Minutes of the 56^{th} Meeting of the PRC

DESY October 30^{th} and 31^{st} 2003

PRC members present:

H. Blümer (FZK), J. Brau (Oregon), R. Forty (CERN), U. Gensch (DESY), W. Hollik (MPI-Munich), K. Jakobs (Freiburg), Y.K. Kim (Chicago), R. Klanner (DESY), J. Kühn (Karsruhe), J. Mnich (Aachen), E. Reya (Dortmund), L. Rolandi (CERN,Chairman), D. Trines (DESY), B. Spaan (TU Dresden), A. Wagner (DESY), J. Stewart (DESY,secretary), U. Schneekloth (DESY,HERA experiment coordinator).

Non PRC members attending closed session items:

HERA	A. Gamp (DESY), M. Vogt (DESY).
Pol2000	B. Zihlmann (Gent).
Representatives from the Experiments:	
H1	M. Klein (DESY), P. Newman (Birmingham), D. Pitzl (DESY), S. Schmitt (Zurich), T. Greenshaw (Liverpool).
ZEUS	R. Yoshida (ANL), W. Zeuner (DESY), M. Wing (Bristol), J. Butterworth (UCLA), R. Carlin (Padova).
HERA-B	M. Medinnis (DESY), A. Zoccoli (Bologna), J. Spengler (MPI-Heidelberg).
HERMES	E. Aschenauer (DESY), M. Amarian (DESY), P. Di Nezza (Frascati), B. Zihlmann (Gent).
AMANDA, Baikal, IceCube	R. Nahnhauer (DESY), C. Spiering (DESY), P. Steffen (DESY), S. Schlenstedt (DESY).
New Proposals:	
HERA-g	P. Schlein (UCLA), M. Bruschi (Bologna), M. Medinnis (DESY)
HERA-c	A. Schwartz (Cincinnati).
R&D for TESLA Detectors:	R.D. Heuer (DESY), F. Sefkow (DESY).
LCAL-LAT	N. Shumeiko (Minsk),A. Stahl (DESY),W. Lohmann (DESY), A. Olshevski (DUBNA).
LCCAL	P. Checchia (Padova), M. Margoni (Padova).
SiLC	A. Savoy-Navarro (Paris), D. Gamba (Torino),M. Berggren (Paris), M. Krammer (Vienna), V. Saveliev (Obninsk), F. Hartmann (Karlsruhe).
External Reviewers:	J. Gayler (DESY), D. Pitzl (DESY), B. Schwingenheuer (MPI-Heidelberg).

The PRC received the following documents:

New Experimental Proposals:

PRC 03/03 HERA-g, a New Experiment for Glueball, Hybrid, and Odderon Studies at DESY

PRC 03/04 A Proposal for R& D Work on a Trigger for $D^{*\pm} \rightarrow D^0\pi^\pm \rightarrow h_1^+h_2^-\pi^\pm$ Decays Using the HERA-B Detector and An Experiment to Study CP Violation and Mixing in the D^0-$\bar{D}^0$ System via $D^0 \rightarrow K^+\pi^-/K^+K^-/\pi^+\pi^-$ Decays

Update Reports from Existing R&D projects:

PRC R&D 00/02 Update 01(03)
PRC R&D 02/01 Update 01(03)
PRC R&D 03/02 Update 01(03)

Agenda:

Open session. October 30th 2003, Main Auditorium

Status Reports LC R&D:
Luminosity Calorimeter–L.A. Tagger – A. Stahl (DESY),
Linear Collider Calorimeter (LCCAL) – M. Margoni (INFN, Bologna).

AMANDA,Baikal,IceCube – C. Spiering (DESY).

Proposal Hera-g – P. Schlein (UCLA).

LOI Hera-c DSTAR–TRIG – A. Schwartz (Cincinnati).

HERA Machine – M. Vogt (DESY).

HERA-B – J. Spengler (MPI-K Heidelberg).

HERMES – P. de Nezza (INFN Frascati).

ZEUS – M. Wing (Bristol).

H1 – S. Schmitt (Zurich).

Closed sessions: October 30-31st 2003

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

Item 2. News from the Laboratory.

Item 3. Review of HERA.

Item 4. Review of Pol2000.

Item 5. Review of HERMES.

Item 6. Review of HERA-B.

Item 7. Review of HERA-g.

Item 8. Review of HERA-c DSTAR-TRIG.

Item 9. Review of AMANDA, Baikal, IceCube.

Item 10. Review of ZEUS.

Item 11. Review of H1.

Item 12. Review of LCAL–LAT.

Item 13. Review of LCCal.

Item 14. Review of SILC.

Item 15. Miscellaneous.

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

The minutes of the 55th session were accepted with minor changes.

The PRC would like to thank the leaving members R. Cashmore, K. Jakobs, and E. Reya for having served on the DESY PRC and would also like to thank J. Mnich and B. Spaan for agreeing to continue their PRC membership for another two years.

The PRC takes note of the memo from the Calice collaboration requesting a postponement of their review until Spring 2004 and agrees to their request.

The dates for the PRC meetings in 2004 were fixed to be May 27/28 and October 28/29.

Item 2. News from the Laboratory.

The status of the XFEL and Petra-III projects were reviewed. The plans for the linear collider were discussed. The technology decision for the linear collider will be taken in 2004. A full module test will be performed when funding is available, possibly in 2005. The general planning for particle physics at DESY for the next six years was discussed. Details on the work of the DESY HEP Strategy group were presented. The priorities of the laboratory were reviewed and the impact of the various commitments to the HERA-II and LC program were discussed.

The PRC takes note that the TDR for Petra-III is in preparation and that the laboratory — following the instructions of the Minister of Science — is preparing to convert Petra to a synchrotron light source in the foreseen schedule. The PRC iterates the importance that the approved HERA–II program — delivery of one fb^{-1} to each the H1 and ZEUS experiments and approximately equally distributed between e$^{+/-}$ L/R — is brought to its completion before the conversion of Petra. The PRC notices that — in spite of the recent progress on the HERA machine — it is unlikely that the HERA-II program will be completed in the present schedule of Petra-III and would like to open a discussion in the Scientific Council to explore the possibility of revising the schedule of Petra-III once HERA is running in stable conditions.

Item 3. Review of HERA.

There was no presentation in the closed session. The implications of the ground fault in the BU-magnet on HERA operation and the risk of additional failures were discussed. HERA will investigate ways to reduce the time needed to replace the magnet coils. The measures taken after the fire in the south hall were reviewed with special attention to preventive measures. The impact of the improvements implemented during the last shutdown on the background conditions at the colliders were reviewed. The vacuum at H1 and ZEUS still needed an improvement by a factor of three but the pressure measured at the pumps was still continuously decreasing. It was estimated that in 2 to 3 months the pressure should be at an acceptable level for both H1 and ZEUS. ZEUS reported that some positron injections produced substantial radiation doses at the MVD.

The PRC continued its discussion in closed session.

The PRC congratulates the HERA team for the progress in the operation of the machine and for starting to deliver relevant integrated luminosity to the experiments with polarized beams. The PRC is worried of the grounding failure that occurred on the BU-magnets. The PRC understands that the present plan is to deliver $\sim$100 pb^{-1} before summer 2004 and that there is good chance that the vacuum will improve with time allowing eventually to reach the design currents with reasonable background conditions in the experiments.

Item 4. Review of Pol2000.

B. Zihlmann presented the status of the polarimeters at HERA. J. Mnich reviewed the project. 20–30% polarization had already been achieved but a $\sim$7% difference between the two polarimeters is observed. The new laser cavity for the LPOL had been operated and the DAQ tested but at the time of the meeting the power supply for the laser was broken due to an unknown cause. It is planned that a new radiation hard calorimeter will be built by H1 which will be ready by mid-2004. The manpower situation in the Pol2000 group should be sufficient if the promised new manpower from H1, ZEUS, and Orsay is realized.

The PRC continued its discussion in closed session.

The PRC congratulates the polarisation team for the results shown on the polarisation measurement. The PRC takes note of the many urgent priorities of the polarisation team: understanding the discrepancy of 7% seen between Lpol and Tpol, new calorimeter for Lpol, defining a new maintenance scheme for the laser, etc. The PRC understands that there are new groups willing to participate to this program and that there is some progress from DESY but not yet from the Collaborations. The PRC looks forward that the steering group of Pol2000 will take actions in order to help the team to converge on the various topics.

Item 5. Review of HERMES.

E. Aschenauer presented the status of the HERMES experiment. The maintenance work performed during the shutdown was reviewed. Both the target and detector were fully functional. Since October 1^{st} 80k DIS events had been collected. The collaboration requested more beam with higher polarization. The status of the recoil detector upgrade project was presented. There are no additional delays since the last PRC meeting. HERMES publications and conference proceedings were discussed followed by the highlights of the most recent analysis.

R. Klanner presented the referee report for S. Bertolucci. The present status of the experiment is good and the initial results on transversity are interesting. The experiment needs their requested 7M DIS and the present program is strongly supported. Though significant progress on the recoil detector project has been made several concerns remain.

The PRC continued its discussion in closed session.

The PRC congratulates the Collaboration for the results presented and for the numerous publications. The PRC takes note of the progress on many components of the Recoil Detectors and notices that no further delay has been accumulated. The PRC looks forward to a timely completion of the commissioning of the Recoil Detector that allows installation during the next long shutdown, presently foreseen for August 2004. The PRC looks forward to an increased effort on the integration of the Recoil Detector in the Data Acquisition and in the Slow Control of the experiment.

Item 6. Review of HERA-B.

M. Medinnis reviewed the status of the data analysis of HERA-B. The collaboration hopes to publish the main analysis topics by mid–2004. Other physics topics will be published as they are finished. The analysis efforts are expected to be done by the end of 2005. R. Forty and K. Jakobs reviewed the experiment. Roughly 70 people were involved in the analysis of the HERA-B data but this number is expected to decrease in 2004. Therefore a rapid conclusion of the ongoing analysis is vital. The reviewers expressed the opinion that approval of the HERA-g experiment would have a negative impact on the analysis efforts.

The committee continued its discussion in closed session.

The PRC congratulates the Collaboration for the results presented. The PRC takes note of the significant progress on data analysis and encourages the Collaboration to publish most of the analyses by the end of 2005. The PRC acknowledges that the analysis of the HERA-B data is presently done with very limited resources and is worried that the approval of the HERA-g program could have a negative impact on the completion of the HERA-B analyses.

Item 7. Review of HERA-g.

The collaboration acknowledged that difficulties existed with resources and emphasized that a strong physics endorsement would greatly assist the collaboration. Concerning resources from INFN, It was pointed out that an endorsement of the physics program would have a significant impact on INFN. K. Jakobs then presented the referee report. The status of all necessary detector components was reviewed. The level one trigger was considered to be technically feasible. It was however unclear if the background rejection factor for the level two trigger would be sufficient, or if this would lead to a larger deadtime and therefore a reduced data set. In general, it was felt that the collaboration lacked the necessary manpower and experience to operate the HERA-B detector. The VDS, ITR, and OTR were of particular concern. Substantial financial support from DESY would be required for the detector operation.

The physics case for the experiment was discussed in detail. It is clear that HERA-g would add to the worlds data a major new precision data set covering an enhanced mass range. As the HERA-B detector has no holes in its acceptance, it is well suited to perform experiments where partial wave analysis is required. Though the HERA-B experiment has already shown nice data, it was unclear what restrictions the lack of information from forward protons would impose on the interpretation of the data. A detailed description of how glue-balls could be cleanly identified was not given but a large precision data set where one can study the multiplet structures in detail is required. The existence of the HERA-g data set would unquestionably have a major impact on the field.

The PRC continued its discussion in closed session.

The PRC takes note of the proposed experimental program on the study of centrally produced glue-balls and hybrid mesons and the investigation of Pomeron, Meson and Odderon exchange with the HERA-B detector. The PRC acknowledges that the proposed program would provide a very significant increase of statistics compared to previous experiments in the same field. The PRC looks forward that the Collaboration provides more information on their analysis strategy and how the increase in statistics will result in a progress in this field. The PRC will ask an external referees for an independent opinion on the proposed experimental program and specifically on why and how the large increase of statistics could make a significant step in the understanding of these complex fields of QCD. The final review of this proposal should be completed by the end of the year. The PRC is unanimous in rating the HERA-g program at a lower priority compared to the approved HERA-II program and proposes that the resources possibly needed for HERA-g are found without diminishing the present level of support by DESY to the approved program. The impact of the running of HERA-g on the experiments H1, ZEUS and HERMES should be quantified.

C.Amsler, M.Albrow, F.Close, M.Faessler, Klemt and G.Mallot were asked to act as external referees for the Hera-g proposal. C.Amsler declined.

Additional comments were received from W.Ochs. The document "The HERA-g analysis strategy", requested by the PRC in order to provide more information on the analysis strategy and how the increase in statistics will result in a progress in the field was received on December 14^{th}. Based on this information the chairman of the PRC in consultation with the HERA-g reviewers produced the following proposed recommendation which was agreed upon by the full physics research committee.

Proposal of recommendation:

1. **The subject of exotic mesons and the detailed study of Pomeron, Reggeon and Odderon exchange are important and deserve a high quality experiment.**
2. **The strong points of HERA-g are the high centre-of mass energy, and the quality and high rate capability of the HERA-B spectrometer.**
3. **The authors, neither in their original proposal nor in the note submitted on Dec. 14th, have made a convincing case on their analysis strategy and how the data would make a major progress in the field.**
4. **Several of the external referees express significant doubt that HERA-g will be able to fulfil its promise. In particular the lack of measuring the fast and slow baryons, the question if the rapidity trigger will achieve a sufficient rejection and the poor performance of the Inner Tracker are pointed out as weaknesses.**
5. **The Collaboration appears weak. There are strong worries about the manpower for operating the detector and to perform the analysis. The availability of funding for running the experiment is not clear.**
6. **The PRC does not recommend the proposal in its present form. However the Committee recognises the interest of a high quality experiment in this field at HERA-II energy and the possibility for increasing the return from HERA-B.**
7. **The PRC would look with interest to a new proposal by a stronger Collaboration. The new proposal should address the physics questions raised by the referees (see attached list) and should contain a clear strategy for the manpower for running the detector, for the manpower for performing the analysis and for funding the experiment including the running costs.**

In its meeting of 29.01.04 the DESY directorate decided not to approve the HERA-g proposal and also not to invite a further proposal.

Item 8. Review of HERA-c DSTAR–TRIG.

Several changes to the letter of intent were given at the start of the closed session. Most significant were that the most recent measurements of $\sigma(PN \to \mathrm{D}^{*\pm})$ indicate that the cross section could be 3.5 times smaller than in the LOI and that the LOI projections were made using a carbon target instead of the more reliable tungsten ribbons. R. Forty gave the reviewer's report. The physics goals of the DSTAR-TRIG experiment were considered very exciting, but the experiment has serious competition from existing B–Factories. The proposed trigger concept is very interesting but significant prototyping and simulation work is needed to prove its feasibility, requiring one year. The experiment does not have at present the necessary support from the existing HERA-B institutes to operate the detector.

The PRC continued its discussion in closed session.

The PRC congratulates the proponents for proposed experimental program. The PRC finds the concept of the D* trigger described in the proposal to be interesting, and the physics goals exciting. The PRC notices that there is serious competition from the B-factories: although the studies presented in the proposal indicated a competitive sensitivity if the experiment runs in 2005, substantial effort would be needed to design and prepare the trigger, and the proposed schedule is considered very tight. In addition during the review process the predicted yield has been reduced. As a result, the PRC has not been convinced of the feasibility of the proposed experiment and does not recommend further investigations toward a HERA-c experiment.

In its meeting of 06.11.03 the DESY directorate decided not to approve the HERA-c proposal.

Item 9. Review of AMANDA, Baikal, and IceCube.

R. Nanhauer reviewed the planned hardware production along with several R&D projects for the Amanda and IceCube experiments. The plan for the optical module production in Zeuthen was shown in detail. H. Blümer presented the referee report for AMANDA, Baikal, and IceCube. The proposed 36 module upgrade for the lake Baikal experiment was strongly supported. The importance of the software work for Amanda and the detector development projects was stressed. Concerns for technical support needed for the optical module production were raised.

The PRC continued its discussion in closed session.

The PRC congratulates the Collaboration for the results presented. The PRC takes note of the small upgrade of the Baikal detector, that physics results of AMANDA are being produced, that DESY–Zeuthen is playing an important role in installing the Grid tools for AMANDA software and that IceCube is proceeding on schedule. The PRC takes note that the facility for the IceCube module production at Zeuthen is ready. The PRC understands

that the DESY management acknowledges the need of technical manpower for the production of the modules and that it will find the resources needed for maintaining the schedule of module production.

Item 10. Review of ZEUS.

R. Yoshida reviewed the status of analysis, publications, and ZEUS representation at conferences. The detector status after the shutdown was reviewed. The radiations levels at the MVD are acceptable, the STT was successfully repaired, and both Lumi detectors will be available in November. Data from the start of the luminosity indicate that if the vacuum continues to improve then ZEUS will be able to operate at full designed luminosity.

The committee continued its discussion in closed session.

The PRC acknowledges the physics results presented and congratulates the Collaboration for the shutdown work that lead to a good status of the detector and to the improved background conditions. The PRC takes note that the SST repair was successful and that the 6-meters tagger was rebuilt and will be reinstalled in November. The PRC takes note that the synchrotron radiation background was eliminated and that the Collaboration is making efforts to tune the running parameters of the CTD to match the background level. The PRC takes note that the Collaboration does not expect that their data taking will be limited by the background.

Item 11. Review of H1.

There was no presentation from the collaboration in the closed session. J. Mnich presented the referee report. The status of publications and analysis was discussed. The background rates looked promising and except for the CST the detector was in good condition. Commissioning of the VFPS had started but needs stable beam to progress. It is hoped that the Fast Track Trigger will be ready by the end of 2003.

The committee continued its discussion in closed session.

The PRC acknowledges the physics results presented and congratulates the Collaboration for the shutdown work that lead to a good status of the detector and to the improved background conditions. The PRC takes note that the VPS commissioning has started, the CIP was successfully repaired and is fully operational, that BST has been repaired and 11/12 modules are operational. The PRC takes note that the FTT front-end is fully commissioned and looks forward to the completion of the trigger by the end of 2003.

Item 12. Review of LCAL–LAT.

There was no presentation from the collaboration in the closed session. J. Gayler gave the referee report. Milestones for the different aspects of the detector R&D were presented. Significant progress in the design of the Low Angle Tagger (LAT) had been made. Capitalizing on changes to the machine design, the design of the LAT was modified. MC studies indicate that the improved LAT may reach the precision for the luminosity of $\Delta L/L \sim 10^{-4}$ as required in the TDR. Additional information is looked forward to in the future. Work on hardware development for the Luminosity CALorimeter (LCAL) has started. Lack of details in the status report makes a precise assessment of the progress difficult.

The PRC continued the discussion in closed session.

The PRC congratulates the Collaboration for the progress done and for the milestones that have been met. The PRC acknowledges that the Collaboration is active in many laboratories and looks forward that the current level of support is maintained. The PRC takes note of the new layout of the forward region and of the proposal of a luminosity calorimeter with better containment. The PRC asks the Collaboration to complete the report DESY PRC R&D 02/01 with milestones and schedule and looks forward to a new status report in autumn 2004.

Item 13. Review of LCCal.

P. Checchia presented the status of the Linear Collider Calorimeter (LCCal) project. A prototype of the LC calorimeter has been built and tested. Measured energy and position resolution are as expected. Data analysis continues. Due to funding constraints the detector was manufactured with lead rather than tungsten absorbers. Future work will concentrate on finishing the analysis, combined tests with a hadron calorimeter, and engineering studies.

D. Pitzl reviewed the project. The LCCal group has successfully completed the R&D work proposed three years ago and is to be congratulated. Additional test beam date with up to 20 degree angles of incidence would be desirable. Test beam studies combining Ecal, Calice, and HCal are strongly recommended. A closer collaboration with the Calice collaboration would be mutually beneficial. The next major step is the work toward a conceptual design.

The PRC continued the discussion in closed session.

The PRC congratulates the Collaboration for the results presented and for the timely completion of the program. The PRC takes note that the construction phase is finished, that also the testing phase is almost concluded. The PRC encourages the collaboration to finalize and report the testbeam data analysis and looks forward to a conceptual design of the detector. The PRC looks forward to the integration of the LCCal program with the general program of calorimetry at Tesla for common tests with

hadron calorimeters and for the integration in the general simulation. The PRC expects a status report in spring 2005.

Item 14. Review of SILC.

A. Savoy-Navarro presented the division of responsibilities and major milestones of the SiLC project (Silicon Tracking for the Linear Collider) as requested at the previous PRC meeting. Plans on how to investigate the integration of their detectors with the VXD and ECal have started.

The PRC continued the discussion in closed session.

The PRC is impressed by the amount of expertise that is concentrated in this program. The PRC takes note of the refined table of responsibilities and looks forward to the appointing of coordinators for each of the activities. The PRC takes note of the contacts with Microvertex, TPC and Calorimetry and is looking forward to maturing plans during the "warm up phase" of mid-2003 to mid-2004 and to a new status report in spring 2005.

Item 15. Miscellaneous.

In order to facilitate feedback between the referees and the authors of the LC R&D status reports, the status reports will be due 4 weeks in advance of the PRC meeting in the future.

The next meetings of the PRC will be on May 27th and May 28th.

The current list of PRC referees is:

H1 - R. Cashmore and J. Mnich
HERA-B - K. Jakobs and R. Forty
HERA-g - K. Jakobs, R. Forty, and J. Kühn
HERA-c DSTAR–TRIG - K. Jakobs, R. Forty, and J. Kühn
HERMES - S. Bertolucci
ZEUS - Y.K. Kim and B. Spaan
AMANDA/IceCube - H. Blümer and L. Rolandi
Polarization 2000 - J. Mnich
R&D LC - J. Brau
W. Hollik, E. Reya, and J. Kühn - Theory

Invited Reviewers:
LCCal - D. Pitzl
LCAL-LAT - J. Gayler
Hera-c DSTAR-TRIG - B. Schwingenheuer

(J. Stewart - June 20, 2004)