PS/LP Note 94-41 (Min.)
7. 10. 1994

CLIC/PS

NEXT MEETING : FRIDAY 21 OCTOBER 1994

9.00hrs in the large PS Conference Room

AGENDA

1. *The polarized electron source of the MANI accelerator by K. Aulenbacher*

2. *A decision on the CTF beam line in 1995.*
   Note in the minutes of our meeting on 27 Sept. - attached to this invitation - you find a proposal for the beam line. If you have ideas on the subject, please discuss them with me before the meeting.

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Summary on the CLIC/PS Meeting 27/09/1994

1. Status CTF

With a pulse splitter in front of the existing pulse train generators a train of 48 pulses spaced by 333 ps was made. With the resulting bunch train more 30 GHz peak could be generated with the TRS. Record peak: 76.5 MW (see fig. 1).

The transmission through TRS depends on the charge but with the highest charge into TRS we had the max. 30 GHz.

The contribution of in/outcoming charge of the TRS requires further experiments.

Another advantage of the 48 bunch train is to generate a longer 30 GHz pulse. On fig. 2 we have a pulse from a 24 bunch train and on fig. 3 from a 48 bunch train. However, if we increase the charge then part of the train passes TRS only and the 30 GHz pulse becomes shorter (fig. 4).

A train of 24 'double' bunches was made by spacing two laser pulses such that the spacing between the double bunch became 33 ps (figs. 5 and 6).

The position of the bunches is not the same and consequently the transmission through TRS was somewhat less than with the pure 48 bunch train.

By reducing the spacing in the double bunch a single bunch of high charge was obtained. Record charges are summarized on fig 7.

2. Extensions to CTF in 1995

Under construction a magnetic bunch compressor between Booster and LAS. The system will be installed early '95.

The construction of a high charge rf gun - 2 1/2 cell - has been launched and a model ordered. To be installed in the course of '95.

We want to replace the LAS by a section having less wakefields upon the passage of a bunch train. The studies on the design of such a section will require quite some time and its construction even more. A new section will not be available before early '96.

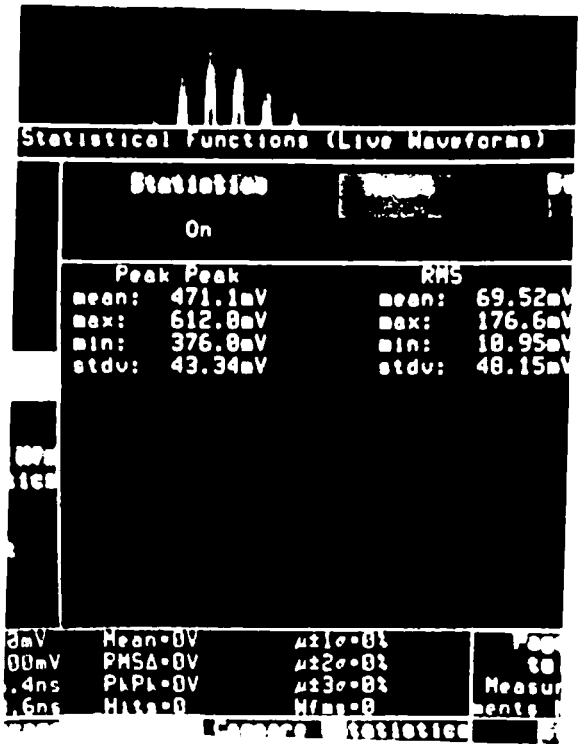
LAL - Orsay has a 1 m long section and conditioned it up to 70 MV/m. Our colleagues are ready to lend the section to the CTF.

The structure of the section is LIL-type with iris diameter of 18 mm and consequently will generate wakefields like in LAS. However, the high accelerating gradient and its short length counter the overall effect of the wakefields. The 1 m section has another advantage it will give space for testing beam monitors in the straight beam before TRS. The optics of the new arrangement is under study but two quadrupole doublets may do the affair. The probe beam will be conserved. Tentative layout: fig. 8

40 bunches

(P17

abs.	UMA375	395	406	455	Vpp.
g + d	3706.10^8	3747.10^8	3641.10^8	3223.10^8	356 mV
d	6806.10^8	6625.10^8	6787.10^8	5082.10^8	572 mV
d'					612 "



67.4 MW peak.

OFF-UMA	HOR(mm)	VER(mm)	Ch.(E8)
UMA170	111.1	111.1	0.8
UMA375	-1.9	1.5	-6806.3
UMA395	2.3	1.6	-6625.3
UMA406	1.1	0.2	-6786.8
UMA455	-4.5	-0.3	-5082.3

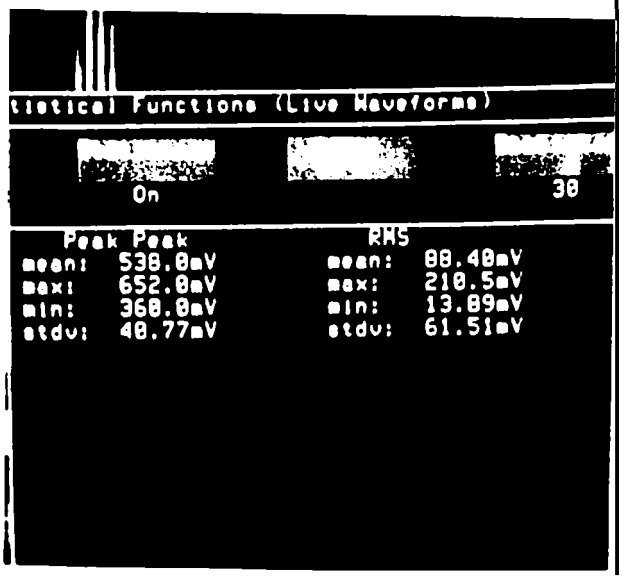
→ 109 mC
→ 65 "

48 bunches
att d. (0.25)

76.5 MW peak
53 " mean

UMA170	111.1	111.1	- 0.9
UMA375	-2.9	0.3	-9100.3
UMA395	2.9	1.6	-8922.4
UMA406	1.9	0.2	-9141.4
UMA455	-2.8	-0.3	-4712.7

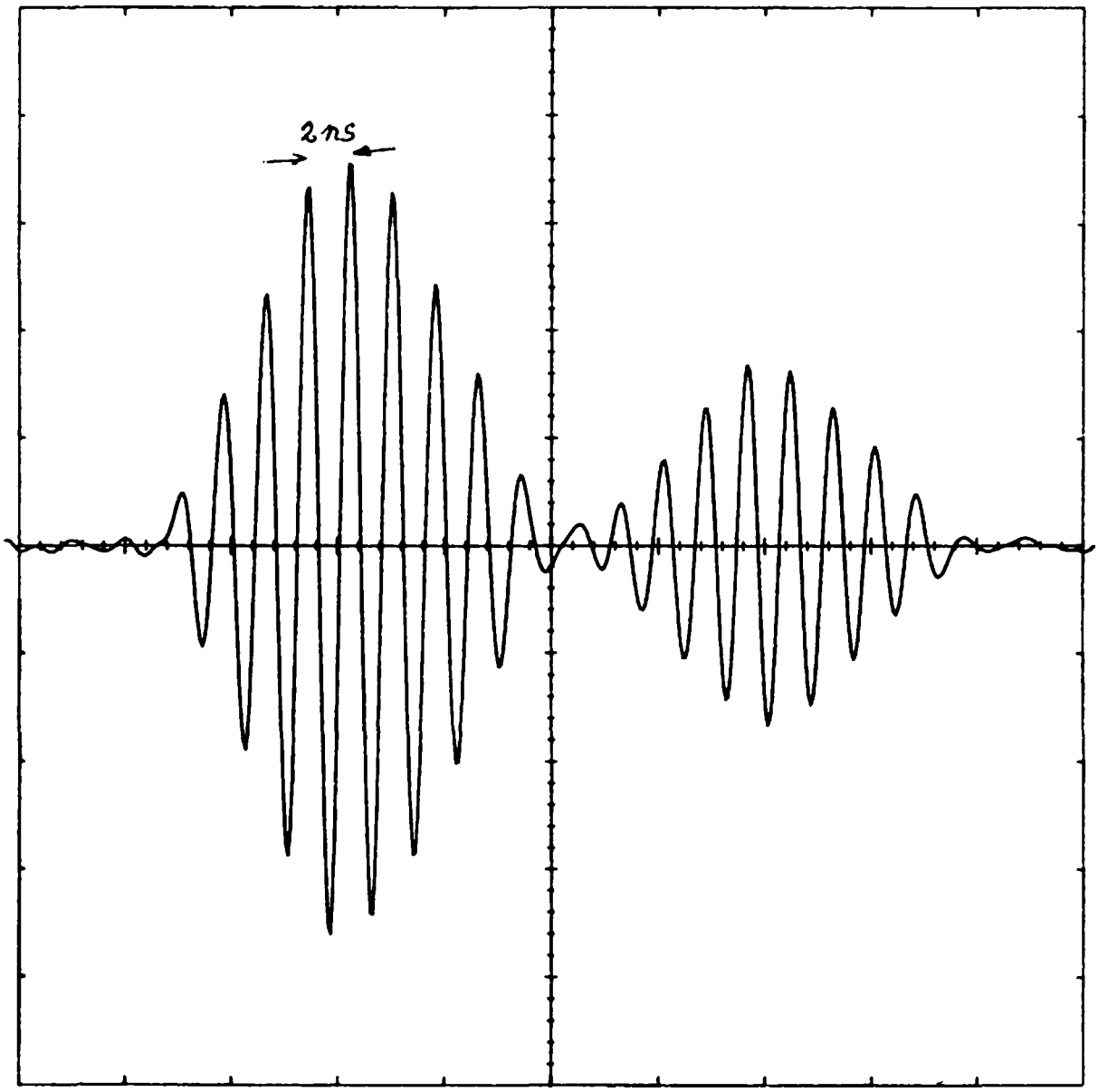
146 mC
61 mC



all abs + abs f+g

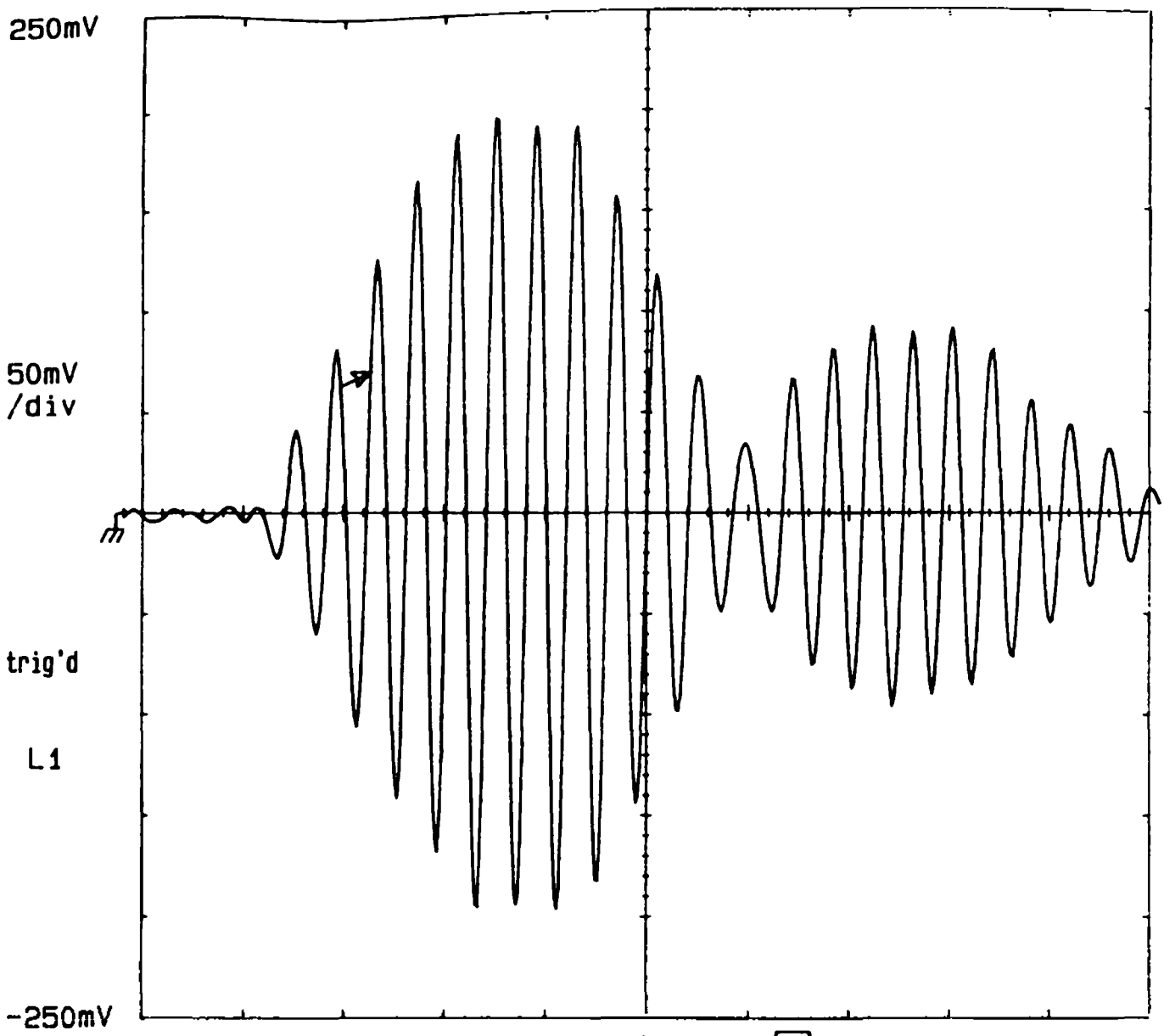
Fig 1

DSA 602A DIGITIZING SIGNAL ANALYZER
date: 12-SEP-94 time: 18:35:03



Peak-Peak	RMS		Measure-ments	Page to Statistics &Histogram	Rem Wfm 1 L1 Main
318.7 mV	48.90 mV	24 bunches			

Fig 2



Peak-Peak 356.2 mV	RMS 29.58 mV		Measure-ments	Page to Statistics &Histogram	Rem Wfm 1 L1 Main
			Main Trig Level 70mV	Main Trig	Main Time Holdoff 2µs

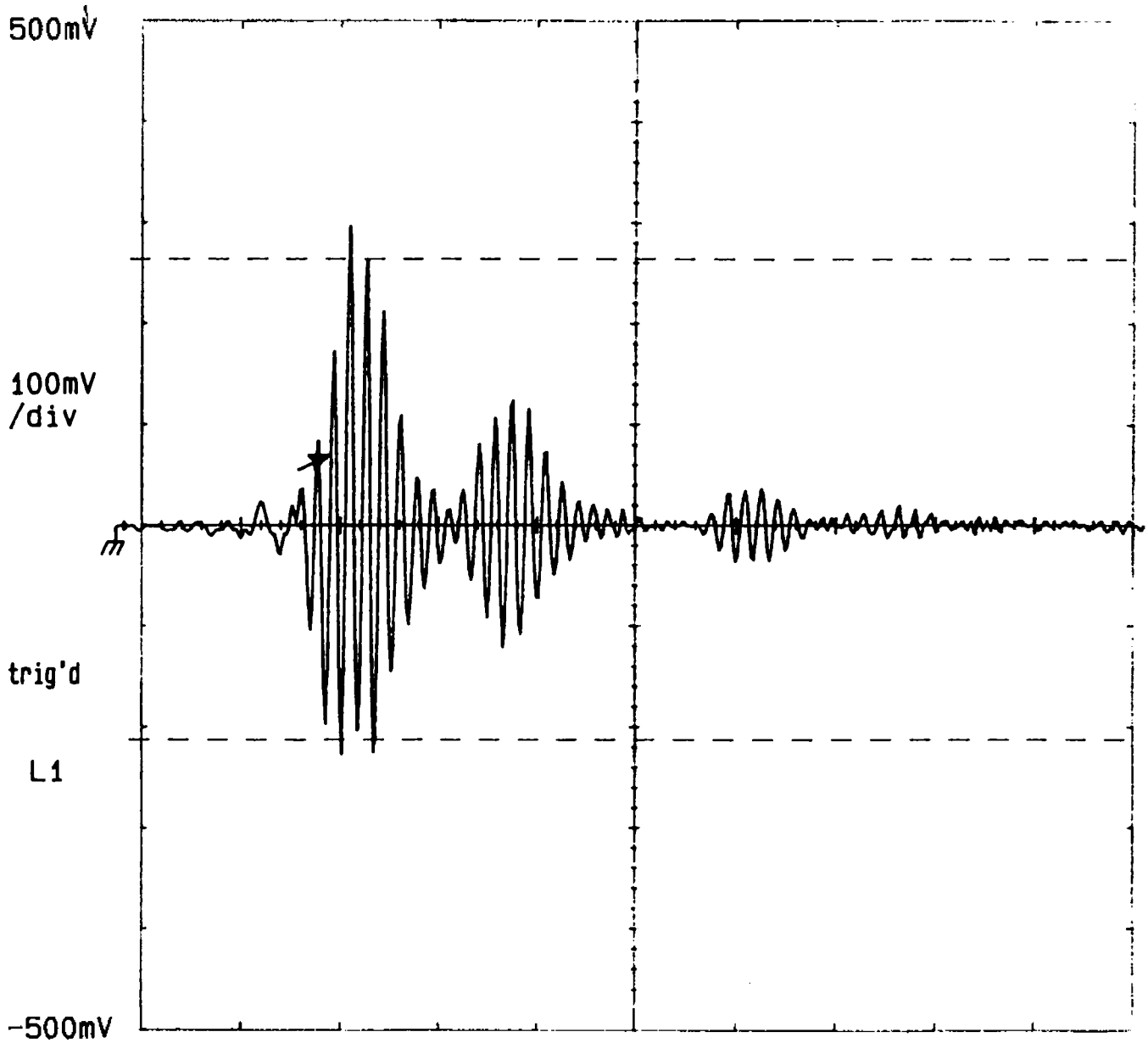
486.

Att: g + d

0.54 + 0.25

Fig 3

DSA 602A DIGITIZING SIGNAL ANALYZER
date: 12-SEP-94 time: 19:32:32



Peak-Peak 493.3 mV	RMS 124.3 mV		Measure-ments	Page to Statistics &Histogram	Aem Wfm 1 L1 Main
			Horizontal Magnify 2 x	Pan/ Zoom On	Horizontal Pos Gr 60 pts

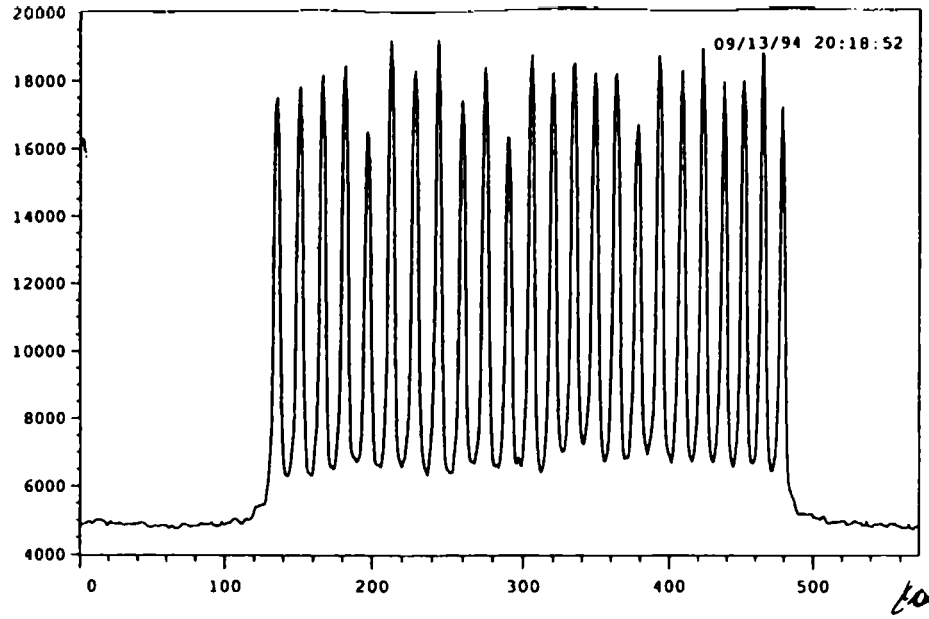
48 bunches all a6 + a54 f + g

Fig 4

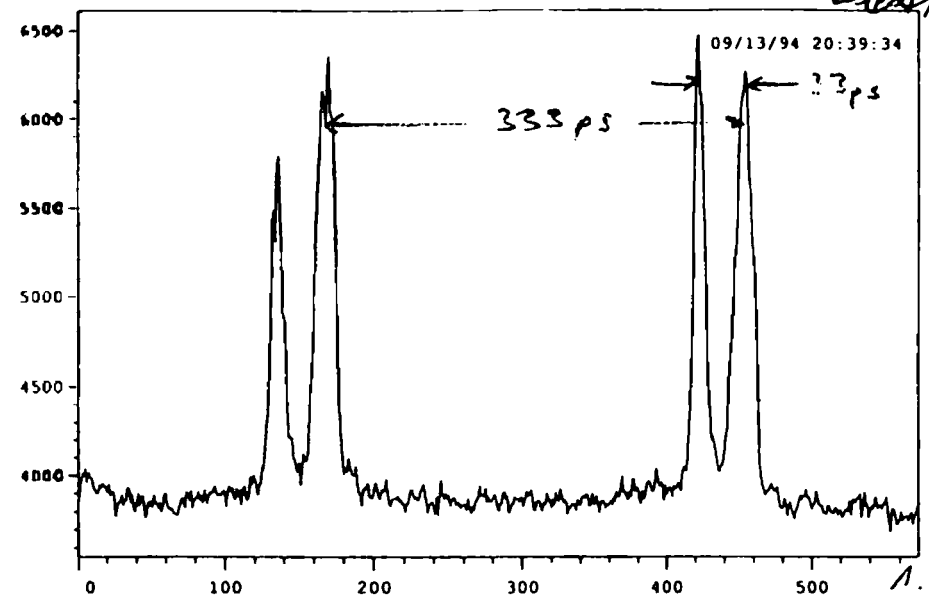
P21

double train of 2 x 14 bunches

30 GHz pair in 36 GHz train



23 ps/pixel



1.14 ps/pixel

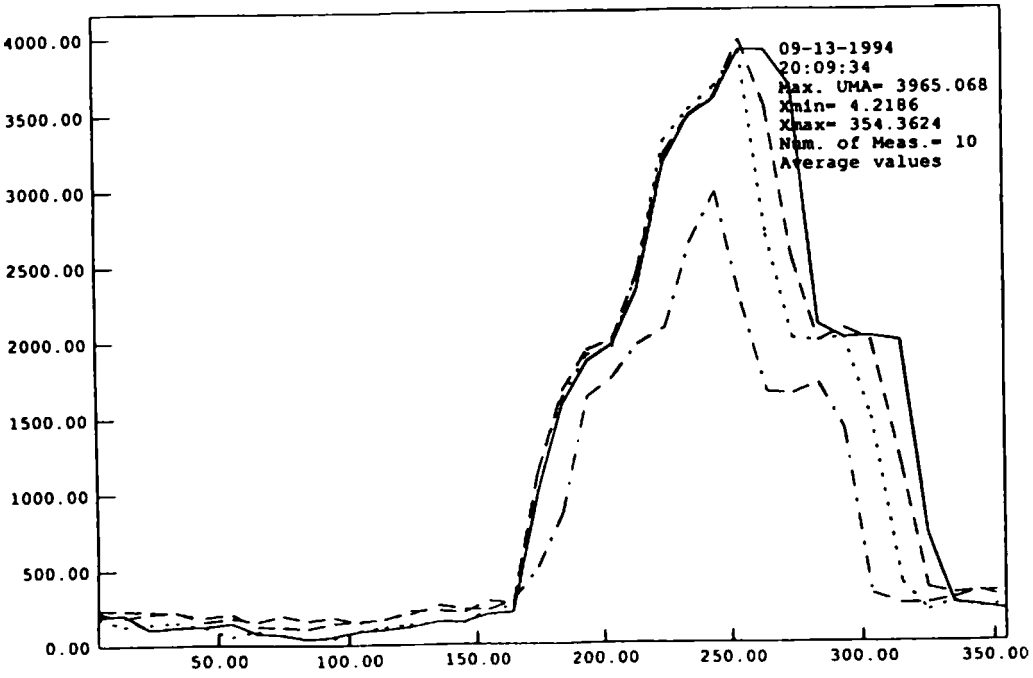
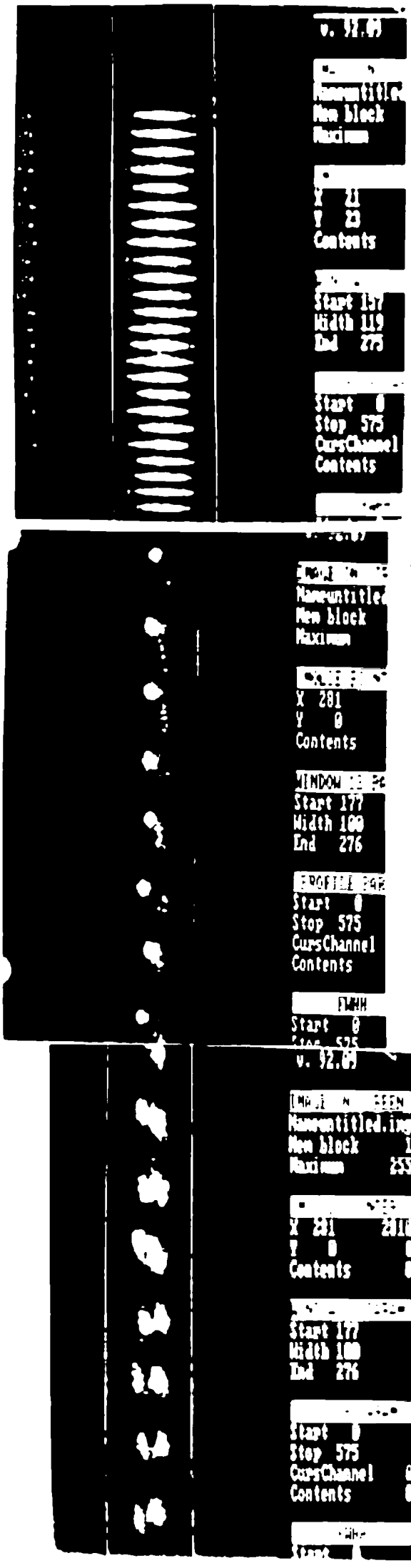


Fig 5



TCM445C

1 past

Last part.

Fig 6.

CTF performances

First Design goal achieved : generate 60 MW peak at 30 GHz.

Single bunch : accelerated to 95 MeV/c without losses ~ 6 nC ; ~ 10 ps FWHH.

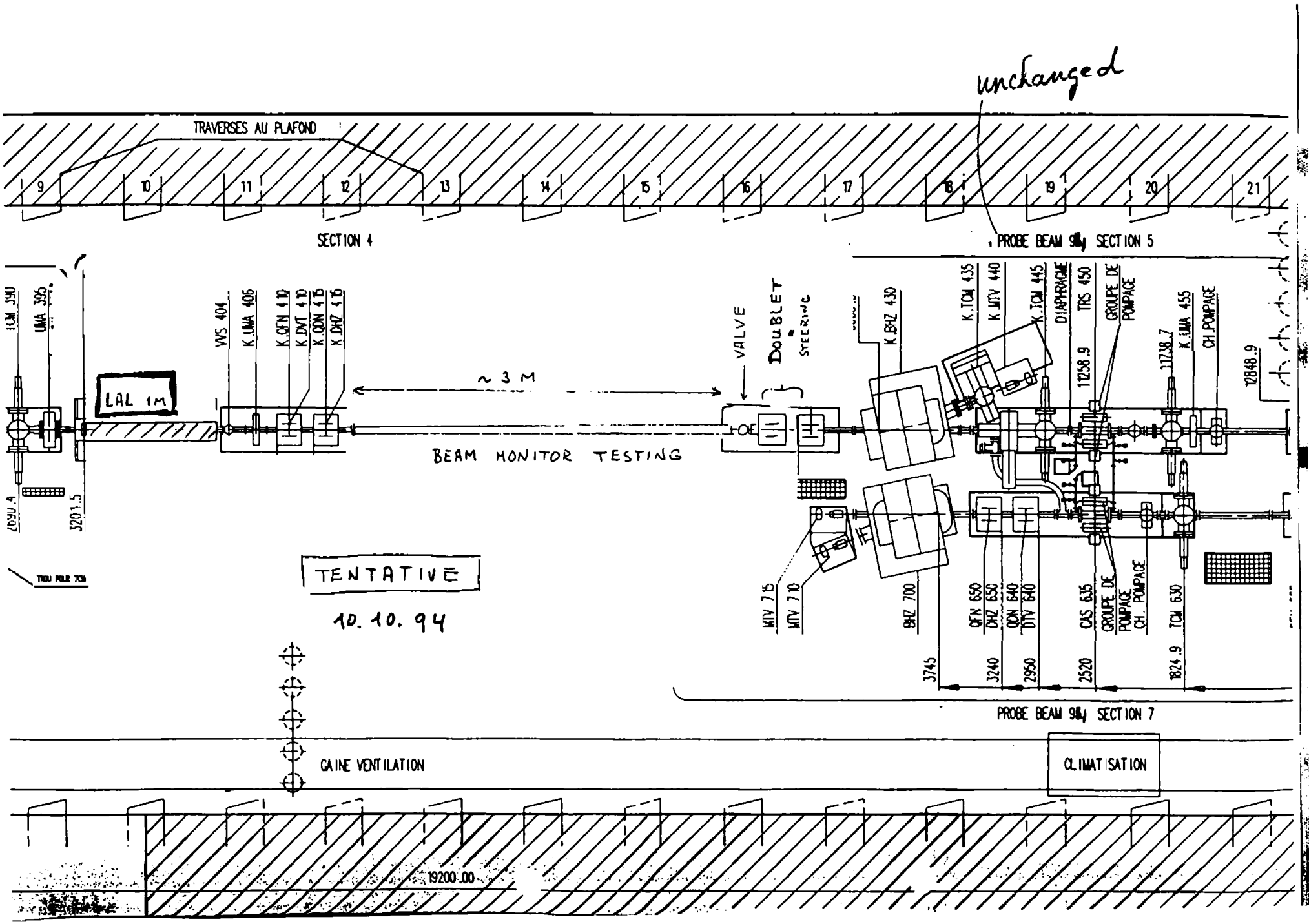
> gun-booster : at 11 MeV/c a charge of 35 nC ; ~ 19 ps FWHH.

Bunch trains : 8/12/24 OR 48 bunches spaced by 333 ps.

24 bunches : gun-booster provided a total train charge of 160 nC ; accelerated 100 nC

48 bunches : without losses accelerated (95 MeV/c) tot. charge of 146 nC ; bunches and train displaced, momentum spread 30% due to beam loading in acc. section

Fig 7


unchanged
TRAVERSES AU PLAFOND
9
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SECTION 4
PROBE BEAM 98y SECTION 5
LAL 1M
≈ 3 M
BEAM MONITOR TESTING
VALVE
DOUBLET
STEERING
TENTATIVE
10.10.94
PROBE BEAM 98y SECTION 7
GAINE VENTILATION
CLIMATISATION
19200.00

Fig 8