HERA	Ferdinand Willeke
H1	David South
ZEUS	Wolfram Zeuner
HERMES	Elke-Caroline Aschenauer
IceCube	Rolf Nahnauer
Invited talk on ILC Detector R&D	Chris Damerell
CALICE	Felix Sefkow
Theory	Wilfried Buchmüller

Closed Sessions: November 10th and 11th, Seminar room 1

1. Approval of minutes and matters arising from last meeting
2. News from the Laboratory
3. ILC Detector R&D
 - CALICE
 - LCcal
4. IceCube
5. Review of HERA
6. Review of POL 2000
7. Review of HERA Experiments
 - H1
 - ZEUS
 - HERMES
 - Discussion of combined HERA working groups
 - Executive session on HERA running
 - HERA-B
8. Review of External Experiment
9. Review of Theory
10. AOB

Item 1: Approval of the minutes and matters arising from the last meeting

The PRC would like to thank the leaving member B. Spaan for having served on the DESY PRC over 6 years, and would also like to thank T. Lohse and N. Saito for agreeing to continue their PRC membership for another two years.

. The PRC thanked U. Schneekloth for being a PRC member as the HERA experiment coordinator and welcomed D. Pitzl as the new HERA experiment coordinator. The minutes of the 59th session were accepted with minor changes.

Item 2: News from the Laboratory

A. Wagner presented the news from the laboratory. HERA had an excellent running in 2005, the experiments perform well. Assuming that HERA continues to work with the same efficiency an integrated luminosity of $700\text{-}750\text{pb}^{-1}$ is expected until the end of HERA II. Increased emphasis is needed to ensure the analysis after the end of running 2007.

The participation in the LHC is a natural continuation of the HERA programme and an ideal preparation for physics at the ILC. The decision about the active participation in ATLAS or in CMS will take into account what strengthens the visibility of Germany at the LHC most.

A lot of progress has been made towards the baseline design configuration of the ILC. Most of the baseline design of the main linac corresponds to the TESLA TDR. The VUV-FEL and XFEL experience and work are the main input from DESY. A Baseline Configuration Document will be ready end of 2005 and a Reference Design Report (RDR) with cost considerations end of 2006. Further changes in the design are only possible under the supervision of the GDE team.

DESY has 2 key people in the Global Design Effort (GDE) for the ILC.

The VUV-FEL has started the user operation in August 2005 and users have taken data successfully. The European XFEL Project is in the preparatory phase and 13 countries have signed a Memorandum of Understanding. M Altarelli became the European Project Team leader, R. Brinkmann is responsible for the accelerator complex and A. Schwarz for the technical infrastructure. The XFEL will be an independent entity in the legal form of a limited liability company. DESY will be a major partner, e.g. for accelerator and scientific use. The TDR including the cost estimate will be ready in summer 2006.

The Foundation of the European Industry Forum for SCRF Accelerator Technology will strengthen the position of the European science and industry by generating political support and insuring a flow of information, promoting the involvement of industry and supporting the members to access information channels and decision makers. A first meeting took place in October.

The public hearing for the project approval procedure (“Planfeststellungsverfahren”) is over; no major difficulties have appeared. The verdict is expected end of January 2006 with an approval for construction and operation of the facility.

The PRC takes note of the report presented by A. Wagner. Establishing theoretical effort at DESY in photon science is an issue that should be resolved, without reducing the size of the particle physics theory group. The high visibility of DESY scientists in the GDE (Global Design Effort) and in outreach for the ILC is welcomed by the PRC, as is the initiation by DESY of a superconducting RF industrial forum in Europe.

Item 3: ILC Detector R&D

3.1. PRC reviewing ILC Detector R&D

After the technology choice for the International Linear Collider in 2004 it was mandatory to coordinate the detector R&D programs worldwide. A R&D Panel was established by the World Wide Study Organizing Committee to create and maintain a register of ongoing programs relevant for ILC experiments. The programs should also include activities needed for measurements of luminosity, energy and polarization and others and may overlap with the Machine detector Interface (MDI) panel. The activities are continued until a global lab assumes these responsibilities. End of 2005 a written report will be produced which identifies and prioritises the topics and areas of detector R&D which need immediate support. The urgent task of the Detector R&D Panel is to establish the current levels of support in different countries, and to quantify the needed expansion. The creation of a global peer review panel with a modest budget to support projects could help to stimulate the expanded programme. More than 90% of support will continue to be supplied by national funding sources.

The European Initiative for detector R&D towards the ILC (EUDET) was recently selected for funding by the European Union. Coordinated by Joachim Mnich, this programme will support the development and the construction of larger prototypes of detectors for vertexing, tracking and calorimetry with 7 Million Euros over 4 years. Also the networking between the institutes will be encouraged by travel money. In total, with the commitment of the national funding the project budget is 21 Million Euros.

The PRC is happy to continue in its role of reviewing Detector R&D proposals for the ILC, and in doing so will carefully consider the recommendations and priorities that will be made by the ILC Detector R&D Panel, chaired by Chris Damerell. The success of the EUDET proposal for funding of Detector R&D infrastructure in Europe is welcomed.

3.2. LCCAL

In a phone conference M Margoni presented the status report for the LCCAL collaboration. The displacement of manpower towards other projects and the difficulty in finding people interested in this subject, partly due to the distance in time to the ILC startup, are the main causes of the strong manpower reduction. Inside the INFN community a "Road Map" process is starting in order to define its involvements in the various physics of the next future. New strengthened interest could collect new people to share the coordination responsibility with the LCCAL group. If this will not happen the currently available people will reanalyze the testbeam data. Aim is to develop new algorithms to get rid of the light leakage and the Pad saturation in the particle separation study. Unless an increase of the collaboration occurs no further PRC Reviews are asked for.

D. Pitzl presented the reviewer's report on the LCCAL project for himself and J. Brau. They acknowledged the role of LCCAL as the first DESY PRC R&D project which has built a prototype and put it to test beams. Encouraging results on energy and position resolution and on uniformity have been obtained and agreed with the simulations. However, problems with the prototype and test beam data preclude the study of particle flow algorithms and jet energy resolution.

The project has come to a stop due to lack of human and financial resources. Further progress can only be made with new collaborators and new funding.

The discussion was continued in the closed session.

The PRC congratulates the LCCAL group for building the first beam-tested linear collider calorimeter prototype, of a cost-effective lead-scintillator calorimeter, with encouraging early results on energy and position resolution and uniformity. Unfortunately no further progress is being made, due to a lack of human and financial resources. The PRC encourages the LCCAL group to investigate possibilities of further support in Italy, or with CALICE or other collaborators.

3.3. CALICE

J.-C. Briant presented an overview on the status of the collaboration and the improved organization structure. The members have signed a Memorandum of Agreement describing the CALICE collaboration as well as its goals and plans. The collaboration is progressing in completing the prototypes and in increasing the number of collaborators.

The focus is now on the preparation of the ambitious testbeam programme in 2006-2008 at CERN and FNAL. A first testbeam run with a partially instrumented ECAL prototype was successfully completed in 2005 at DESY. The detector and readout performance has been established. The wafer production remains critical for the full testbeam programme; the development of electronics and mechanics for the technical prototype is under way. A combined ECAL-HCAL test will follow later. For both, tile and digital HCAL different hadronic shower models will be validated and the technology choice for the ILC experiments will be tested.

The collaboration asks for support and manpower and an endorsement of a testbeam with the digital HCAL. Concerning the latter one is waiting for US funding. The European part of the collaboration anticipates support from EUDET funding.

J. Brau presented the reviewer's report on the CALICE project for himself and D. Pitzl. The detailed report of the CALICE collaboration shows the excellent progress in the last two years, and laying out many of the remaining technical issues. A clear strategy has been established to decide between various calorimeter options. High quality test beam data will be taken with full-size (in depth) prototypes and unprecedented sampling granularity under various conditions. The shower simulations will be tuned and particle flow algorithms applied, benchmark tests like W-Z separation will be performed. The technical and financial constraints are taken into account.

The discussion was continued in the closed session.

The PRC congratulates the CALICE collaboration for the steady progress that they have made, with a number of technical problems being addressed and the signing of a Memorandum of Agreement by the collaboration members. The PRC agrees with the collaboration that testing of both analog and digital HCAL prototypes is important, and expresses concern about the US funding for the digital HCAL. The PRC considers that CALICE is a very important program for the ILC detectors, and should continue their strong effort with high priority.

Item 4: Review of IceCube

There was no presentation of the IceCube/AMANDA collaboration in the closed session. The physics results are still based on measurements with AMANDA, the largest neutrino telescope worldwide. The IceCube observatory will increase the effective area by a factor 30. The mass production of optical modules for the strings is ongoing; the string deployment has started close to the AMANDA for cross-calibration and for verification. The planned schedule is tight due to logistics and safety requirements.

To allow much larger detector volumes concepts for larger hybrid optical-radio-acoustic detectors are under study. The goal would be physics with extremely high energetic cosmic neutrinos. After testing acoustic detection with very promising results in the laboratory, the proof of basic properties of the target material needs to be tested with a South Pole Acoustic Test Setup (SPATS).

G. Anton gave the referee report on the IceCube collaboration. The groups work forcefully and with tremendous enthusiasm to stay in time with the production and deployment of modules and to present physics results. With respect to the directions of particle astrophysics the extension of the detector volume and the development of acoustic sensors as a future technique is the right way.

The discussion was continued in the closed session.

The PRC congratulates the DESY Zeuthen group for the Amanda physics analyses and high visibility in the collaboration, as well as for the successful production of high quality optical modules for IceCube. The successful deployment of the first string of modules is welcomed, but any delay in deployment of further strings would be a concern. The PRC considers that the acoustic detection technique has an excellent potential for future very-high-energy neutrino observation, although the successful deployment of the IceCube optical modules should have the highest priority.

Item 5: Review of HERA

HERA made a big step in improving the performance compared to 2004, more than 210 pb^{-1} of luminosity have been delivered, but polarization is in competition with luminosity. Running with electrons turned out to be slightly more difficult; somewhat larger background and occasional lifetime break down have been obtained. However, this was more than balanced by a large luminosity enhanced by dynamic beta (+10%). There have been a number of technical problems reducing the operation time by about 40%. The technical problems and the background problems have either been solved during the run or are addressed in the HERA improvement program. Switching from positrons to electrons or vice versa during the run is very time consuming (25d) whereas switching after the shut down requires more commissioning time (~7days).

Operating HERA with lower energy is most likely possible; the parameters need to be worked out. The loss in luminosity is estimated to be 90 pb^{-1} .

The discussion was continued in the closed session.

HERA has been performing excellently, reaching an integrated luminosity of over 200 pb^{-1} delivered in 2005, and the PRC is greatly impressed by the progress. This success which

results from the excellent efforts of the accelerator staff, is due both to the decrease in hardware failures, resulting in fewer interruptions, and a systematic approach to solving problems. The PRC acknowledges that the improvements foreseen during the next shutdown correctly prepare for future operation, and recognizes that keeping the current team together is important for the continued success of the HERA run until 2007.

Item 6: POL2000

Ties Behnke presented the status of the POL2000 project. Each polarimeter, TPOL and LPOL, has been working stable, reliable and highly efficient but the results do not agree with each other. A sudden jump by approximately 10% happened in the ratio of LPOL and TPOL results. Despite intense checks no reason has been found which explains this effect. The work is ongoing to understand the systematic errors better with the goal to reduce them further. The manpower situation is critical. The cavity project is delayed, the commissioning of the cavity failed until the shutdown. A support of continuing the commissioning will help to operate the cavity for a reasonable time and to be used at least as a cross check for the LPOL and TPOL.

P. Buchholz presented the referee's report on POL2000 for himself and R. Milner. Stable operation of TPOL and LPOL with efficiencies better than 95% was obtained in 2005; both together showed an overall efficiency of more than 99%. The already previously seen difference of about 10% between the measurements with LPOL and TPOL appeared during a period of about one month and puts the overall precision of 2% required by the experiments into question. The commissioning of the new cavity LPOL failed, the problems are not yet understood and will be solved during the shutdown. The new calorimeter has been installed, serious noise and DAQ problems were obtained. The testbeam calibration will be possible during the shutdown. The Orsay group is committed to the cavity and the analysis. A stop of the cavity commissioning would not provide increased person power to the old LPOL and TPOL, the commissioning should go on.

The discussion was continued in the closed session.

The PRC acknowledges the continuing support of the polarimeters by a small, dedicated group, but is concerned that a jump in the LPOL/TPOL ratio (of ~10%) has again occurred for a period of time during the last run, and is not understood. The PRC recommends that priority should continue to be given to the understanding of the existing TPOL and LPOL. The continued commissioning of the cavity polarimeter is supported, but interference with HERMES and the LPOL should be minimized. It should eventually provide a useful cross-check of the existing polarization measurements.

Item 7: HERA Experiments

7.1. H1

There was no presentation of the collaboration in the closed session.

The H1 detector is in a good shape and taking high quality data, up to 20pb^{-1} per month could be used for analysis. A large number of analyses and publications of HERA I data has been

achieved; the analysis of HERA II data is ongoing. The H1 hardware projects are close to completion. In order to clarify the observed excess of isolated leptons H1 prefers to return to e^+p collisions after the shutdown. More details of the HERA running strategy are discussed in item 7.4 of the agenda.

T. Lohse presented the referee's report for P. Buchholz and himself. In an efficient data taking H1 recorded 115pb^{-1} of 210pb^{-1} delivered. With the excellent run conditions in the past month a DAQ efficiency of 95% and a HV-on efficiency of 80-90% were achieved.

The Fast Track Trigger (FTT) and the Very Forward Proton Spectrometer (VFPS) have been successfully completed. The repair of the Forward Silicon Tracker (FST) and the Backward Silicon Tracker (BST) has been finished and FST/BST are ready for installation. The VFPS is fully operational, some technical problems are fixed. The VFPS was taking data during 85% of the HV-on time. Ongoing work concerns calibration and detector performance and the improvement of operational procedures.

One group left the collaboration, the responsibilities were redistributed. There is an expression of interest of one new group.

The discussion was continued in the closed session.

The PRC congratulates H1 for the significantly improved detector performance and data taking efficiency, and for their dedication to physics analysis up to and beyond the end of HERA operation. The PRC notes that there are no major detector problems, the FTT and VFPS upgrade projects have been successfully completed, the FST/BST repairs finished and ready for installation, and the remaining detector work is to complete the Level 3 Trigger – DAQ interface. The PRC appreciates the human resources survey effort beyond 2007, and is pleased to see there should be enough physicists to carry out physics analysis of the complete dataset.

7.2. ZEUS

R. Yoshida presented the status of the experiment. HERA II has delivered almost 300pb^{-1} to ZEUS. The high efficiencies of data taking achieved at the end of the positron running in 2004 were maintained through the 2004/5 electron running.

The Forward Straw Tube Tracker (STT) which is off due to insufficient cooling will be operational again after the shutdown. Repair plans for the shutdown are made and reviewed by external engineers, the repair preparation is ready. Tracking studies for the STT were intensified and using the real data from 2004 the usefulness of the STT for physics is confirmed. The combined pattern recognition is well under way.

All publications are still HERA I, first HERA II publications will follow in the next 6 months. The steady reduction of manpower will have no impact on the data taking until the end of HERA II. A significant drop is expected in the analysis manpower, particularly beyond 2007. The collaboration began to formulate strategies to deal with this and evolves a model for the analyses and the computing strategy beyond 2007. Efforts are going on to combine the HERA results but the manpower is a problem. Formally, ZEUS thinks about a semi-autonomous combined

working group with a lot of visible credit going to its members but is flexible and can consider many scenarios.

Details of the HERA running strategy are discussed in item 7.4 of the agenda.

B. Spaan presented the referee's report for Y-K Kim and himself. ZEUS provided copious high quality physics results. Apart from the STT the new detectors were operated successfully. With the high data taking efficiency ZEUS can make use of the high luminosity delivered. The goal precision of 1% for the luminosity measurement is not yet reached. The tracking software to integrate old and new detectors is improving and the MC production is successfully using GRID. The combination of H1 and ZEUS results has started; there is considerable room for improvements. The manpower is at a minimum level but sufficient to operate the detector. More person power would help to complete the tracking software, to improve the luminosity measurement and quickly to turn HERA II data into publications. ZEUS should finalize all remaining issues very soon to avoid that they remain open forever with the drop of manpower.

The discussion was continued in the closed session.

The PRC congratulates the ZEUS collaboration for their excellent detector performance, high data taking efficiency and physics output. The PRC recognizes that the detector is in good condition and STT repair during the shutdown is ready. The PRC appreciates that development of human resources has been studied, and that the collaboration has begun to formulate strategies to deal with the decline expected beyond 2007, by optimizing the analysis model and computing strategy.

7.3. HERMES

E.-C. Aschenauer presented the status of HERMES. The collaboration is active in publishing the physics results; the HERA-I analysis is finalized and the analysis of HERA-II data is in full swing. The calibration runs for the recoil detector are finally analyzed. The cosmic test experiment is dismantled and all planned repairs are done. New backplanes for the SCIFI were produced and tested; the work on the readout from dynode 12 is still in progress. Dead light guide channels in the SCIFI will be removed by the use of spares and a (hopefully) repair in the rest of the shutdown. The recoil detector is ready for installation in the upcoming shutdown. Effort is still ongoing on software issues like tracking, Monte Carlo and alignment.

HERMES proposes to stick to the agreed running plan from October 2004 and to switch to positrons in late fall 2006. This will provide a charge and helicity balanced data set with highest luminosity and polarization.

R. Milner presented the referee's report for himself and N. Saito. Great progress in understanding quark flavor decomposition of nucleon spin has been reached and no evidence for significant anti-quark polarization has been seen. More than 5.5 million DIS events have been recorded in an outstanding 2005 run on the transversely polarized proton target. The high quality data set is important to constrain the transversity in the nucleon and to measure the structure function $h_1(x)$ from the HERMES asymmetries.

The recoil detector is ready for installation. Scientific goal is focused to the measurement of deeply virtual Compton scattering (DVCS) process. HERMES will take unique and important

data necessary to constrain the contribution of quark orbital angular momentum to the spin structure of the proton and can uniquely determine both real and imaginary parts of DVCS amplitude. The data taken by HERMES will be complementary to other planned measurements at JLab, COMPASS and eRHIC. Hence, a maximum fixed target luminosity and lepton polarization in 2006/7 is required.

The software for the recoil detector is not in shape to analyze data. This can be fixed by certain groups providing adequate manpower. An increased presence at DESY by senior leadership of recoil detector effort is strongly recommended. The goal must be a smooth data taking with recoil detector by summer 2006. The manpower for operation and support of the transverse and longitudinal polarimeters is critical: HERMES sees the cavity project diluting manpower for operating polarimeters.

The discussion was continued in the closed session.

The PRC congratulates HERMES for their successful running, great progress on physics output, and preparation of the recoil detector for installation. The PRC notes that software for the recoil detector is not yet ready for data to be analyzed, but that this can be accomplished by providing adequate human resources. The PRC recommends that people with the right skills from the recoil detector institutes be present at DESY to ensure that the data taken immediately after the shutdown are usable for physics.

7.4. HERA Running

The H1 collaboration expressed its preference for running with positrons after the shutdown. H1 observed an excess of 3.4 standard deviations to the Standard Model expectation for events at large hadronic transverse momentum. The excess has been observed in e^+p data but not in e^-p what could be explained by models of new physics. The events are rare. Doubling the e^+ statistics should lead beyond 4 standard deviations for a real signal. H1 intends to return to running with e^-p unless the effect will be confirmed by H1 and ZEUS with a large significance. The standard HERA programme is not affected since the switch to the basically known configuration with positrons has been estimated to cost one week in the running in phase. Asymmetry measurements profit from switches of the initial conditions.

Therefore the H1 Collaboration decided to propose to switch to positrons in January.

ZEUS has analyzed so far a part of the HERA data; the combination of H1 and ZEUS results gives an affect of 2.5 standard deviations.

The ZEUS collaboration expressed its concern regarding the consequences of an additional lepton switch. The total accumulated luminosity will be tangibly affected by an additional parameter change for HERA. In the past the bulk of luminosity losses was due to unpredictable problems introduced while changes are being made. The HERA data on isolated leptons with high transversal momentum do not show a compelling evidence of an excess beyond the Standard Model. The hypothesis that the present "excess" is real cannot be proven even with all of the remaining HERA II luminosity. ZEUS considers the change to positrons as an

unnecessary risk and strongly requests to stay with the original plan to switch to positrons only after the half of the total HERA II luminosity is accumulated with electrons.

The H1 collaboration also expressed an interest in a 3 months running at low proton energies in 2007 to measure the structure functions F_L and F_L^{Diff} at low x . The low energy programme has always been part of H1's HERA II goals. It can only be done at the end, when the luminosity is high and the running time short.

ZEUS has an ongoing internal evaluation of the running at low energies and will be ready in spring 2006 to make a statement.

The discussion has been continued in the closed session.

Although the excess in the lepton sample with high transverse momentum of the hadronic system that has been seen by H1 in e^+p running has a significance of over 3σ , when the H1 and ZEUS data are combined the significance is well below 3σ . Given that a change to positron running would lead to at least one week of delay in the start of luminosity running, and a possible risk of further delay in reaching the highest luminosity, the PRC does not see a compelling case for making a change to positrons during the next shutdown. The PRC recommends that the DESY management foresee to switch from electrons to positrons during the next run so as to ensure a balanced dataset with each beam, but early enough to ensure that a substantial positron sample will be accumulated before the end of HERA. The PRC acknowledges the request from H1 for a low energy run in 2007, but decided to defer its discussion until the next meeting, and referees have been assigned to review the physics case. In case the decision would be taken to have a low energy run, the switchover time to positrons should be adjusted accordingly.

7.5. HERA-B

M. Medinnes reported about the HERA-B analysis status. The collaboration is active in physics analysis. A considerable number of papers are in the publishing process or in preparation. The HERA-B analysis activity is expected to be largely completed by mid 2006.

The PRC welcomes that HERA-B is producing a range of physics results and recognizes their good progress. The PRC appreciates that the collaboration has a good strategy for the orderly completion of their analysis effort. The PRC welcomes the willingness of the DESY management to support limited effort continuing into 2006, particularly for students completing their thesis work.

Item 8: External Experiment

There was no presentation and no discussion with a LHC representative of the future DESY group in the closed session.

The PRC reviewed the report of the evaluation committee on opportunities for DESY in ATLAS and CMS, and found it to be an excellent report, presenting a lot of ideas, illuminating many aspects of the choice between the experiments, and well balanced. From the report it is clear that it was an excellent decision for DESY to participate at the LHC: there is a first class physics program in the near future, well adapted to the potential of DESY and to its physics program, in particular the ILC. Since the physics program of the two experiments is evidently very similar, and the potential for DESY to contribute to each experiment is similarly large, the choice will be made based on other differences. Time is critical and the PRC urges the DESY management to make their choice promptly, and encourages them to explain the motivation for the choice once it has been made.

Item 9: Theory Group

F. Schrempp presented an overview on the evolution of activities and human resources of the Hamburg Theory Group. At present the resources are sufficient. However, to keep the current level of scientific impact, it is crucial to fill the leading scientist position again in the field of collider physics after the forthcoming retirement.

T. Riemann presented an overview on the activities and manpower situation of the Zeuthen Theory Group. The human resources in collider physics are nearly critical. The presently available annex personnel should be maintained with the filling of the leading scientist position.

The continuous flow of excellent graduate students from universities to DESY is decisive for the scientific life and the success of the DESY theory groups in Hamburg and Zeuthen.

W. Hollik presented the referee's report for Y.-K. Kim, J. Kühn and himself. Theoretical physics constitutes an essential part of the scientific program of DESY and covers phenomenology, Lattice gauge Theory, Cosmology and Astroparticle Physics and Mathematical Physics. The interaction and close cooperation between theory and experiment is crucial for the success of the ongoing program and the planning of new projects. Close collaboration with universities and the Helmholtz Institutes is desirable. The DESY theory plays an important role within Germany and at an international level also through the organisation of workshops.

The phenomenology subgroup has shown continuous high activity and productivity and first class international reputation. Important for the future is the continuity in collider physics at ILC and LHC. During the past 3 years a significant shift is observed from lattice gauge theory to string theory and from phenomenology to cosmology and astroparticle physics. In view of the soon retirement of a leading scientist the theory group may face a situation where theoretical research in hadron or lepton collider physics is no longer represented well enough, with sufficient visibility. For the annex personnel of the Zeuthen phenomenology group the reduction is critical already now for an adequate activity. With a shift towards astroparticle physics appearing in the leading scientist position this will become even more serious. At least the present support at the postdoc and PhD level should be maintained.

The discussion was continued in the closed session.

The PRC recognizes that for the future performance of DESY as a high energy laboratory a highly visible theory group is essential. Particle phenomenology, covering physics of the Standard Model and beyond, is a central theme for DESY with its mission in high energy collider physics, with its aim to play a central role in the preparation and construction of the ILC and to significantly participate in an LHC experiment. The DESY theory group also plays an important role for the German particle physicists at universities, and the connection with universities is of basic importance for the future through engaging highly qualified young researchers. The PRC recommends that the collider physics theory group should be maintained at full strength, with a leading figure as is the case at present. At Zeuthen the new direction towards astroparticle physics is acknowledged. The rearrangement of resources that is entailed should be done carefully to ensure the continuing strength of the collider physics and lattice gauge theory group there.

Item 10: AOB

Successor candidates for B. Spaan were chosen.

The date for the next the 61st PRC meeting is May 11th and 12th, 2006.

The current list of PRC referees is:

P. Buchholz, T. Lohse:	H1
R. Forty:	HERA-B
R. Milner, N. Saito:	HERMES
Y.-K. Kim, B. Spaan:	ZEUS
G. Anton:	AMANDA/IceCube
P. Buchholz, R. Milner:	POL2000
J. Brau, J. Timmermans:	R&D for the ILC
W. Hollik, J. Kühn:	Theory
Y.-K. Kim, T. Lohse:	Theory

Invited Reviewer:

D. Pitzl:	R&D for the ILC: LCCAL, CALICE
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(S. Riemann – April 2006^{*})

^{*} November 2007: Numbers of the documents sent to this PRC meeting were corrected.

