Minutes of the 33^{rd} Meeting of the PRC

DESY 27-28^{th} September 1993

PRC members present:

F.Barriero (Madrid), D.G.Cassel (Cornell), R.Felst (DESY), R.-D.Heuer (CERN), W.Hofmann (MPI-Heidelberg), J.Jaros (SLAC), R.Klanner (DESY), V.Lüth (SLAC), J.May (DESY), D.H.Saxon (Glasgow) [from 27^{th} 17:00], R.Sosnowski (Warsaw), W.D.Schlatter (CERN), P.Söding (DESY-IfH Zeuthen), G.-A.Voss (DESY), A.Wagner (DESY), B.H.Wiik (DESY,chairman), C.Youngman (DESY,secretary), P.Zerwas (DESY).

Non PRC members:

ZEUS - B.Löhr (DESY), J.Whitmore (Pennsylvania), G.Wolf (DESY). [27^{th}]
H1 - F.Brasse (DESY), J.Feltesse (Saclay). [27^{th}]
HERMES - E.Steffens (MPI-Heidelberg), K.Rith (Erlangen).[28^{th}]

The PRC received the following documents:

PRC 93/05
The ZEUS Detector. Status Report, ZEUS-Collaboration.

PRC 93/06
Technical design report. HERMES. HERMES-Collaboration.

PRC 93/07
Letter of Intent for a Presampler for the ZEUS Uranium-Scintillator Calorimeter in ZEUS. ZEUS-Collaboration.

PRC 93/08
A Forward Neutron Calorimeter for ZEUS. ZEUS-Collaboration.

Open session. Sept 27th, 10:30, Main Auditorium

Summary of the Meeting on Internal Target Physics at HERA. A. Wagner, DESY.

Status report on HERA. R. Wanzenberg, DESY.

Status report on H1. E. Elsen, DESY.

Status report on ZEUS. J. Whitmore, Pennsylvania.

Closed sessions: Sept 27-28th, 14:00-17:30 and 9:00-12:30, Sem. Rm. 1

1. Approval of the minutes and matters arising from the last meeting.
2. HERA schedule 93/94.
3. Status and upgrades of ZEUS.
4. Status and upgrades of H1.
5. Status report on HERMES.
6. Status report on the B Physics Experiment.
7. Discussion on the Internal Target Meeting.

8. Miscellaneous.

9. Future PRC schedule and summary of recommendations made.

Before opening the agenda the chairman introduced the new PRC secretary C. Youngman. The chairman also announced that, due to an oversight, the new PRC member L.Foa (CERN) had not received an invitation to the PRC.

Item 1. Approval of the minutes and matters arising.

The minutes of the 32^{nd} meeting of the PRC were approved without modification.

The last PRC meeting had reviewed the future of the ARGUS experiment. To produce a competitive physics program an integrated luminosity of, at least, 200 pb^{-1} was required.
To ensure that this goal could be met the ARGUS collaboration requested that DORIS III demonstrate, by May 1^{st}, that a daily integrated luminosity of, at least, 1 pb^{-1} could be achieved. A peak integrated luminosity of 0.86 pb^{-1}/day was reached without HERA operation. Based on this result the DESY directorate, in full agreement with the ARGUS group, decided to end the data taking phase of the experiment. Data analysis will continue. HERMES and the B physics experiment should benefit from the the manpower released.

The Chairman announced that an ARGUS symposium was being organized for the 19^{th} November. The many successes of ARGUS would be reviewed followed by a celebration dinner. PRC members will be invited.

Item 2. HERA schedule 93/94.

The Chairman reviewed the HERA schedule for the remainder of 93 and for 94.

The HERA machine requires two weeks of machine studies at the end of the current running period. A search for bad vacuum chambers, tests of the proton ring transverse feed back system and further measurements of the B-target efficiency will be made. Luminosity running will therefore end in the first week of November. HERA is projected to reach 1 pb^{-1} of delivered luminosity at this time.

The minimum length of the shutdown, 4.5 months, is determined by the repairs to the H1 jet chamber. During this period the machine will rebuild the east straight section and install the two spin rotators.

It is scheduled to close the HERA ring on the 8^{th} of April. Luminosity running should therefore be expected from the second half of May onwards. The running period is scheduled to extend until November.

J.Feltesse stated that H1 plan to rewire only one chamber of CDC1 (Central Drift Chamber), make minor changes to the z chambers (no rewiring) and continue with the scheduled upgrades.

In response to questions referring to the open session talk of R.Wanzenberg. The Chairman stated that the proton bunch current is limited to $\sim$ 0.2 mA, 25% of the design value, by a longitudinal instability in DESY III and by a single bunch transverse instability in HERA at injection and during the early stages of ramping. Both instabilities will be corrected by feedback systems which should be available next year. The electron current is limited to 20 mA presumably due to charged particles trapped in the stray field of the circulating beam. Additional electron loss monitors are now being installed. These will allow identification of faulty vacuum chambers.

Item 3. Status and upgrades of ZEUS.

Normally documents should be submitted to the PRC at least 14 days before the PRC meeting in which they are to be discussed. It was pointed out by the chairman that the ZEUS contributions were considerably later than this. In future the 14 day requirement would be enforced more rigorously.

This talk presented material contained in the following submissions to the PRC:

PRC 93-07 *Letter of Intent for a Presampler for the Uranium-Scintillator Calorimeter in ZEUS*

PRC 93-08 *A Forward Neutron Calorimeter for ZEUS*

Additionally a list of possible future upgrades covering the next 2-3 years was presented. This had been requested by the PRC.

B.Löhr (DESY) reported on the status of these upgrades to ZEUS.

Forward Neutron Calorimeter (FNC). The FNC will allow the study of neutron inclusive interactions. The acceptance of the FNC is 30-40% for neutron reactions. The required calorimeter must have a dz/z $\sim$ 0.2 resolution in the size of Bjorken x. The spatial resolution is limited by the beam divergence, $\sim$ 5mm/105m. A depth of $\sim 10\lambda$ with 60×60 cm^2 entry volume would give 95% energy containment for 1TeV deposits. The aperture, of particles incident on the FNC, is restricted to the center of the FNC by the beamline components.

Currently a prototype FNC iron scintillator calorimeter (40x40 cm^2, 9λ, de/e $\sim 200/\sqrt{e}$) is installed 105 m. from the interaction point. Energy deposits, during beam ramping, have been successfully used to calibrate the device.

An optimal installation would require modifications to the beamline: a reduction in the beampipe diameter to 6cm, at the FNC, an exit window in the beampipe and a rotation of vacuum pumps away from the installation.

Two possible implementations are being studied. Scintillator or SPACAL readout using Iron or depleted uranium absorber. The scintillator solution would cost approximately half the SPACAL.

Open discussion

W.Hofmann asked what the leakage was for particles incident at the edge of the FNC. This is relatively small due to the entrance aperture defined by the beamline elements.
P.Zerwas requested the kinematic ranges, for neutron reactions, which would be seen by ZEUS. With the DU calorimeter, 3-4 $\leq$ Q^2, and with the FNC and a BPC (Beam Pipe Calorimeter) tag, $0.5 \leq$ Q^2 $\leq$ 100-1000 GeV^2 were foreseen.
D.Cassel wanted to know which implementation would be chosen if construction would start tomorrow and what extra background rate, w.r.t. that seen in the current FNC prototype, could be accepted. Currently ZEUS favours the spacal solution because of the superior position resolution. It was stated that a factor of 10 increase in the background rate could be handled.
R.Felst asked whether pomeron exchange was a background to π scattering.

V.Lüth requested the current trigger rates seen. These are 200 Hz raw and 2 Hz when a coincidence with a tagged electron is required.
The chairman ask for the number of good events expected in a 10 pb^{-1} sample. The cross-section of 0.8μb gives 150K events for ep$\rightarrow$nX.
J.May asked whether radiation damage is a serious problem. It was reported that the small amount of radiation seen is mostly synchrotron radiation which is easily shielded. The magnets in the beam line sweep out nearly all protons with only a few μ's remaining.

The chairman proposed that discussion be continued tomorrow after studying the letter of intent.

A Presampler for the Uranium-Scintillator Calorimeter in ZEUS.

The presampler would be used to correct the degradation in the F and RCAL Uranium-Scintillator calorimeter performance resulting from particles interacting in the material proceeding the calorimeter. Test measurements show that the degradation is linearly related to the amount of absorber present. The ability to correct on an event by event basis will correctly center the x, y and Q^2 measurements and remove tails. This has been shown in extensive Monte-Carlo simulations.
The design of the presampler requires 20$\times$20 cm^2 plates of 5 mm thick scintillator readout via embedded wavelength shifter fibers connected to photomultipliers. The cost of the detector is estimated to be 600KDM with tests scheduled for early 94 and installation at the end of 94.

Open discussion

W.Hofmann asked whether or not a simple correction could not be made on all events using the known amount of material proceeding of the calorimeter. G.Wolf replied that ZEUS favoured an event-by-event correction which would enhance the value of the rare DIS events.
A.Wagner suggested that it would be simpler to cover only those regions where the amount of material was $\geq$ 2 X_0. G.Wolf said that most high Q^2 events are in the FCAL region. J.Feltesse pointed out that the 1/y factor requires that good resolution is needed particularly at the highest energy.
D.Cassel observed that CDF have recently installed a presampler and that the results are very impressive.

The chairman decided that a referee would be required and that a final decision should be made during tomorrows closed session after reading the letter of intent.

Forseen upgrades 94-98

The following upgrades were envisaged:

- **Beampipe calorimeter.** A small calorimeter in the region of the C5 counter. Date 94. Estimated cost 200-300 KDM with large DESY contingent.
- **Luminosity detector.** Replacement detector with a $\leq$1% systematic measurement error. Date 94/95. Estimated cost 100 KDM with large DESY contingent.
- **Presampler for BCAL.** Date 95/96 for installation 97. Estimated cost 500-800

KDM without DESY contingent.

- **Micro-vertex detector.** Date 95-97. Estimated cost 3-5 MDM. **DESY should be involved.**
- **Cosmic shield.** To reduce the cosmic rate thus improving the rare event search. Date of design 94. Estimated cost 500-800 KDM without DESY contingent.

Open discussion:

J.May asked if Data Acquisition upgrades had been considered and what the expected costs are. G.Wolf said that DAQ upgrade costs were not included.
V.Lüth asked what the current luminosity measurement accuracy is. B.Löhr replied 4-5%. R.Klanner stated that there is a clear need for a 1% measurement but no clear concept of how to do it.

The chairman asked for the status of the upgrades currently in progress. B.Löhr stated that the Forward Tracking Chambers looked in good shape and that FTD prototype would be replaced during the 93/94 shutdown, as scheduled.

Closed discussion

FNC. The chairman opened the FNC discussion by requesting an outline of the physics possibilities. P.Zerwas stated that the study of the π quark and gluon distributions are of interest. The π being a type of Goldstone boson. Here the π is space like and does not have the same theoretical problems as other channels. The measurement might still be difficult due to the need to extrapolate to t=0. The measurement is interesting and would stimulate theoretical effort. W.Hofmann was concerned that the neutron production rates would be large and that all outgoing particles would require observation. Additionally other diffractive process might be large. P.Zerwas expected these processes to be at the 10% level.

R.Klanner expanded on the choice of construction. The use of SPACAL is complicated by the difficulty of beamline calibration resulting in long term stability problems. This would not be the case with a scintillator wavelength shifter design where the calorimeter could be calibrated by traversing the beamline. W.Hofmann asked how funding would be solved. R.Klanner replied that, if the PRC gave a positive signal then collaborators could be expected.

The chairman asked how long was required for installation of the finished calorimeter in the beamline. R.Klanner replied that SPACAL is intrinsically modular and installation is relatively straightforward. The scintillator solution would have to be installed complete which would be complicated. V.Lüth asked whether a move away from scintillator would be a problem for ZEUS. The answer to this was no.

J.May asked whether SPACAL from the CERN production facility had the correct characteristics. It was decided that the CERN product was acceptable. A.Wagner asked whether the production of the beampipe window was simple and if the use of depleted uranium was seriously being considered. R.Klanner replied that ZEUS had no experience of beampipe windows.

The PRC recommended that a neutron calorimeter be installed 93/94 and encouraged the ZEUS group to submit a final proposal as soon as possible. This will be refereed by

W.Hofmann, who will report directly to the DESY directorate.

Presampler. The chairman pointed out that there was some controversy about the usefulness of the presampler. Event by event correction would be advantageous but an average correction could already be applied from the knowledge of the absorber in ZEUS. The chairman proposed that a referee should report to the PRC in March.

Replying to R.Sosnowski, R.Klaner expected that a technical proposal would be ready by the end of the year. D.Cassel suggested that the PRC should encourage the production of a prototype.

The committee encouraged the proponents to present a complete proposal and would expect a referees report at the next PRC meeting.

Forseen upgrades. The chairman asked R.Klanner to comment on the list. In response it was stated that the list is a result of brain storming and does not represent the ideas of the entire collaboration. R.Sosnowski stated that the luminosity measurement was important in view of HERA achieving the design luminosity in 95. In view of HERA being the largest source of charm, P.Zerwas was surprized that the micro-vertex chamber was not scheduled for 95. J.May thought that initial funding might not be so crucial since the largest cost items could be expected in the last year of production. The chairman pointed out that DESY will support the experiments up to the fractional cost incurred for the ZEUS and H1 detectors, but DESY cannot be looked on as the sole source of funding.

Item 4. Status and upgrades of H1.

J.Feltesse (Saclay) reported on the status of upgrades to H1.

The BDC (Backward Drift Chamber) and BEMC (Backward ElectroMagnetic Chamber) detectors should be ready in exactly one year.

The BST II (Backward Silicon Tracker) upgrades have been presented to the PRC but not yet approved. One prototype has been ordered. A proposal will be made to the PRC in the second half of 94. Installation will be in 96 provided approval is given.

The Forward Proton Spectrometer detector, presented to the last PRC as a letter of intent, is progressing. HH II and DESY-IfH Zeuthen are evaluating photomultipliers and a fibre system for position detection. Lancaster is designing the plunge vessels (pots) and DESY is developing the moveable bellow system.
H1 is preparing a test of 2 pots, each equipped with a scintillator plane, to be installed into HERA during 94.
A search for additional collaborators is underway.

No long term list of upgrades could be presented. This will require detailed discussions with all groups in the collaboration. At the next PRC these plans will be presented.

Open discussion.

The chairman asked where BST II was being prepared. BST I was constructed by DESY. BST II will also be constructed by DESY in collaboration with Zurich and the UK. The UK funding has already been approved.

P.Zerwas stated that both H1 and ZEUS should be considering the effects of spin. Transverse spin is already observed and the installation of spin rotators, during the

95/96 shutdown, will produce longitudinal polarisation.

Closed discussion.

R.-D Heuer was concerned that H1 should be allowed to take the necessary time to fix their chambers. Was the 17 days scheduled by H1 sufficient ?

V.Lüth stated that the SPACAL photmultiplier order was on schedule but that other things seemed to be slipping. The grooved lead sheet production must start 1/94, this looked tight.
The chairman asked whether the milestones from the last PRC had been maintained. A $\sim$ 2 month slippage had taken place. The Si. pipeline chip looks late and whether AC or DC signal coupling should be used has not been finalized. The cooling concept is also unclear.

Item 5. Status report on HERMES.

The chairman announced that the HERMES experiment had been officially approved.

E.Steffens (MPI Heidelberg) reported on the status of HERMES.

The success of the HERMES experiment can only be guaranteed if a high precision measurement is made and data taking starts in 95. Detector installation is required to start at the end of 94.

Critical path elements in the tracking chamber systems are the early ordering of the Magnet Prop Chamber electronics and reorganization of the Front Drift Chambers due to the withdrawal of MIT. The TRD design is progressing and a number of improvements are being made.
The first 1000 monte-carlo events will be available by November. This and the availability of geometry files and a tracking algorithm will allow detailed simulation of the detector.

It was pointed out that the test experiment, scheduled for installation during the 93/94 shutdown, could gain 2 weeks if a separate interlock were provided.

Open discussion.

The chairman emphasized that 95 would see high luminosity.

Referees report

D.Saxon

A number of technical problems have been solved. The TRD group has been strengthened by the addition of a physicist with recent experience of TRD construction. The Calorimeter group has benefited from the engineering expertise of NIKHEF. It remains essential to fix a number of calorimeter parameters as soon as possible. The gap dimension and the method of connecting the light guides to the PM's.

The required resolution of the vertex chambers should be justified and the amount of material in the detector should be reviewed.

Concern was expressed at the lateness of simulation results. It will be difficult to incorporate results about tracking performance into the final design if additional time slippage occurs.

The prime area of concern remains, however, the funding and manpower problems which have arisen. In order to best use available resources a phased installation should be considered which will protect the physics goals.

Open discussion.

It was pointed out that the WA89 experiments DAQ system would be used and that the WA89 expert was working for HERMES.

W.Rith presented, on transparency, the following money saving scenarios:

- save 1.5 MDM, by having the upper half for e identification and lower half for hadron identification.
- save 3 MDM, e identification in the upper half without analogue readout.
- save 6 MDM, upper half without Cherenkov, only e and no hadron identification.

A decision will be made when the US and Dutch funding situation is be clarified. The committee agreed that the situation would be reviewed at the HERMES Nov. 19^{th} meeting with A.Wagner. If funding problems still remain then HERMES must provide a staged schedule with responsibilities clearly defined. The goal must be to carry out inclusive electron experiments in 95.

Closed discussion.

J.Jaros asked whether funding was being lost because of doubts over the physics goals. A.Wagner said that this was not the case. The DOE were undergoing a general reduction in funding but HERMES has had good reviews. The Argonne problem is one of manpower. The chairman stated that NFS was trying to secure funds for HERMES but that they are also in the middle of a review. The referee pointed out that HERMES are missing on site representation.

The committee made the following recommendations:

- A senior person must be permanently on site.
- A phased construction and installation schedule must be defined so that the detector can take data in 95. The electron identification should be prioritized so that the physics goals are not compromised.

Item 6. Status report on the B Physics Experiment.

W.Hofmann (MPI Heidelberg) reported on the status of the B experiment.

Extensive wire target tests have been carried out by the collaboration since the last PRC meeting. Wire targets have been driven to 4-5σ of the HERA proton beam. The beam lifetime is unaffected and the ep experiment backgrounds, as measured with the ZEUS C5 rate, have show no long term effects. During insertion some spikes at the level of 5-10% were observed. Additionally the drift chamber system installed for the test shows tracks coming from the wire position. The observed rates are also found to be sufficient for the experiment.
It is therefore possible to run wire target experiments concurrently with ep experiments.

No major changes have been made to the detector design although some discussion regarding tracking and the TRD is taking place. The CERN beam tests of the TRD design have shown that the system will work at HERA.

The trigger hardware and DAQ were discussed in detail at the last PRC meeting. There is some concern about the second level trigger in view of the large data transfer rates i.e. 5Gb/s. Transferring only sparse data requires $\leq$ 50 Mb/s which is feasible. The collaboration must be strengthened in the DAQ area.

The simulation of the experiment, using GEANT etc., is progressing. Geometry and a new tracking algorithm, using less detector dependent data, are available. Secondary interactions are also included. Currently no tracking is available in the large tracking chambers. It is anticipated that event reconstruction efficiencies will be available in 2-3 months.

Measurements from E789 have been extrapolate to HERA and confirm the collaborations rate calculations. Dileptons signals should allow additional physics.

Concern was expressed at the small size of the collaboration. More interaction with LHC initiatives, e.g. RD-6 and RD-20, is required. Additionally a considerable fraction of the detectors 30 MDM funding requirement is still missing.

Referees reports.

R.-D. Heuer

It was stressed that the proceeding weeks Internal Target Workshop had been very useful.

The experiments time window exists but delays should be avoided. Competition from CDF and D0 can be expected from 98 onwards. These experiments will measure sin2β with an accuracy of 0.1 within one year. The requirement of additional physics goals was understood and studies have begun.

It was stressed that the collaboration should try to profit form LHC research.

As reported the target test have been successfully carried out. The collaboration should decide on the target material to be used and ensure that the beampipe design allows for the higher HERA currents expected.

The silicon detector seems feasible although the high backgrounds will require replacements at least every year. The track occupancy of the detector should be checked by simulation. Is the 100 μm. double track resolution sufficient given the expected high occupancy of $\geq$ 90% ?
Tests of a different Si detector design at Heidelberg have been made. Manpower is available but a 10μs pipeline is not. RD-20 support for the electronics should be investigated.
Concern was expressed w.r.t. the tracking between the Si and Straw tubes ($5 \geq r \leq 20$ cm). The original design is not sufficient and a new design is not available.

The software situation has been eased by the collaboration with DESY-IfH Zeuthen. However the large drift chamber tracking is a concern.

The trigger and DAQ systems seem to be manageable. A faster bus system is required and a design study has begun. It was stressed that a DAQ expert would greatly strengthen the collaboration. No problems were seen in the offline analysis.

J. Jaros.

The Internal Target Workshop was again praised. Experts had been onsite and many questions relevant to this experiment were discussed at length.

The experiments letter of intent specified $\delta_{sin2\beta} = 0.065$ (0.15/year) to be obtained after 4 years of running. If additional dilution factors due to background beneath the signal and the presence of false asymmetries are considered then one would expect 0.20/year.

Presentations at the workshop of v_{cb}, v_{ub} and x_s show that other physics is accessible. The already difficult trigger should be studied to allow for μe and other triggers.

Concern was expressed for the secondary goal physics. A measurement of x_s requires the same statistics as the CP violation measurement. It cannot therefore be considered as a one down measurement.

The fast RICH detector is the key to the experiment. Without kaon tagging the error on sin2β doubles. It was required that some proof of the working of a RICH counter in a similar environment be found. Additionally the effect on pattern recognition due to a reduction of the number of seen photons should be considered. Originally 40 photons were anticipated. What happens if 20 or less photons are seen ?

The envisaged trigger requires a reduction factor of 10^3. The requirements of a J/ψ trigger, which is generated by e tagging, may be compremized by the high rates in the e tagging electronics. This problem is recognized by the collaboration. A definite answer to this problem, including detailed simulation, is required. Additionally the secondary goal physics triggers must be included in the trigger design.

The TRD results show the detectors potential as an e tagger. Multiple occupancy effects should be considered as a matter of urgency.
Several technologies are being considered for the ECAL (SPACAL, scintillator crystals, etc.). The interconnection of the ECAL with the TRD at the trigger and reconstruction levels is a major concern to the functioning of the experiment.
The muon detector and trigger system seem to be well understood.

Referees joint conclusions.

Milestones are required for:

- RICH - prototype (N_γ, occupancy, ageing)
- e tagging and trigger (TRD and ECAL designs, occupancy, trigger efficiency, rejection power)
- tracking r $\leq$ 20 cm. (reconstruction efficiency, occupancy, radiation damage)

Items to be addressed:

- DAQ
- Tracking simulation (double hit, track linkage, K^0 efficiency)
- Silicon detector (pipeline, distortions, replacement)

- Machine (shields, target material, aperture)
- dilution factors (fake asymmetry)
- background rejection (E771/789 experience)
- other physics goals

Open discussion.

The chairman thanked the referees for their presentation and suggested that the *Items to be addressed* list be reviewed.

A. Wagner expressed concern about interfacing the small radius detectors with those at larger radius. Did the simulations show any problems in this region ?

W.Hofmann pointed out that the CERES experiment at CERN had produced the required proof of RICH usage. D.Saxon stated that RD-27 estimate a one year period before the fast RICH environment is fully understood. The PRC requested the collaboration to return with a design for a working RICH detector.

The PRC requested that the collaboration present a final design for the e tagger and trigger systems.

The radiation rates to be expected in the beampipe region are $\sim$ 10 Mrad. The cost of replacement Si detectors was estimated at 150 KDM. The chairman requested the D.Trines be involved in the design of the replacement mechanism. Vacuum loss in the beampipe and long shutdowns are unacceptable.

The PRC stated that a DAQ resident expert was required. The data storage requirements of the experiment should also be explained.

The chairman underlined the amount of work which will have to be done by the machine, 20m of beamline will have to be redesigned.

Closed discussion.

The chairman proposed that a PRC meeting was required to address the points raised by the referees in February, to be followed up by a meeting in May.
Additional collaborating institutes should be found and the funding issues considered.

Item 7. Discussion on the Internal Target Meeting.

The Internal Target Meeting was deemed, by all, to have been a remarkable success. A.Wagner was applauded for organizing the meeting. No further comments were thought to be necessary.

Item 8. Miscellaneous.

The chairman thanked V.Lüth and D.Cassel for their active participation in the PRC over the last three years.

Item 9. Future PRC schedule and summary of recommendations made.

The following PRC meetings have been scheduled:

- **21-22nd February 94 (Mon-Tue)**

- **30-31st May 94 (Mon-Tue)**
- **17-18th October 94 (Mon-Tue)**

The following recommendations were made:

- **ZEUS FNC.** The PRC recommended that a neutron calorimeter be installed 93/94 and encouraged the ZEUS group to submit a final proposal as soon as possible. This will be refereed by W.Hofmann, who will report directly to the DESY directorate.
- **ZEUS Presampler.** The committee encouraged the proponents to present a complete proposal and would expect a referees report at the February PRC meeting. The referee is W.Hofmann.
- **H1 Forseen upgrades 94-98.** H1 should present their list of forseen upgrades at the February PRC meeting.
- **HERMES.** The PRC recommended that a senior member should be permanently at DESY. Additionally a phased construction and installation schedule must be defined so that the detector can take data in 95. The electron identification should be prioritized so that the physics goals are not compromised.
- **B Physics Experiment.** The committee recommended that the points raised by the referees be addressed at the February PRC meeting. This would be followed up in the May PRC meeting.

(C.Youngman - 21st December 1993)