B. Parker, -MHE Hamburg, 16.6.1997

Minutes of the Meeting on HERA Luminosity Upgrade

June 13.1997

Present: R.Bacher,MHE; R.Bandelmann,MK; D.P.Barber,MPY; W.Bartel,-H1; M.Berglund,MPY; P.Biddulph,H1; K.Bozisseriko,MPY; H.Brueck,MKS; R.Felst,F22; E.Gianfelice,MPY; W.Hain,ZEUS; B.Holzer,MHE; K.Gadow,FH1; V.Lorshakov,MPY; R.Kose,MR; N.Meyners,MEA; C.Muhe,ZEUS; I.Muschick,MR; E.Lohrmann,ZEUS; V.Lokiev,MPY; G.Lopez,MKI; B.Parker,MHE; A.Petrov,MEA; U.Schneekloth,ZEUS; D.Sellmann,MKS; T.Sen,MPY; F.Willeke,MHE; S.G.Wipf,MPY; G.Woebke,MEA; K.Zapfe -Dueren,MVP;

Topics:

- **First Draft of the Report**
- **S.C. Quadrupoles Update**
- **S.C. Quadrupole Installation in H1**
- **Stray Fields in ZEUS**
- **Rev.2 Optics**

1.) Status of the Report (U.Schneekloth)

Thanks to the editorial work of U.Schneekloth the first draft of our updated report entitled **"HERA Luminosity Upgrade (1st Draft 12.06.97)"** is available and 20 copies were handed out at the meeting. This first draft is still incomplete. Some contributions are still missing, others are incomplete of inconsistent. Please give U.Schneekloth comments until Wednesday, 18.06.97 morning or come to the editorial board meeting on Wednesday, 18.06.97, 14:00 hrs, (seminar room 5'th floor of building 30b). All corrections should be made until Monday, 23.06.97, 9:00 hrs. The plan is to distribute a second, hopefully complete draft, on Tuesday, 24.06.97.

If you make corrections, please copy the tex file from:

/afs/desy.de/user/s/schneekl/public/hera_upgrade/report

You can use the file **example_main.tex** to run latex.

2.) Update of S.C. Quadrupoles (H.Brueck,MKS)

H.Brueck reported on his efforts to reduce the field errors on the superconducting separator quadrupoles especially those due to the dipole windings in QO. Each magnet consists of a quadrupole coil with three layers and a single layer dipole coil. A solution with a second gap or "spacer" in the dipole winding is found to give acceptable harmonic content with the largest multipoles in the range of a few times E-4.

Estimates will be made as to the precision needed for individual conductors placement. Also the design presented serves as a basis for coil force and torque calculations and for stray filed estimations. Outer cryostat dimension is a critical parameter for H1 and will be minimized.

3.) S.C. Quadrupole Installation in H1 (K.Gadow)

K.Gadow reported on the space available to install the QO, QG and QH magnets inside of H1. While there exists a second weldment, not considered in the original layout of F.Willeke, it seems that there should be enough transverse space to fit the magnets inside of H1. The most critical magnet is QO where there is about 2 mm clearance. Some details of QO support and installation need further work and the request was made to keep the outer cryostat diameter as small as possible.

4.) Impact of Separator Magnet Stray Fields in ZEUS (W.Hain)

W.Hain reviewed the issues associated with large stay fields inside of the ZEUS. A first issue is the effect of the stray field on the inner layer of FCAL phototubes. It may be possible to slightly improve the shielding of the phototubes somewhat by replacing the existing shield with better materials; however, the limit still seems to be of the order of 200 - 400 gauss and in order to reach this will require more than 10 mm of iron shielding around the QO cryostat. Such a thick shielding perturbs the field seen at the beam positions which means that the shielding with have to be taken into account in the magnet design calculations.

Also there is a movable iron support structure piece which extend about 0.7 m longitudinally (parallel to the beam) which will interact with any stray field. It was suggested that it might be necessary to have the shielding arrayed with a conical taper such that the thickest part occurs at the longitudinal location of the phototubes. This shielding arrangement would avoid spurious shielding saturation effects due to sudden transitions and would provide some buffering of the internal field components form changes in the external (i.e. iron FCAL support structure) environment.

5.) First Look at Rev.2 Electron Optics (T.Sen)

T.Sen presented the first attempt at a Rev.2 electron lattice which uses the superconducting separator magnets QO, QG and QH. The horizontal-beta peaks are nearly left-right symmetric with maxima of about 180 m. There is a small vertical design asymmetry, due to the balancing of QO (left) against QG and QH (right) which yields vertical peak betas also a little more than 180 m (compared to 350 m for Rev.1). The net result is that the horizontal chromaticity increases slightly but the vertical chromaticity is significantly reduced as expected. Depending upon details of the dispersion matching (still to be further optimized since it changes optimal sextupole strengths) the Rev.2 lattice emmitance is between 18. and 23. nm*radian. The Rev.2 dynamic aperture, between 20 to 27 sigma, is much better that what has been found for Rev.1.

6.) Review Meeting Announcement (F.Willeke)

F.Willeke reported that there will be an all day internal review meeting on the luminosity upgrade on Tuesday, July 22, 1997. Presentations will be made before a review committee of local experts. This sets the time scale for completing the report for its timely availability to the review committee.

7.) Next Steps

- Finish writing of report.
- Cryostats consistent with s.c. magnet design and H1/ZEUS space.
- Determine magnetic shielding thickness needed for ZEUS
- Further Rev.2 lattice optimization and analysis.

9.) Next Meeting:

Friday, June 20, 9:00h, Bld 30b, 4th floor, R459