PS/BD/Note 94-09 (Min)
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Minutes
of a visit to LETI, Grenoble, May 9, 1994

The purpose of this visit, was to discuss the possibility to use the optoelectronic sampling device developed by LETI.

Persons present : M.Cuzin and J.Lajzerowicz from LETI.

An existing device, consisting of a main line of about 25 mm length, with 16 photoconductors (taps) and a CCD with 16 inputs, has been shown. This device has been analyzed and tested in a doctoral thesis (V.Gerbe, 1993).

A new device is under development for an application in laser fusion. This device will have 100 taps (photoconductors). Unlike the preceding device where the 16 photoconductors where illuminated by the same light pulse, it is foreseen to trigger the different photoconductors of the new device by light pulses distributed in time by fiberoptical cables of different length. This technique could be directly used for the CTF beam position acquisition by delaying the laser light by the correct amount, such that the signals of individual bunches of any button and any BPM could be acquired. The fast samples are acquired by a MOS device (which replaces the CCD) with a resolution of 12 bits.

Due to the availability of 100 samples different strategies can be envisaged:

- the signal bursts corresponding to the 24 bunches of each shot and originating from different buttons are combined by appropriate delays into one sampling line. With 4 bursts from 4 buttons on each line 5 devices would be needed. The different attenuations due to the different delays would have to be calibrated.
- a higher precision could be attained on using several samples around the peak value of the bunch signal. With a distance of 2 mm between taps the equivalent time resolution would be less than 10 ps. Twenty devices would be needed to acquire the signals of 24 bunches on 5 BPMs with 4 buttons each.

A very preliminary price estimation for one unit comprising:

- the optoelectronic sampling line with 100 taps
- the optical fibers to deliver the delayed light pulses to the corresponding photoconductors
- the electronics to deliver digital outputs with 12 bit resolution on a bus still to be determined

would be around 250 kFF. It could be expected that the price/unit would be halved for the production of 20 units.

The first unit could probably be produced until the end of the year. The production of the remaining 19 units could be expected during 1995.

Since the light which illuminates the photoconductors is derived from the LASER which fires the photocathode of the CTF, we will get two pulses corresponding to the pulses generating the two times 12 bunches. These pulses would provoke a double exposure of the photoconductors which would then mix signals from different bunches on the same output. Up to now no solution avoiding the double exposure in 4 ns has been found.

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