Summary of a Meeting between DLNP JINR (Dubna) and DESY Zeuthen from 13.10. to 15.10.2003 in Dubna

Present :
V. Duginov, T. Mamedov, I. Meshkov, N. Morozov, E. Syresin, I. Titkova (DLNP JINR Dubna)
K.-H. Hiller, H.J. Schreiber (DESY Zeuthen)
A. Ljapine (TU Berlin)

The meeting was aimed to give status reports on subjects related to beam energy measurements at a future linear colliders (LC). Also, next steps and the possible content of a note to the DLNP director A. Olshevsky were discussed. Finally, some discussions were devoted to the content and size of the Technical Design Report (TDR) on the magnetic spectrometer for precise beam energy measurements.

N. Morozov reported on further 2D-calculation of the spectrometer and the ancillary magnets in dependence on construction elements as bolts, supports, girder and beam tube. The influence of the chemical admixtures of the iron magnet was also analyzed.

He concluded that the specification considered would not alter previous design studies ot the magnets.

Also, possible B-field measurements were discussed and an error of $\Delta B/B$ of about $2 \cdot 10^{-5}$ seems possible for the spectrometer as well as the ancillary magnets.

A.Liapine reported on the status of dedicated beam position monitors (BPM) with high position resolution. A new BPM version with the dipole frequency of 5.5 GHz was presented with the result, that a) basic properties of this monitor fulfills the requirement of 100 nm position resolution and b) this new monitor is in many aspects similar to the old version with a dipole frequency of 1.5 GHz.

A. Liapine emphasized that the new BPM has much better timing behaviour than the first one, which will allow single-bunch measurements at TESLA. It was suggested to investigate whether all possible other modes excited in the cavity would guarantee single-bunch measurements. It is planned to test the BPM with beam at the beginning of 2004.

K.-H. Hiller summarized general properties of the beam spectrometer (see also his report at the meeting in March 2003). General properties suggested in his talk should be taken in to account in further detailed studies.

E. Syresin presented the idea of using the synchrotron radiation (SR) generated within the magnets of the spectrometer for beam energy measurements. Absolute beam energy measurements of $\Delta E/E \approx 10^{-4}$ and relative energy measurements down to 10^{-5} might be attainable. It was general agreed to continue these investigations and to present some reliability studies as soon as possible (at least at the next meeting). Also, some SR detecor possibilities and their necessary space and angle resolutions should be involved in these studies.

The collaboration highly welcomes these potential complementary beam energy measurements and encourages the colleagues to continue their studies to some reliable proposal.

V. Duginov summarized the status of slow control of the spectrometer including magnetic field measurements, BPM information, temperature stabilization and alignment system.

He proposed to use the IEEE 488 networked system which involves all properties required to develope a control system for the spectrometer on the instrumentation level. For the transfer of the data to the external DAQ system the standard IEEE 802 (Ethernet) and related network using TCP/IP protocol should be used.

J. Schreiber gave a status report on beam energy measurement using radiative return events. This study carried out together with the summer student Helge Todt used $e^+e^- \to \mu^+\mu^-\gamma$ events at $\sqrt{s} = 500$ GeV. It was concluded that measuring the beam energy with a precision of 100 ppm would be a challenging task.

J. Schreiber gave a short introduction on a new idea of D. Barber and R. Melikian for precise beam energy measurements based on resonance absorption (RA) of laser light by the beam particles within a static magnetic field (R. Melikian was unable to attend the meeting). It has been proposed a) to consider these ideas independently by Dubna experts, b) to invite R. Melikian to Dubna for discussions and c) if the physics behind the ideas seems correct possible feasibility studies are needed aiming to an additional complementary beam energy measurement.

Concerning the report to the DLNP director A. Olshevsky, it was decided to prepare a draft within the next 10 days. This document should include a short summary of the results so far obtained, the topics covered in 2004 and specific requirements on financial support from the Germany BMBF funding. The final version of the report is expected to be ready at November 10.

Concerning the draft for the Technical Design Report, J. Schreiber gave an overview on its possible content, a time schedule and the volumes devoted to each topic. Basically, the suggestions were accepted, with the advice to start writing the contributions at the beginning of 2004 so that the final version can be presented and discussed in June 2004. Appendices on SR, RA and on radiative return events should be included in the TDR.

It is foreseen to make all presentations of the meeting, the report to the directorate and the meeting summary accessible on the Web-page
http://www-zeuthen.desy.de/main/html/aktuelles/workshops.html

The next meeting will be at DESY Zeuthen at the end of the March 2004, while the meeting finishing the TDR document should be in Dubna at begin/middle of June 2004.

Dubna, October 2004

Victor Duginov and H.Jürgen Schreiber