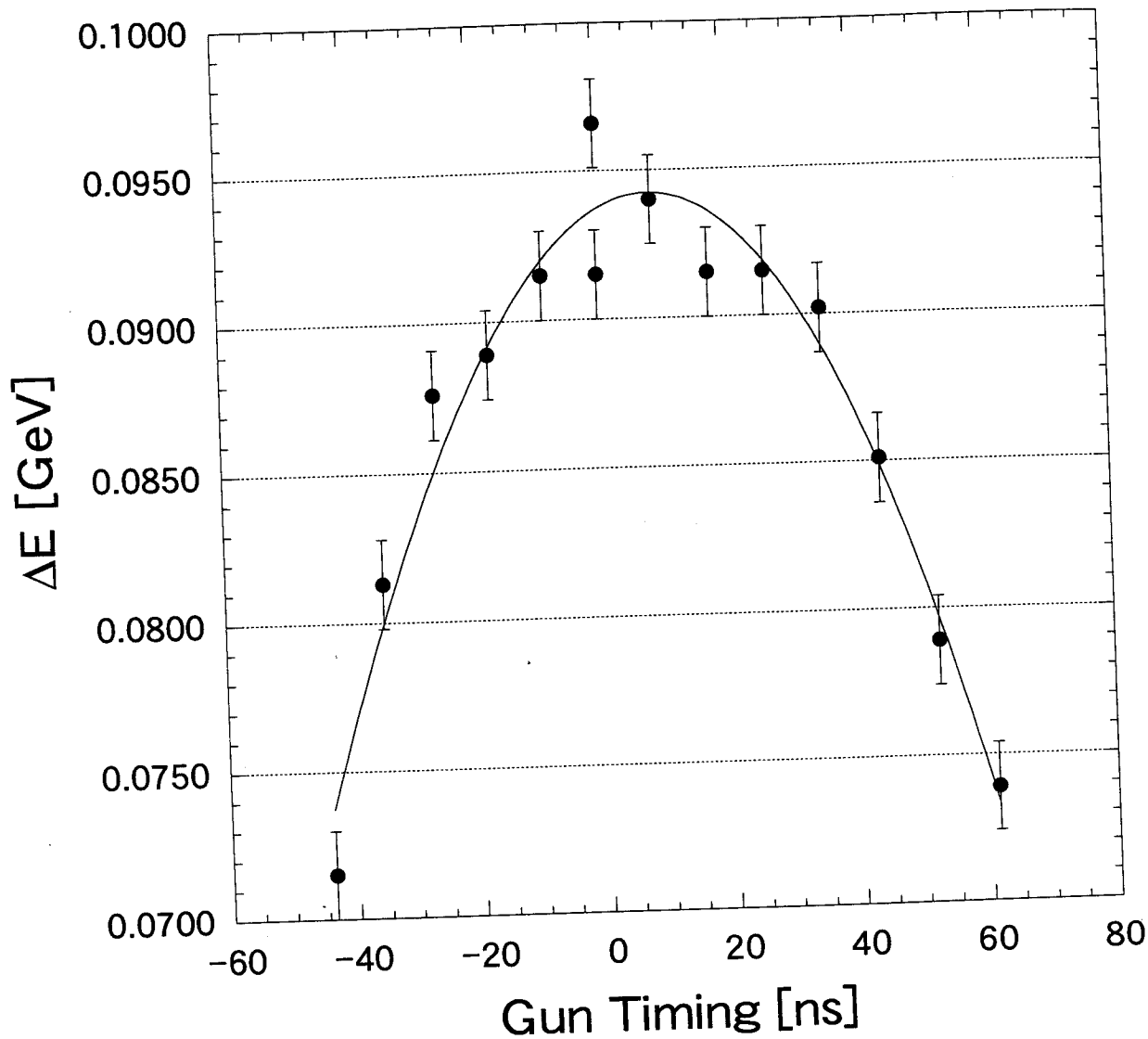


J-Arc Energy



	SHB1 Period	Time [ns]	KL_B5 Phase	KL_B6 Phase	E [GeV]	Energy [GeV]
0	-6.0000	-52.524				
1	-5.0000	-43.770	189.50	277.50	1.6285000	0.071500
2	-4.0000	-35.016	191.00	276.00	1.6187000	0.081300
3	-3.0000	-26.262	192.50	275.00	1.6124001	0.087600
4	-2.0000	-17.508	192.50	274.50	1.6111000	0.088900
5	-1.0000	-8.7540	193.00	274.00	1.6085000	0.091500
6	0.0000	0.0000	193.00	274.00	1.6034000	0.096600
7	1.0000	8.7540	193.00	274.00	1.6059999	0.094000
8	2.0000	17.508	193.50	273.50	1.6085000	0.091500
9	3.0000	26.262	193.00	274.00	1.6085000	0.091500
10	4.0000	35.016	193.00	274.00	1.6098000	0.090200
11	5.0000	43.770	191.50	275.00	1.6149000	0.085100
12	6.0000	52.524	190.50	276.50	1.6210999	0.078900
13	7.0000	61.278	189.50	277.50	1.6260999	0.073900
14	0.0000	0.0000	193.00	274.00	1.6085000	0.091500

2ビーム加速の予備テスト (小M. 5M, スワダ, 松本, 大沢)

Gun Grid Pulsar 用 TD4R の設定値

現在	DDOE	基準	タイム	SHB1	KL-B5,	KL-B6	E(GeV)	TD4R	ORBIT
	の値	周期						の値	
DCD	-6								
DCD7	-5	189.5	277.5	1.6285			DCF5	16250	
DCEZ	-4	191.0	276.0	1.6187			DCFA	15253	
DCEB	-3	192.5	275.0	1.6124			DDFF	15252	
DCF8	-2	192.5	274.5	1.6111			DD04		
DD03	-1	193	274	1.6085			DD09	15244	
DD0E	0	193	274	1.6034 1.6034			DD0E	15222	
DD19	1	193	274.0	1.6060			DD13	16221	
DD24	2	193.5	273.5	1.6085			DD18	16223	
DD2F	3	193.0	274.0	1.6085			DD15		
DD3A	4	193.0	274.0	1.6098			DD1D	16229	
DD45	5	191.5	275.0	1.6149			DD22	16232	
DD50	6	190.5	276.5	1.6211			DD27	16235	
DD5B	7	189.5	277.5	1.6261			DD2C	16239	
	0	193.0	274.0	1.6085			DD31	16242	
							DD0E	16247	

• 10nCビームのタイミングを, TD4Rで, SHB1の1周期ごとに変えて
 インジェクション Feedback の RF位相とエネルギーを J-ARC で測定した

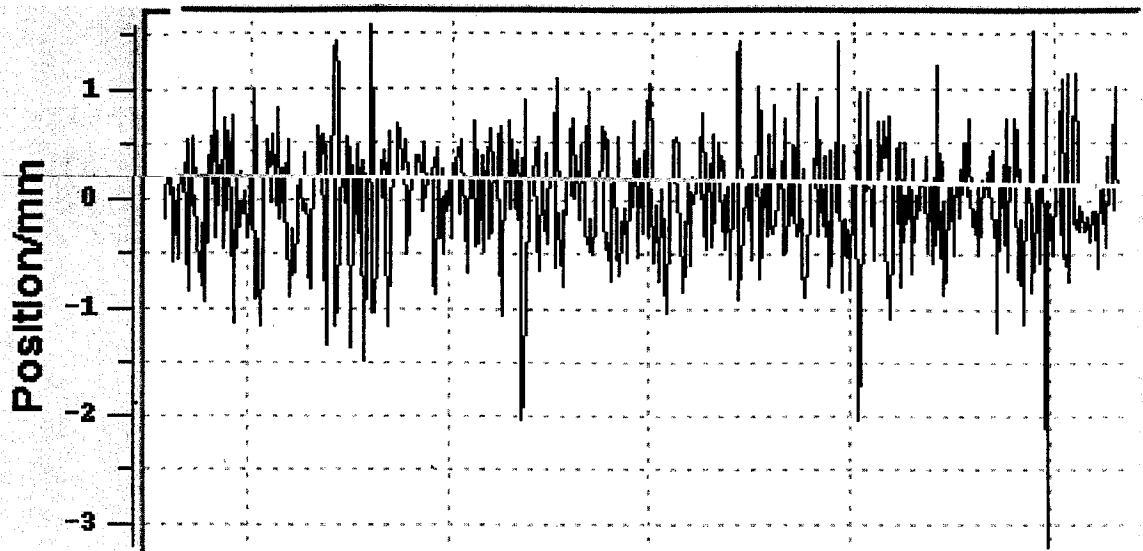
• GUN Parameter 00529-10nC

Feedback ON	-4.	190.5	276.5	1.6211	DC	DDFA	(16258 17201)
" OFF	7	"	"	"		DD31	17204
(GONHV, SHB2の Power のみ ON)							
Feedback ON	7	189.5	277.5	1.6261		DD31	17209

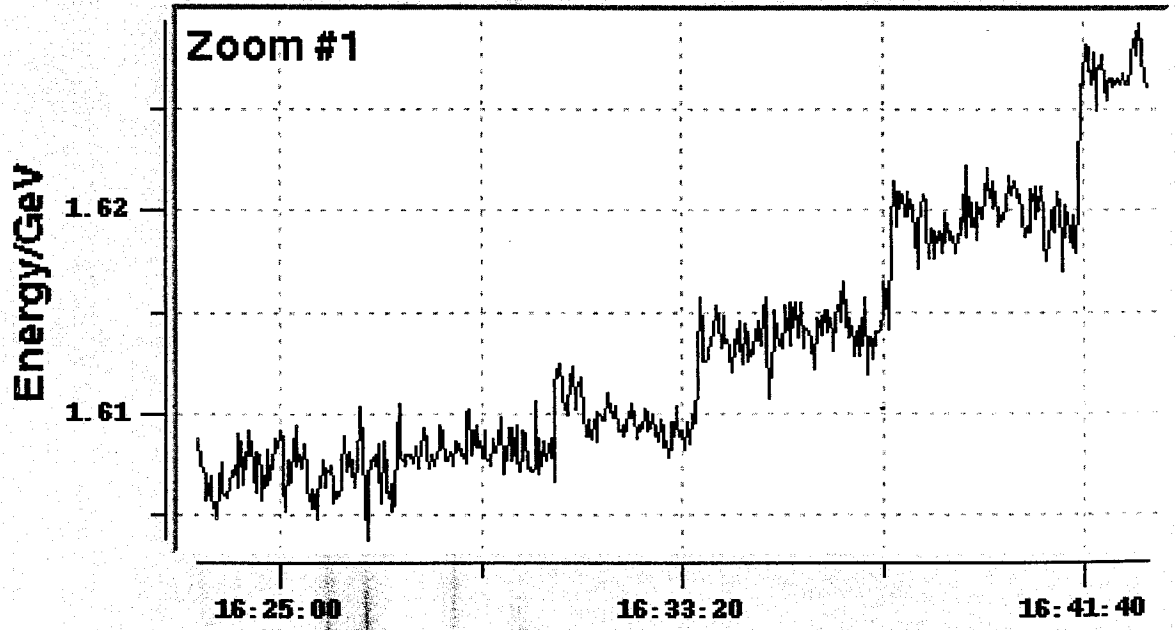
File

R0 e+ Energy

16:42 v2.2.2



Zoom #1



16:25:00

16:33:20

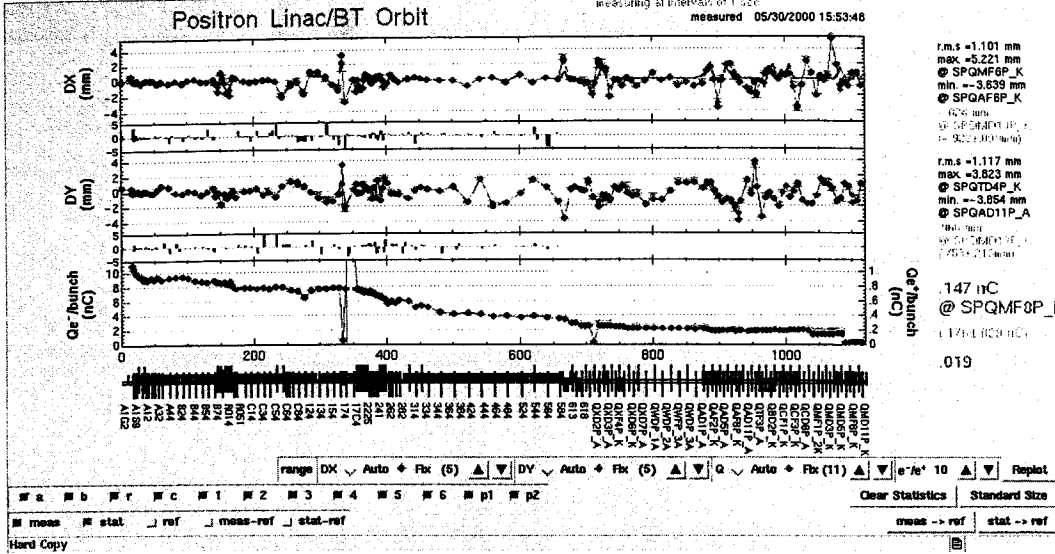
16:41:40

Time

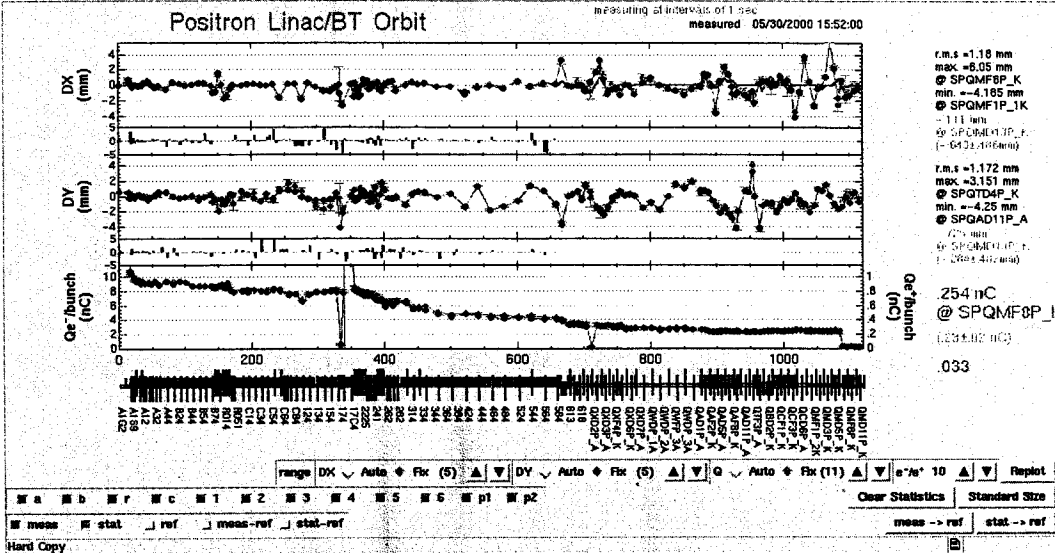
Drag Button-1 to Zoom Graph

Clear Data

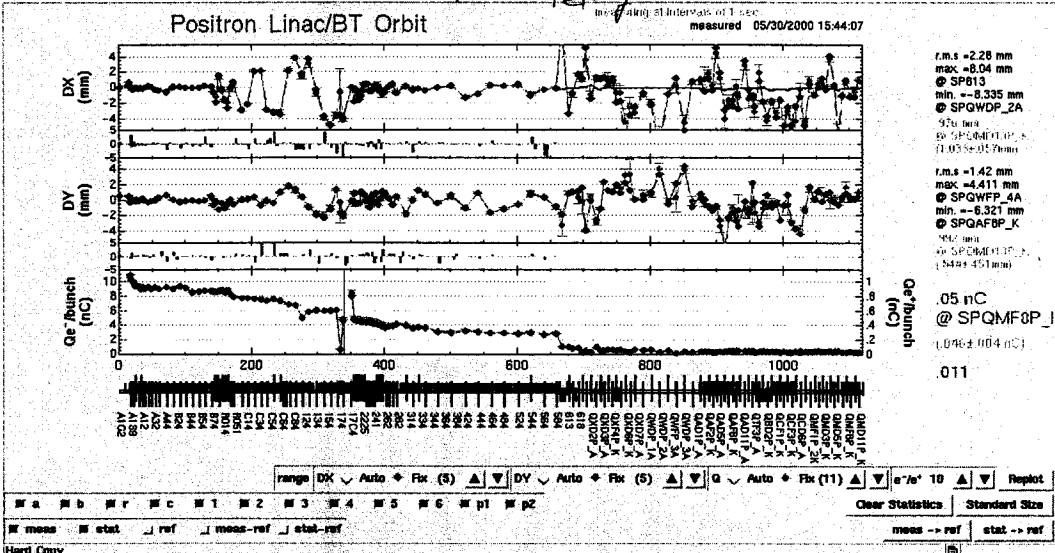
-4



-3



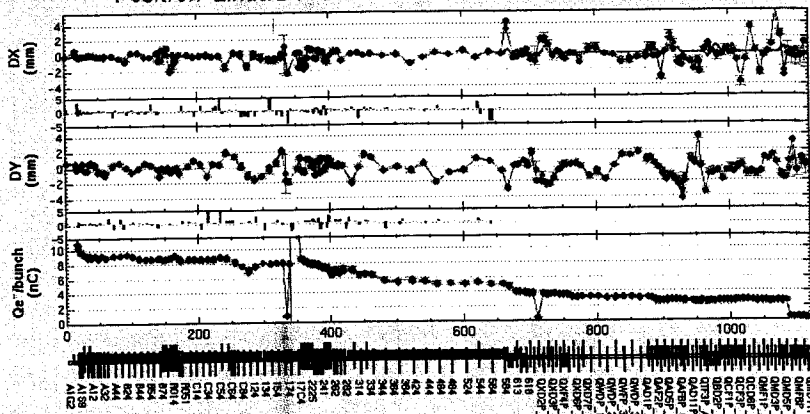
Gun Delay -1



Po

Positron Linac/BT Orbit

measuring at intervals of 1 sec
measured 05/30/2000 15:25:53



r.m.s = 1.127 mm
 max = 5.579 mm
 @ SPQMF8P_K
 min = -3.779 mm
 @ SPQMF1P_1K
 1.532 mm
 @ SPQAD11P_A
 (-19.141.1276mm)

r.m.s = 1.198 mm
 max = 5.845 mm
 @ SPQTD4P_K
 min = -4.398 mm
 @ SPQAD11P_A
 1.532 mm
 @ SPQAD11P_A
 (-19.241.2196mm)

Qe* bunch
 247 nC
 @ SPQMF8P_1
 (25.74.014 nC)

032

range DX Auto Fix (5) DY Auto Fix (5) Q Auto Fix (11) e/A 10 Replot

a b r c 1 2 3 4 5 6 p1 p2

Clear Statistics Standard Size

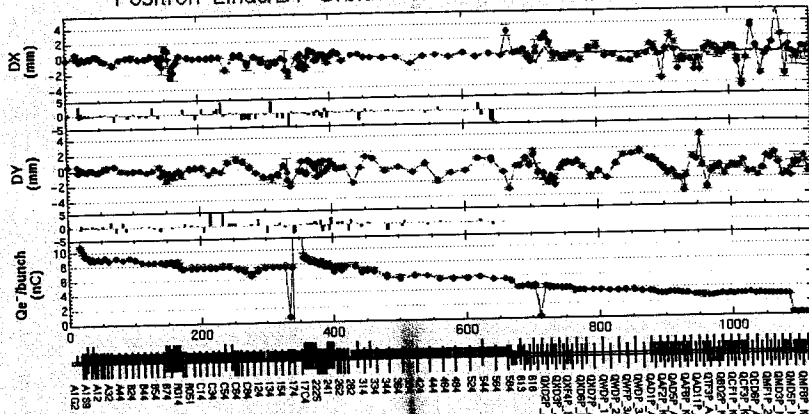
mes stat ref mes-ref stat-ref

mes -> ref stat -> ref

Hard Copy

Positron Linac/BT Orbit

measuring at intervals of 1 sec
measured 05/30/2000 16:21:06



r.m.s = 1.162 mm
 max = 5.968 mm
 @ SPQMF8P_K
 min = -4.491 mm
 @ SPQMF1P_1K
 1.532 mm
 @ SPQAD11P_A
 (-19.641.2016mm)

r.m.s = 1.051 mm
 max = 3.752 mm
 @ SPQTD4P_K
 min = -3.84 mm
 @ SPQAD11P_A
 1.532 mm
 @ SPQAD11P_A
 (-19.741.2096mm)

Qe* bunch
 209 nC
 @ SPQMF8P_1
 (1.944.014 nC)

038

range DX Auto Fix (5) DY Auto Fix (5) Q Auto Fix (11) e/A 10 Replot

a b r c 1 2 3 4 5 6 p1 p2

Clear Statistics Standard Size

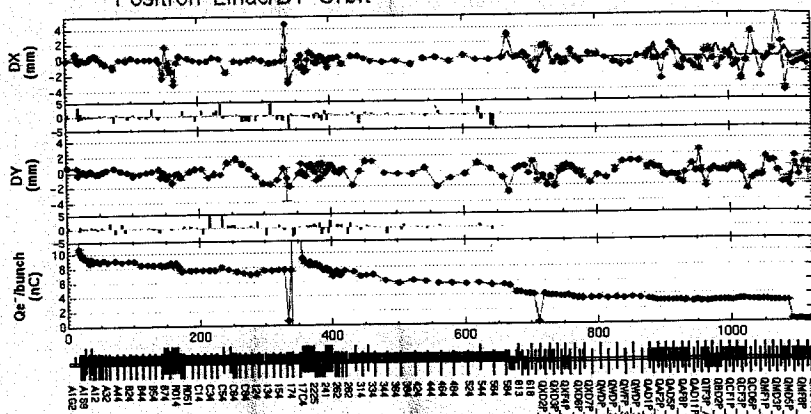
mes stat ref mes-ref stat-ref

mes -> ref stat -> ref

Hard Copy

Positron Linac/BT Orbit

measuring at intervals of 1 sec
measured 05/30/2000 16:23:00



r.m.s = 1.194 mm
 max = 5.768 mm
 @ SPQMF8P_K
 min = -4.452 mm
 @ SPQMF8P_K
 1.532 mm
 @ SPQAD11P_A
 (-19.241.2196mm)

r.m.s = .949 mm
 max = 2.44 mm
 @ SPQTD4P_K
 min = -2.683 mm
 @ SP613
 1.532 mm
 @ SPQAD11P_A
 (-19.241.2196mm)

Qe* bunch
 297 nC
 @ SPQMF8P_1
 (1.974.014 nC)

039

range DX Auto Fix (5) DY Auto Fix (5) Q Auto Fix (11) e/A 10 Replot

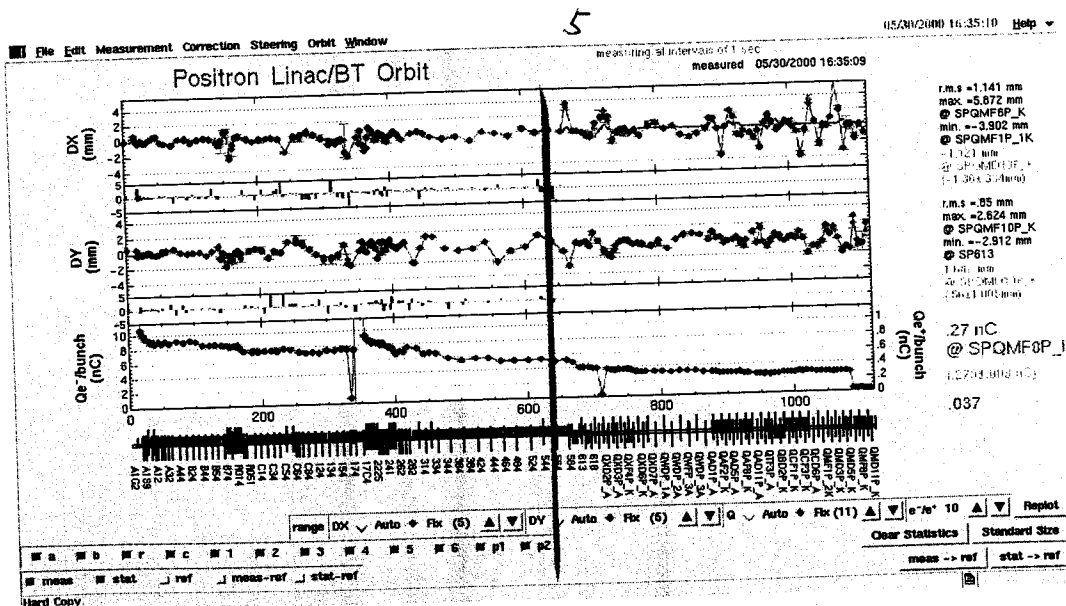
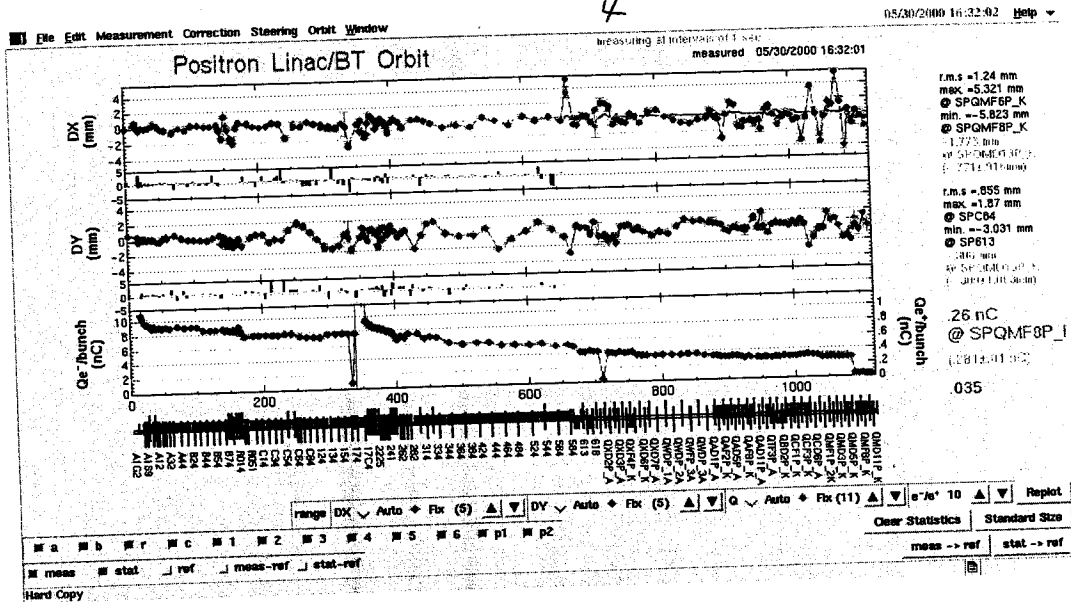
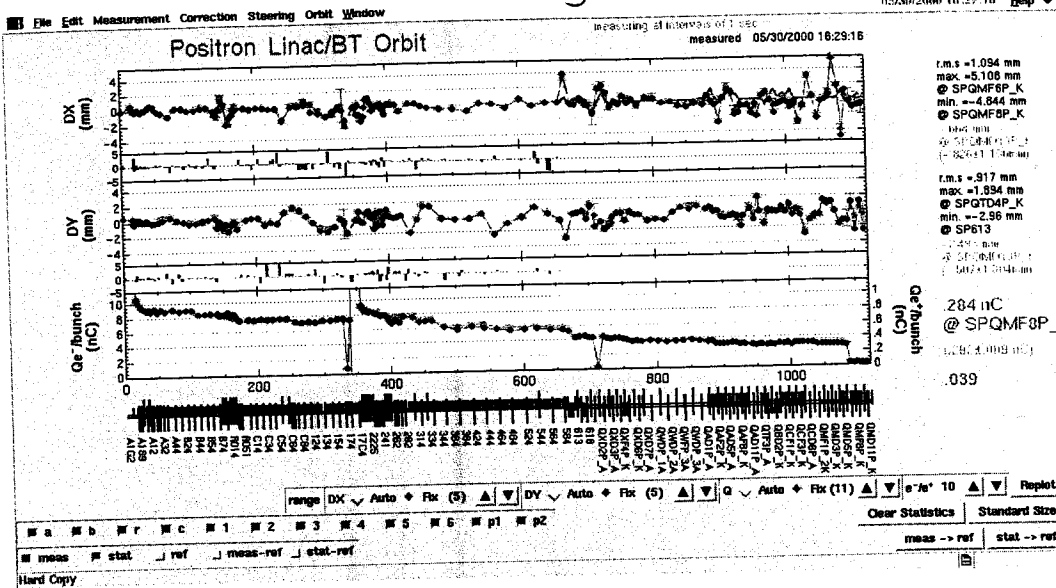
a b r c 1 2 3 4 5 6 p1 p2

Clear Statistics Standard Size

mes stat ref mes-ref stat-ref

mes -> ref stat -> ref

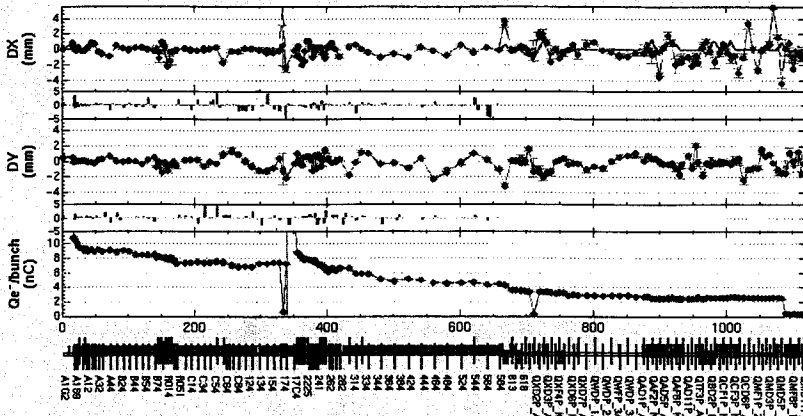
Hard Copy



6

Positron Linac/BT Orbit

measuring at intervals of 1 sec
measured 05/30/2000 16:39:15



r.m.s = 1.27 mm
 max = 6.129 mm
 @ SP17C2
 min = -4.407 mm
 @ SPQMF8P_K
 1.442 mm
 @ SP24MD4P_K
 1.165417 mm

r.m.s = 0.78 mm
 max = 2.06 mm
 @ SPQTD4P_K
 min = -3.217 mm
 @ SP613
 1.133 mm
 @ SP24MD4P_K
 1.162417 mm

.246 nC
 @ SPQMF8P_I
 (1.2442 007 nC)

.034

range DX Auto Fix (5) DY Auto Fix (5) Q Auto Fix (11) e-h* 10 Replot

Clear Statistics Standard Size

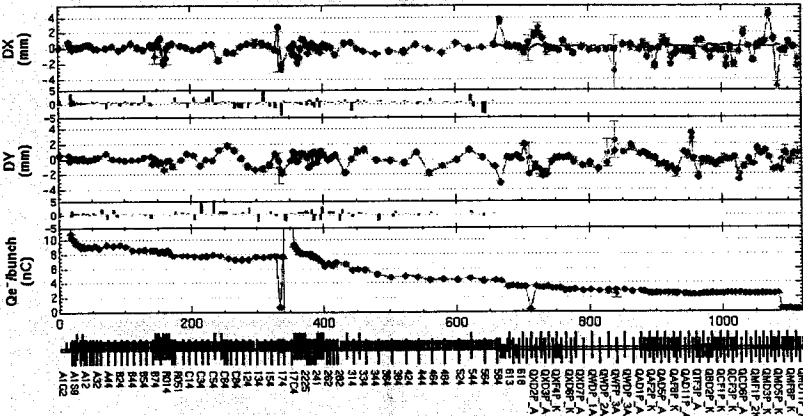
meas -> ref stat -> ref

Hard Copy

7

Positron Linac/BT Orbit

measuring at intervals of 1 sec
measured 05/30/2000 16:42:08



r.m.s = 1.052 mm
 max = 4.225 mm
 @ SPQMF8P_K
 min = -5.803 mm
 @ SPQMF8P_K
 1.565 mm
 @ SP24MD4P_K
 1.165417 mm

r.m.s = .967 mm
 max = 3.301 mm
 @ SPQTD4P_K
 min = -3.311 mm
 @ SP613
 1.133 mm
 @ SP24MD4P_K
 1.162417 mm

.237 nC
 @ SPQMF8P_I
 (1.233 008 nC)

.031

range DX Auto Fix (5) DY Auto Fix (5) Q Auto Fix (11) e-h* 10 Replot

Clear Statistics Standard Size

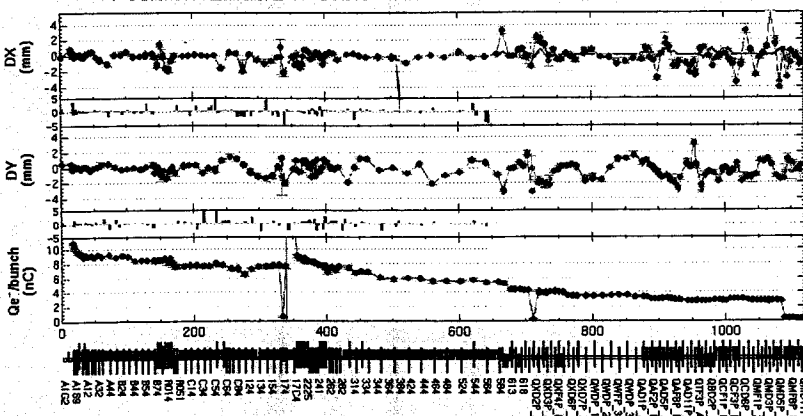
meas -> ref stat -> ref

Hard Copy

0

Positron Linac/BT Orbit

measuring at intervals of 1 sec
measured 05/30/2000 16:47:17



r.m.s = 1.163 mm
 max = 5.721 mm
 @ SPQMF8P_K
 min = -4.182 mm
 @ SPQMF8P_K
 1.451 mm
 @ SP24MD4P_K
 1.165417 mm

r.m.s = 1.042 mm
 max = 3.085 mm
 @ SPQTD4P_K
 min = -3.164 mm
 @ SPQDF2P_A
 1.133 mm
 @ SP24MD4P_K
 1.162417 mm

.272 nC
 @ SPQMF8P_I
 (1.269 011 nC)

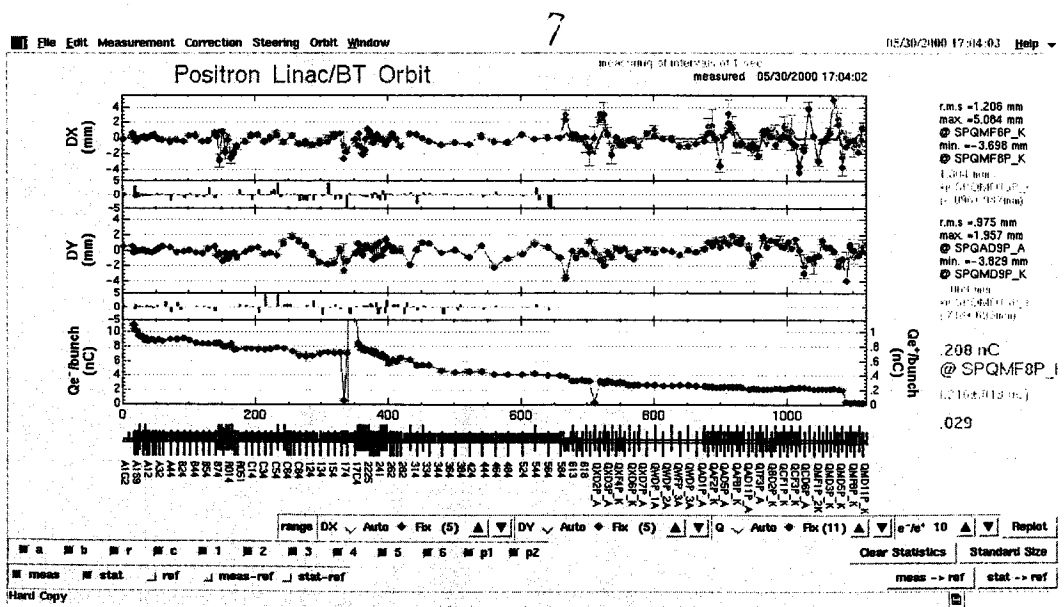
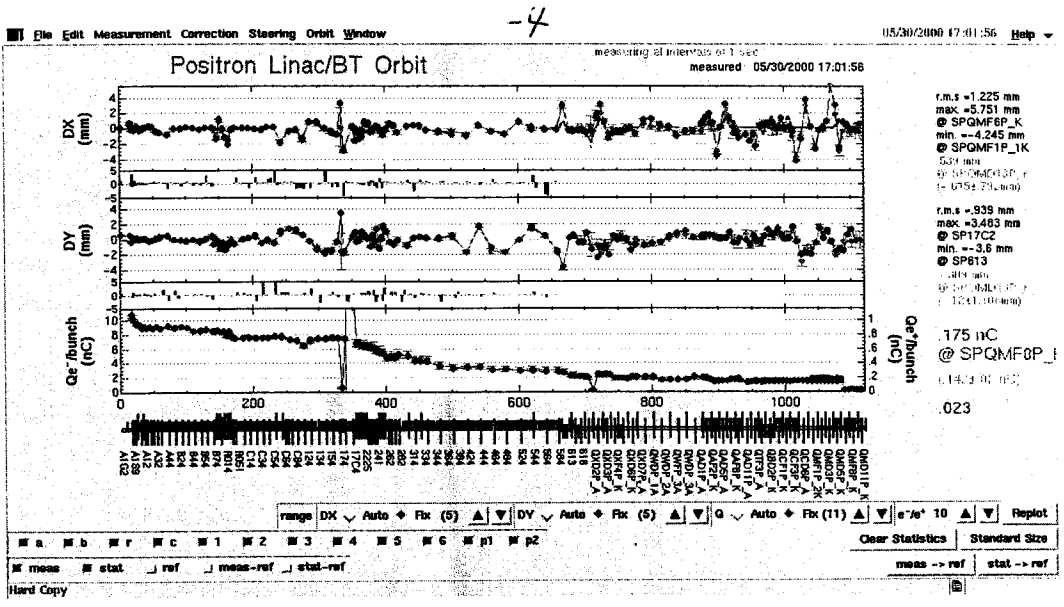
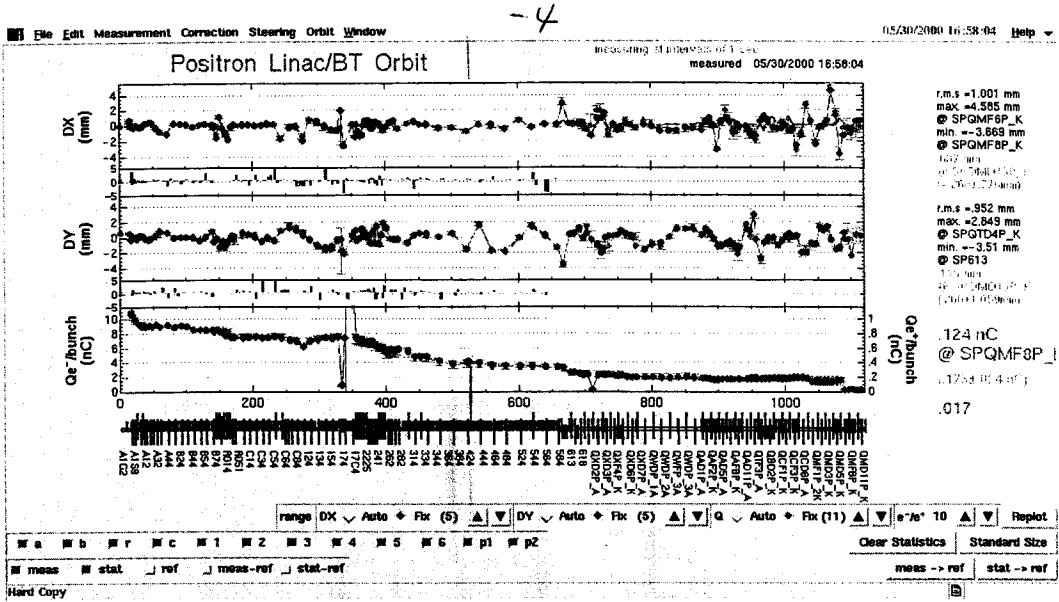
.035

range DX Auto Fix (5) DY Auto Fix (5) Q Auto Fix (11) e-h* 10 Replot

Clear Statistics Standard Size

meas -> ref stat -> ref

Progress Bar

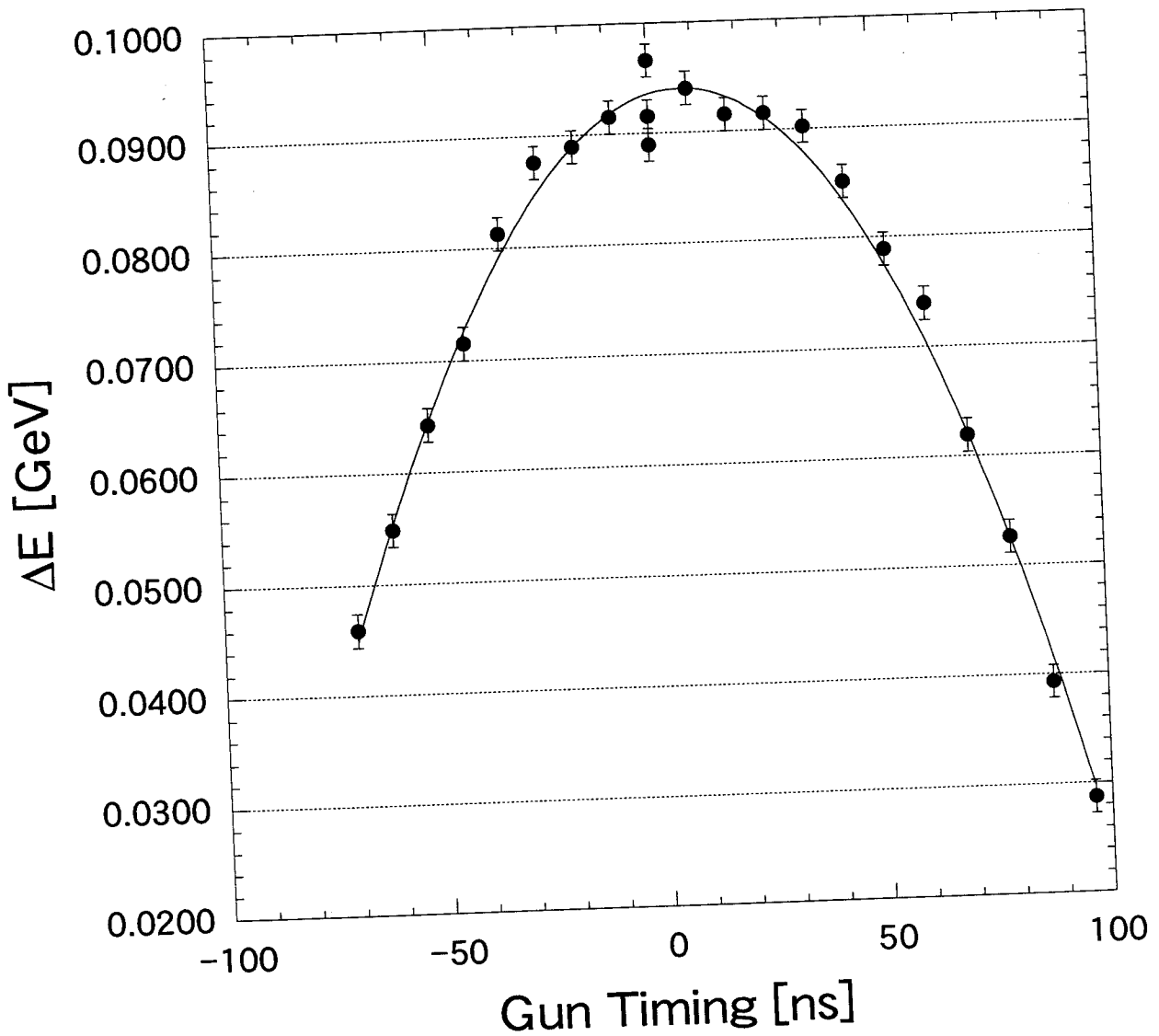


TDR	SHB1 周期	KL_B5	KL_B6	E [GeV]	ORBIT
DDE	0	192.5	274.5	1.6111	
DCFO	-6	187.5	279.5	1.6357	18=19
DCEB	-7	186.0	281.5	1.6451	18=25
DCE6	-8	184.0	283.5	1.6541	18=27
DDE	0	192.5	274.5	1.6111	
D36	+8	187	280	1.6381	18=34
D3B	9	184.5	282.5	1.6474	18=36
D40	10	182	285	1.6607	18=37
D45	11	179.5	287.5	1.6713	18=39

Tuesday, May 30 6:45 PM 2000

	SHB1 Period	Time [ns]	KL_B5 Phase	KL_B6 Phase	E [GeV]	Energy [GeV]
0	-8.0000	-70.032	184.00	283.50	1.6540999	0.045900
1	-7.0000	-61.278	186.00	281.50	1.6451000	0.054900
2	-6.0000	-52.524	187.50	279.50	1.6357000	0.064300
3	-5.0000	-43.770	189.50	277.50	1.6285000	0.071500
4	-4.0000	-35.016	191.00	276.00	1.6187000	0.081300
5	-3.0000	-26.262	192.50	275.00	1.6124001	0.087600
6	-2.0000	-17.508	192.50	274.50	1.6111000	0.088900
7	-1.0000	-8.7540	193.00	274.00	1.6085000	0.091500
8	0.0000	0.0000	193.00	274.00	1.6034000	0.096600
9	1.0000	8.7540	193.00	274.00	1.6059999	0.094000
10	2.0000	17.508	193.50	273.50	1.6085000	0.091500
11	3.0000	26.262	193.00	274.00	1.6085000	0.091500
12	4.0000	35.016	193.00	274.00	1.6098000	0.090200
13	5.0000	43.770	191.50	275.00	1.6149000	0.085100
14	6.0000	52.524	190.50	276.50	1.6210999	0.078900
15	7.0000	61.278	189.50	277.50	1.6260999	0.073900
16	8.0000	70.032	187.00	280.00	1.6381000	0.061900
17	9.0000	78.786	184.50	282.50	1.6474000	0.052600
18	10.000	87.540	182.00	285.00	1.6607000	0.039300
19	11.000	96.294	179.50	287.50	1.6713001	0.028700
20	0.0000	0.0000	193.00	274.00	1.6085000	0.091500
21	0.0000	0.0000	192.50	274.50	1.6111000	0.088900
22	0.0000	0.0000	192.50	274.50	1.6111000	0.088900

J-Arc Energy



単バンチビームタイミングの分散 (loss factor)

e^+ 用 \rightarrow 2 pC と e^- 用 (0.7 nC) の J-Arc の ノード間の

エネルギー量の差は $\frac{43 \text{ MeV}}{(0.065/29 \text{ 午節中})}$

e^+ 用 \rightarrow 2 pC は SBA, Bφ を $\Delta\phi = -10^\circ$ とすると
(Energy Spread Minimum)

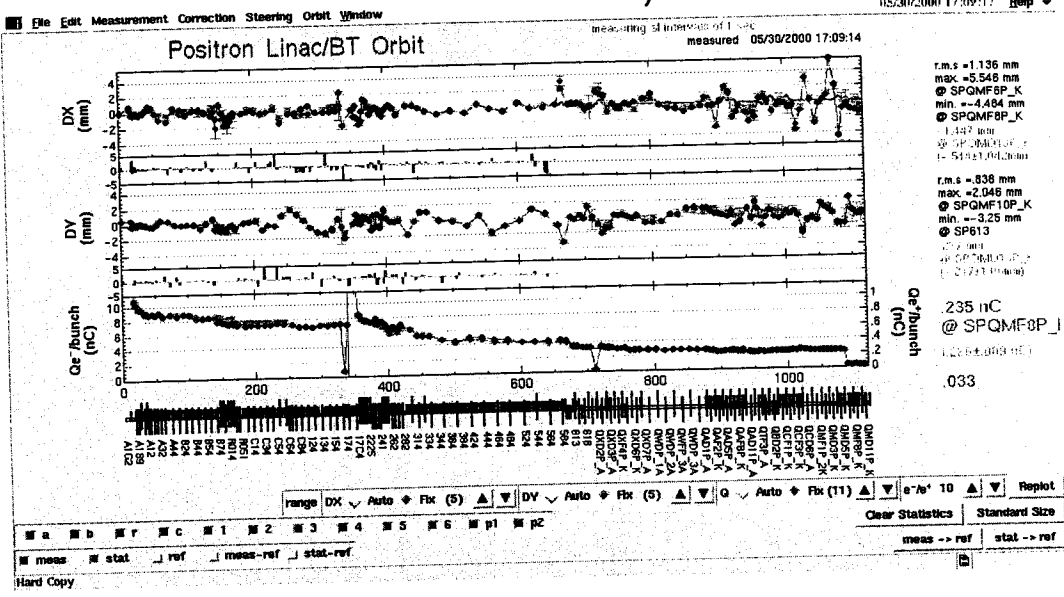
$$(1 - \cos 10^\circ) \times 1.7 \text{ GeV} = 26 \text{ MeV}$$

この分を引くと

$$43 - 26 = 17 \text{ MeV} / \text{pC} \quad \Leftarrow \text{self loading (loss factor)}$$

$$\Rightarrow \frac{17 \text{ MeV}}{8 \text{ nC}} \times 2 = 4.25 \text{ MeV} / \text{nC}$$

$$\Rightarrow \frac{4.25 \text{ MeV}}{1.7 \text{ GeV}} = \boxed{0.25\% / \text{nC}}$$

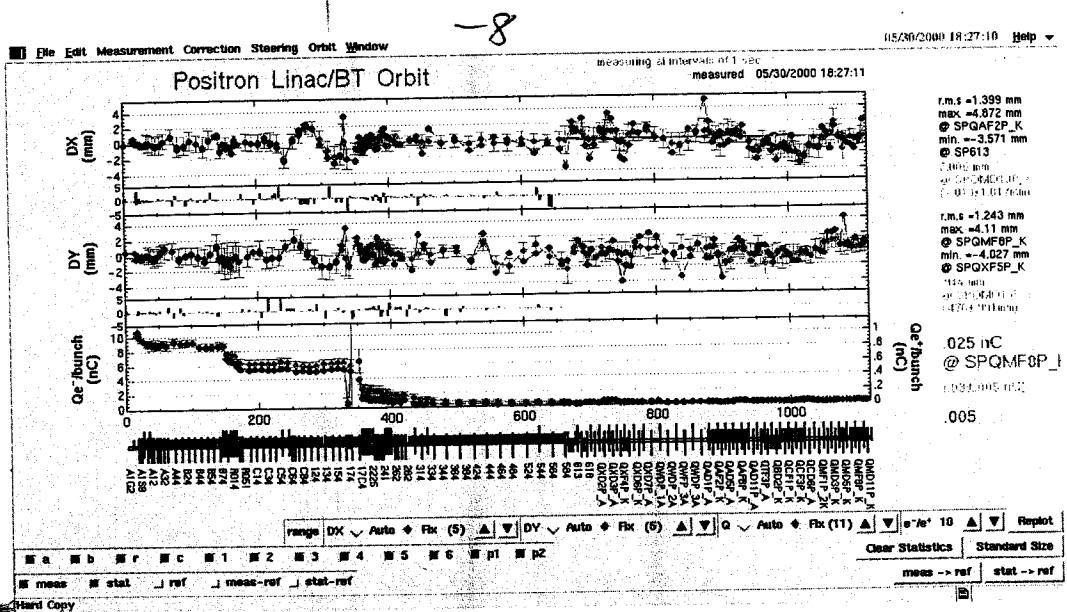
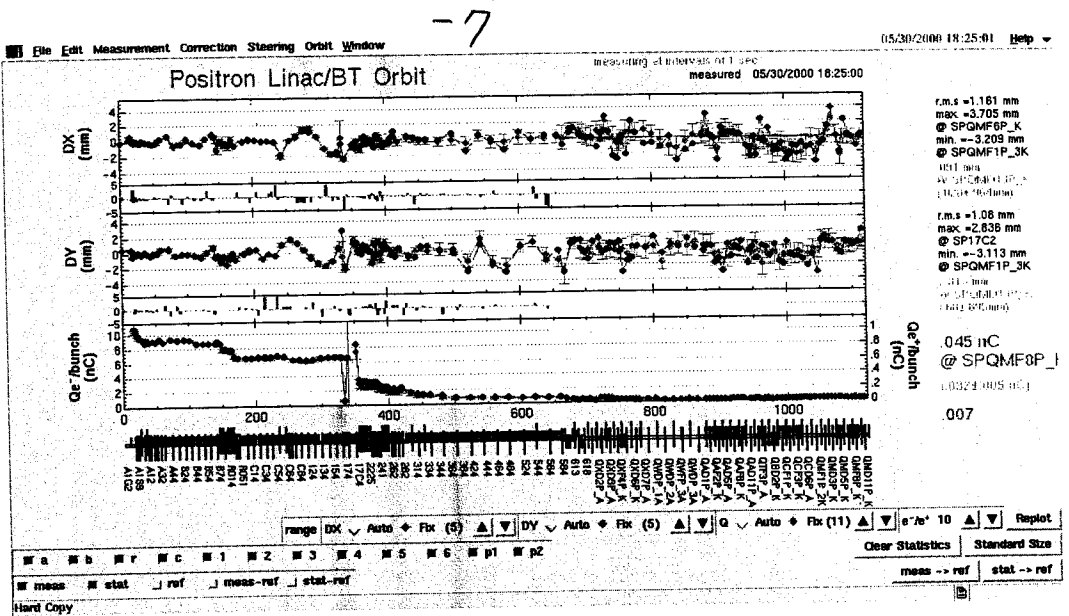
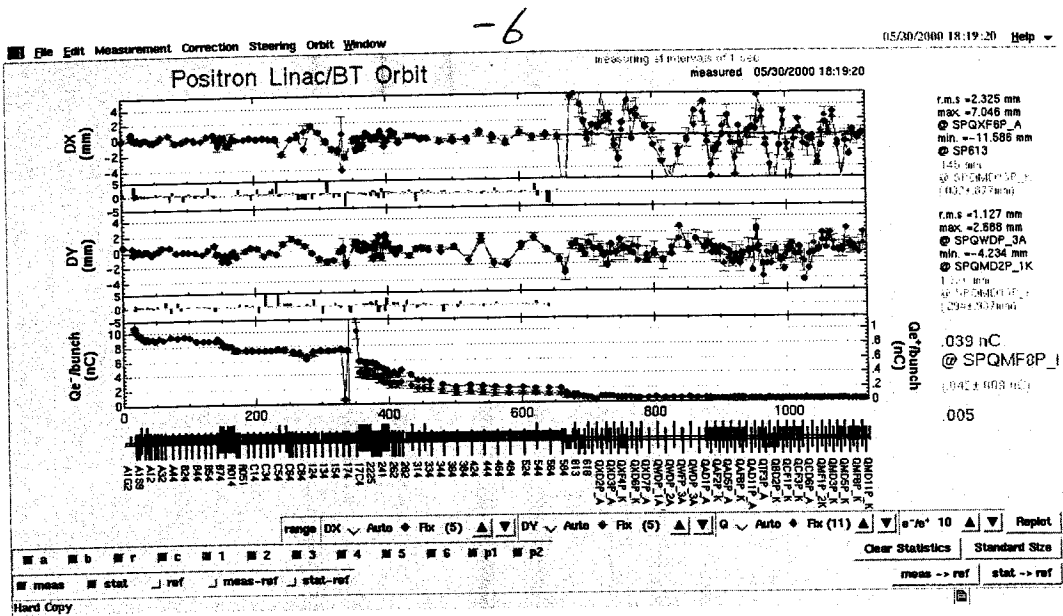


8nCの場合 2 bunchのエネルギー差は $J_{unc}(R0) = 4.25 \times 8 = 34 \text{ MeV}$ とする。

この値は前頁のグラフ(互換性)



とすることが出来るので OK



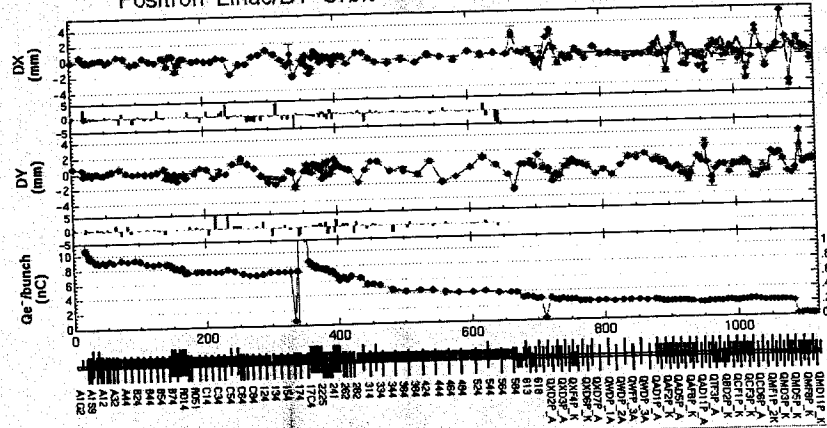
+8

05/30/2000 18:34:20 Help

File Edit Measurement Correction Steering Orbit Window

measuring at intervals of 1 sec
measured 05/30/2000 18:34:20

Positron Linac/BT Orbit



r.m.s = 1.093 mm
max = 5.019 mm
@ SPQMF8P_K
min = -4.066 mm
@ SPQMF8P_K
-1.392 mm
@ SPQMD4P_K
(-0.584, 0.24mm)

r.m.s = .93 mm
max = 3.903 mm
@ SPQMF10P_K
min = -3.062 mm
@ SP613
-448 nC
@ SPQMD4P_K
(-0.51, 0.10mm)

.21 nC
@ SPQMF8P_K
(-1.11, 0.62 nC)

.028

range DX Auto Flx (5) DV Auto Flx (5) Q Auto Flx (11) e-/e+ 10 Replot

Clear Statistics Standard Size

meas -> ref stat -> ref

a b r c 1 2 3 4 5 6 p1 p2

meas stat ref meas-ref stat-ref

Hard Copy

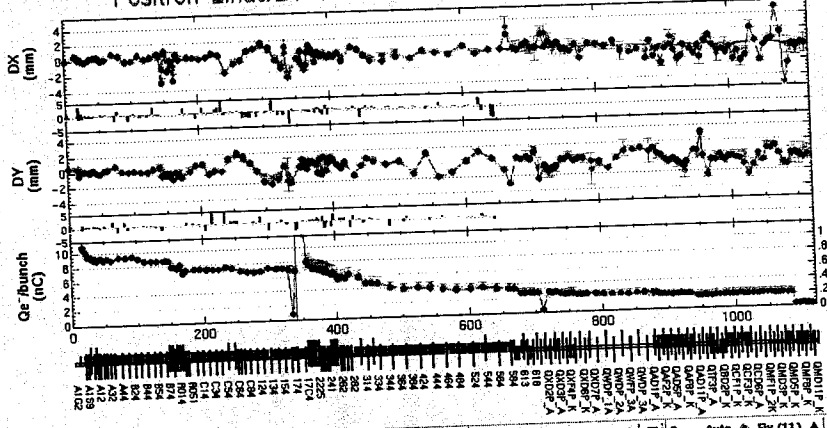
+9

05/30/2000 18:36:10 Help

File Edit Measurement Correction Steering Orbit Window

measuring at intervals of 1 sec
measured 05/30/2000 18:36:07

Positron Linac/BT Orbit



r.m.s = 1.141 mm
max = 4.798 mm
@ SPQMF8P_K
min = -5.699 mm
@ SPQMF8P_K
-0.4 mm
@ SPQMD4P_K
(-0.56, 0.09mm)

r.m.s = .925 mm
max = 3.021 mm
@ SPQTD4P_K
min = -3.014 mm
@ SP613
-184 nC
@ SPQMD4P_K
(-0.2, 0.10mm)

.181 nC
@ SPQMF8P_K
(-1.08, 0.62 nC)

.027

range DX Auto Flx (5) DV Auto Flx (5) Q Auto Flx (11) e-/e+ 10 Replot

Clear Statistics Standard Size

meas -> ref stat -> ref

a b r c 1 2 3 4 5 6 p1 p2

meas stat ref meas-ref stat-ref

Hard Copy

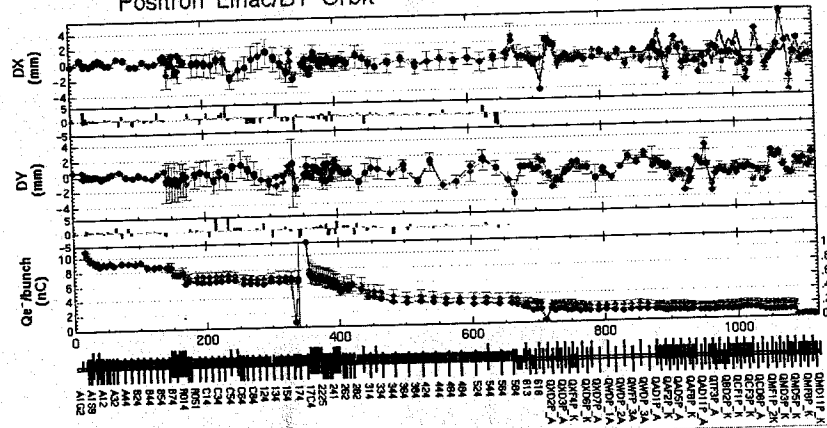
+10

05/30/2000 18:37:05 Help

File Edit Measurement Correction Steering Orbit Window

measuring at intervals of 1 sec
measured 05/30/2000 18:37:04

Positron Linac/BT Orbit



r.m.s = 1.115 mm
max = 5.282 mm
@ SPQMF8P_K
min = -4.348 mm
@ SPQX2P_A
-548 nC
@ SPQMD4P_K
(-0.1, 0.154mm)

r.m.s = .99 mm
max = 2.647 mm
@ SPQTD4P_K
min = -3.336 mm
@ SPQBD2P_K
-1.248 nC
@ SPQMD4P_K
(-0.5, 0.124mm)

.102 nC
@ SPQMF8P_K
(-1.2, 0.43 nC)

.016

range DX Auto Flx (5) DV Auto Flx (5) Q Auto Flx (11) e-/e+ 10 Replot

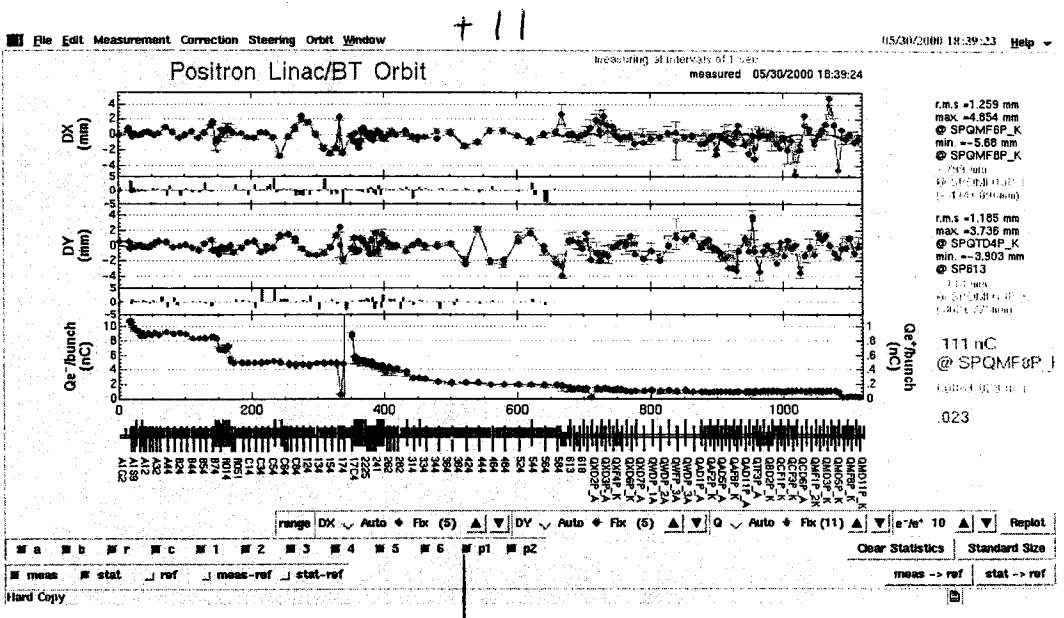
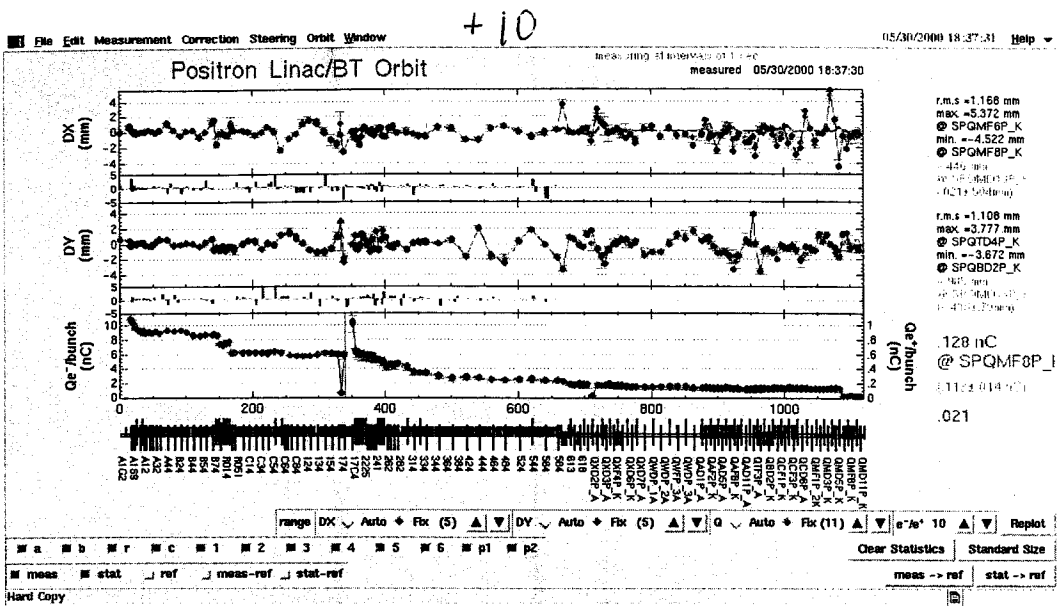
Clear Statistics Standard Size

meas -> ref stat -> ref

a b r c 1 2 3 4 5 6 p1 p2

meas stat ref meas-ref stat-ref

Hard Copy



T04KL1T04R

SHBI 周期

KL-B5
183.5

KL-B6
283.5

E(GeV)
1.6583

ORBIT

1.3844ns DCE6

GUN
Delay -8

20244

[-70ns
13774ns

" 894 "

ns

" " " "

20246

s

" " " "

21000

J-ARC 変動
短大遅い

ns

" " 914 "

21004

" " 894 "

184.0 283.0 1.6519

↓

13844ns

" " "

183.0 284.0 1.6563

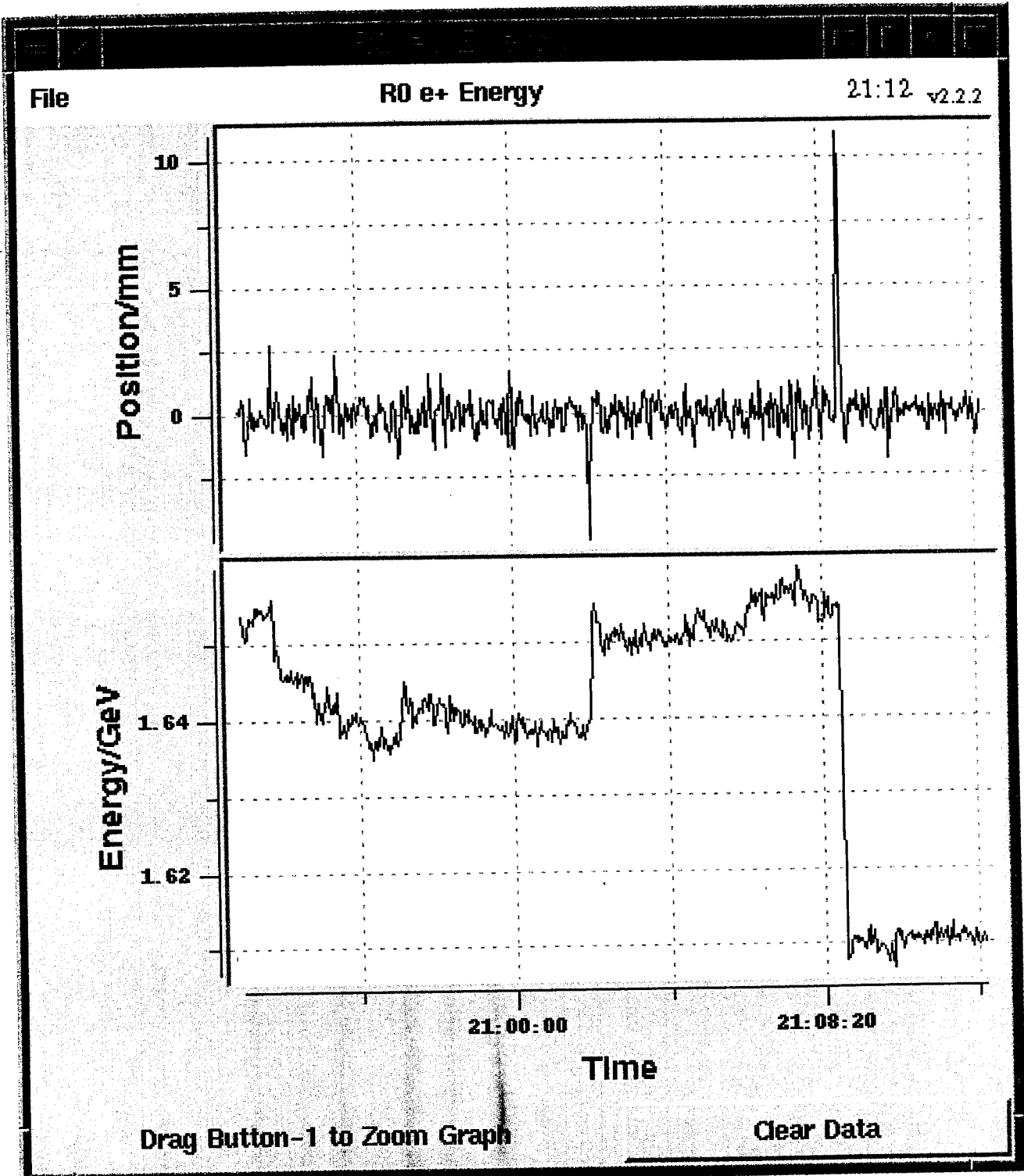
21008

" DDE "

0

192.5 274.5 1.6111

21210

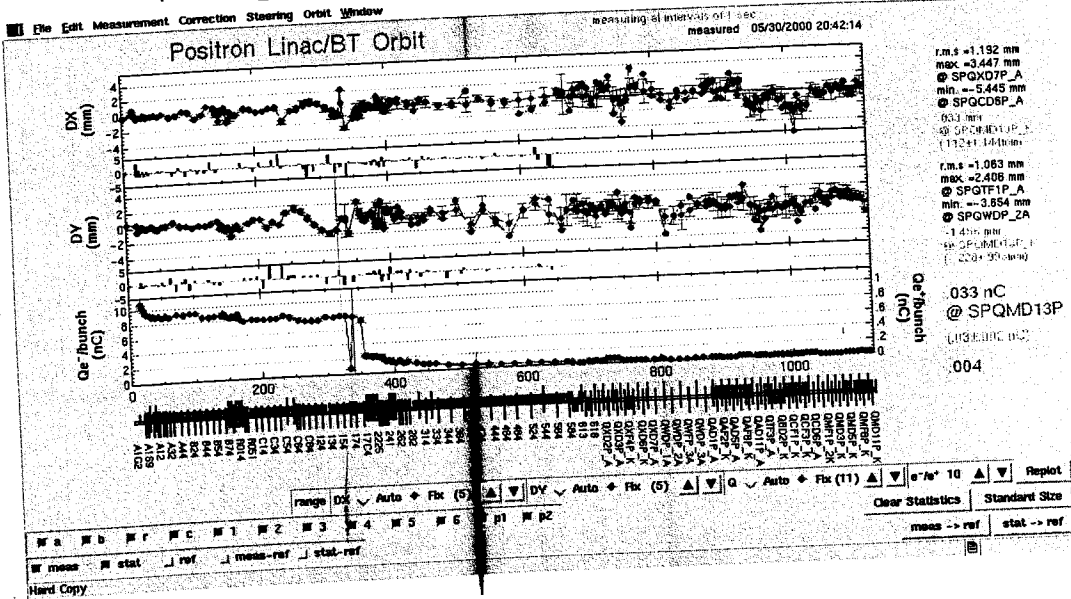


TD4R	DCE6 (-8)	(SHB1 周期)	" (-8)	" (-8)	" (-8)	DDOE (0)
GUN Delay	894	↑	914	↑	894	894
KL-A1	-70ns	↑	-70ns	↑	0	0
KL-Z1	-70ns	↑	0	↑	0	0

KL A1 & -70ns

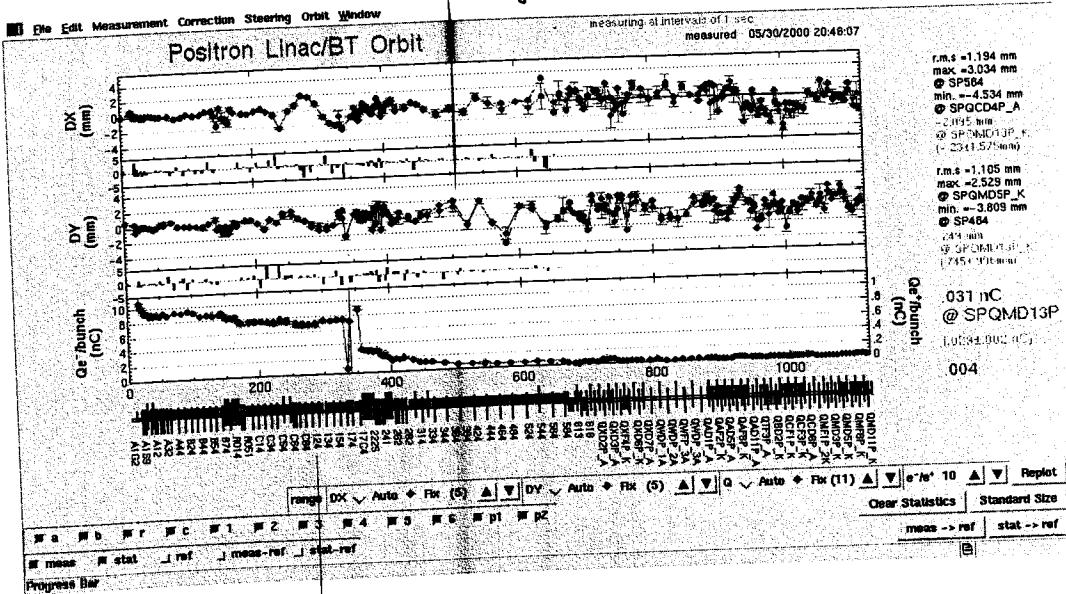
-8

05/30/2000 20:42:15 Help



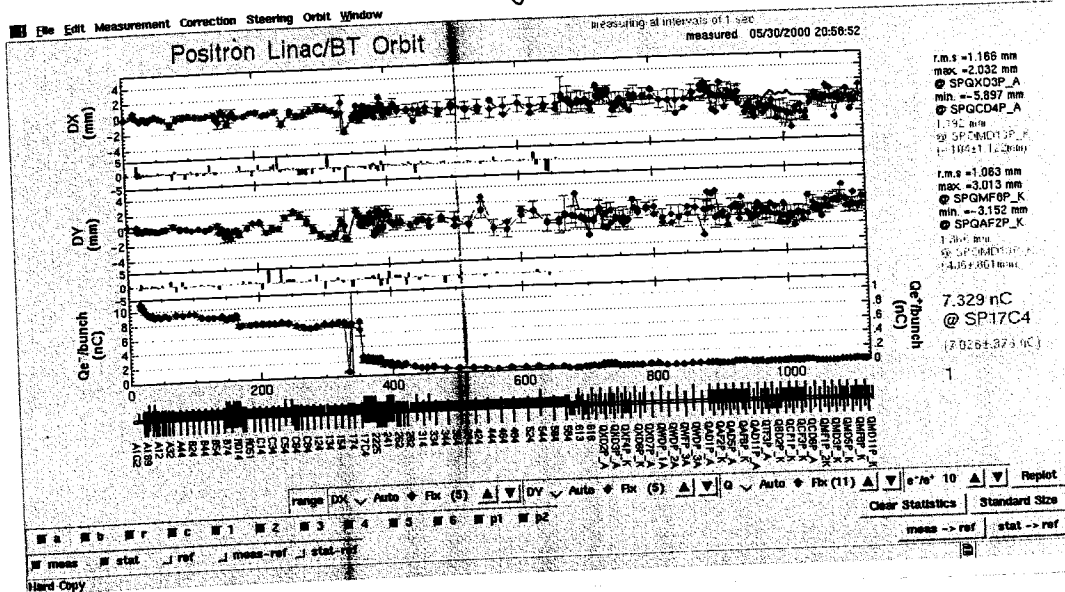
-8

05/30/2000 20:46:08 Help



-8

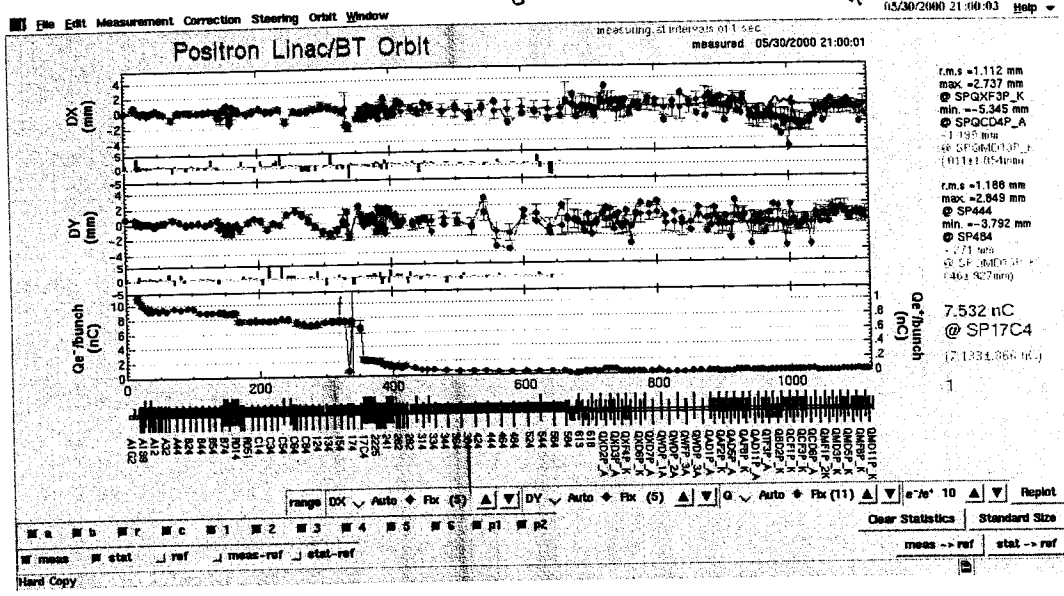
05/30/2000 20:58:52 Help



GUN delay 894 (π)
KL-A1 - 70ms

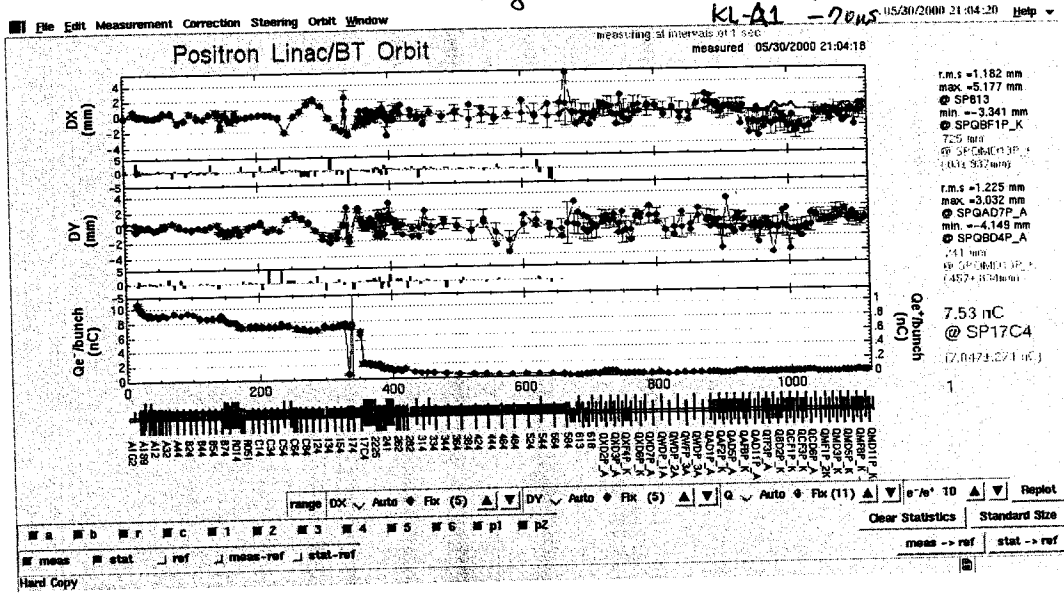
-8

KL-21 π + 0ms



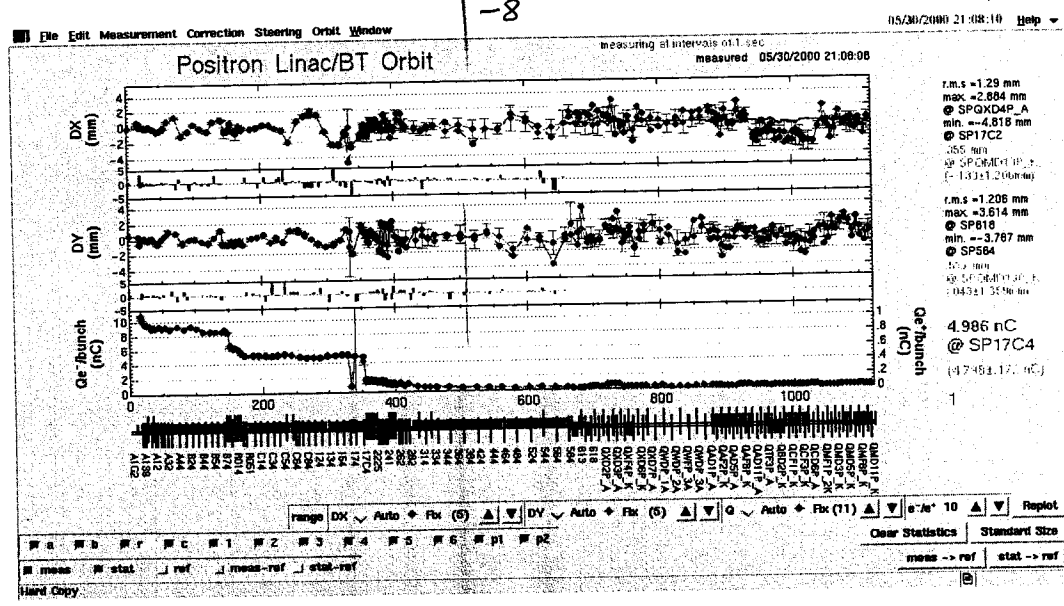
GUN delay 894 (π)
KL-A1 - 70ms

-8

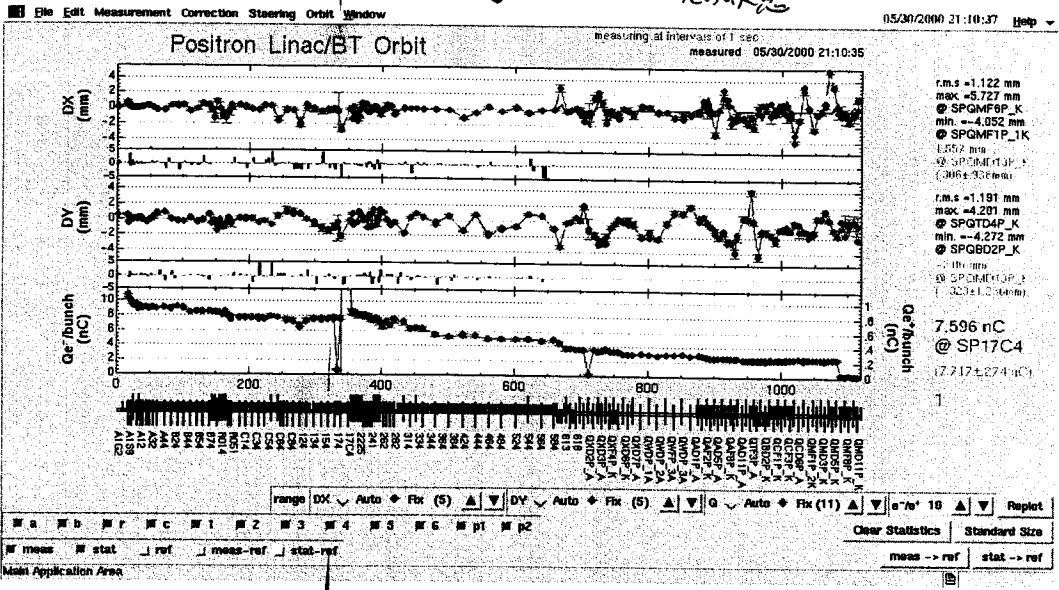


KL-A1 0ms (π)

-8



元の状態



0012/27

Two bunch Beam Test

エネルギー補償

SLED 反転タイミング +70ns (遅らせる)

TD4R-1	DD0.5	}	Data #1 k same
" -2	DD3C		

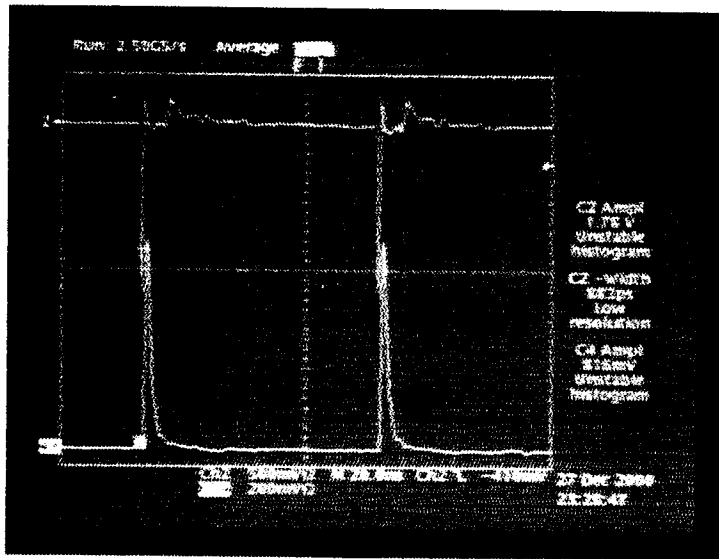
[以下の Grid pulser 使用時は]

TD4R-1 DD0D

Two bunch 運転 パラメータ

"KEKB #1/#6" と "TB001227" の GON parameter を same.

Two Pulse beam



上: Grid pulser

下: Gun Beam

←————→

96.3 ns

2台の新パルサーを使用.