EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH
ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLEAIRE

CERN - PS DIVISION

PS/ LP/ Note 94-15 (Min.)

MINUTES OF A MEETING OF THE UPPSALA UNIVERSITY/CERN COLLABORATION

E. Schulte

Geneva, Switzerland
7 April, 1994

PS/LP
5.4.1994

Minutes of a Meeting of the Uppsala University/CERN Collaboration

on March 17, 1994

Point 1: BEAM MONITORS

Present:
Prof. T. Ekelof, D. Reistad, Yan Yin (Uppsala University)
M. Ahlbeck (Scanditronix)
H.H. Braun, F. Caspers, J.-P. Delahaye, W. Schnell, E. Schulte, G. Suberlucq (CERN)

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E. Schulte gave a résumé of the discussions during Monday morning between F. Caspers, Yan Yin and himself.

Yan Yin presented results of measurements made at SLAC with a 35 ps risetime pulse generator and a wide band sampling oscilloscope. Three different monitors with 40.5 mm inner diameter and short coaxial matching sections to the 50 Ω measuring system on each side were tested. The inner conductor had a constant diameter such that the impedance through the measuring set-up changed from 50 Ω to 100 Ω inside the monitor (measured).

Monitor 1:

8 SMA connectors carry different pick-up forms: 2 V-antennae, 2 L-antennae and 2 conical buttons (one of each covered with Aquadag) and 2 straight pins of different lengths.

Monitor 2:

8 SMA connectors attached to 8 short strip-lines short-circuited to the vacuum chamber at the other end.

Monitor 3:

1 Kaman feed through carrying a straight pin.

Measurements show strong ringing (5 ... 6 GHz) for the V- and L-antennae, much less for the buttons and for the straight pins. The single pin on the Kaman feedthrough showed the least ringing. This may be partly due to some coupling from the heavily ringing V- and L-antennae to the buttons and pins in monitor 1. Another source for the observed oscillations could be the creation of fields due to the imperfect transition through the short conical sections from 50 Ω to 100 Ω and back again.

Some time was spent on the discussion of a signal acquisition system based on a recirculating optical delay line and a conventional wide band sampling oscilloscope. If one assumes a sampling frequency of 20 MS/s the delay line should have a length of at least 50 ns. The signals of 24 bunches on 4 buttons could be stored. The signals have

to circulate 96 times on the delay line to get one sample of every bunch. Due to unavoidable reflections the last samples would probably be useless.

The following propositions were formulated during the meeting :

- Use a network analyzer with time domain capability to verify measurements done at SLAC. The suitable network analyzer will be back at CERN after Easter*),
- Discuss data acquisition possibilities with E. Rossa/SL*),
- Acquire the average position of 24 bunches to a resolution of 0.1 mm but preserve the bunch-to-bunch intensity measurement with the required resolution. Investigate the use of the 3 GHz cavity ("ringing bell", F. Caspers) as filter and pulse stretcher,
- Write proposal with detailed description and cost estimate of the system including the integration to the control system,
- Prepare as soon as possible a vacuum-tight prototype which could be tested with the CTF beam using the existing 50 GHz sampling scope.

E. Schulte

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*)During Yan Yin's stay, after the meeting, the following points could be settled:

- A 6 GHz network analyzer with time domain analysis (75 ps) could be found, the measurements confirmed the findings already mentioned,
- Discussion with E. Rossa/SL revealed the possibility to use photoresistors as samplers illuminated by light from the Laser which fires the photocathode. There may be a device available from LETI (Grenoble). Contacts with this Laboratory are underway (E. Schulte) with the help of E. Rossa,

  Advantages: high signal amplitude capability, synchronized to the Laser, acquisition (through CCD) already realized (V. Gerbe, Thesis Univ. Grenoble).

Distribution:
Persons Present