

ATF2 Accelerator Status and Plans

for JFY 2014 runs

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Renewal of the Refrigerator for EXT/ATF2 cooling water



Renewed in this summer 2014.

Previous: operated in 25 years

Powerful but only used less than $\frac{1}{4}$, 15 min
operated every an hour.

Simple ON/OFF control. Heavy current
load when it turns on → disturb primary
400V line → Linac RF, ...

Failures:

2010 Aug/Sep...

long shutdown but no damage on beam
schedule

2013 Sep/Oct... same as above

2014 Apr... lost a week of beam operation

Renewed:

**inverter control → smooth then 400V line
should be stable.**



Repairs

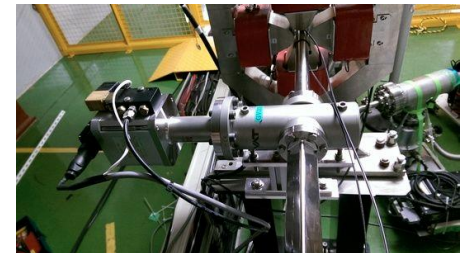
EXT kicker controller

- HV could not turned on sometimes after March 2014. Exchanging the logic board recovered the problem but failed again in short term.
- Even so, we could minimize the loss of the beam time in spring runs.
- In summer, some boards were repaired but broken shortly when tested in situ. Careful survey was done for the control units and found the 15V bias voltage supplied by a crate was 24V. It might damage the control board gradually.
- After exchange a DC unit to 15V, we have no this problem again.
- **EXT kicker is ready for a beam operation.**



Wakefield mitigation

- **Rotate the EXT vacuum Gate Valves**
 - Three GVs in EXT was rotated in this summer.
 - Made a gap structure symmetric in vertical; cylinder port of GV, $45^\circ \rightarrow 0^\circ$
- **multi-OTRs were re-installed**
 - They were removed in June 2014 for the Goal-1 study. No improvement was obtained when removed... insufficient beam tuning?
 - Mask piece of the side port will be installed in next week.
- **No wire scanners from EXT to IP**
 - They were removed in spring 2014.



Vibration Study

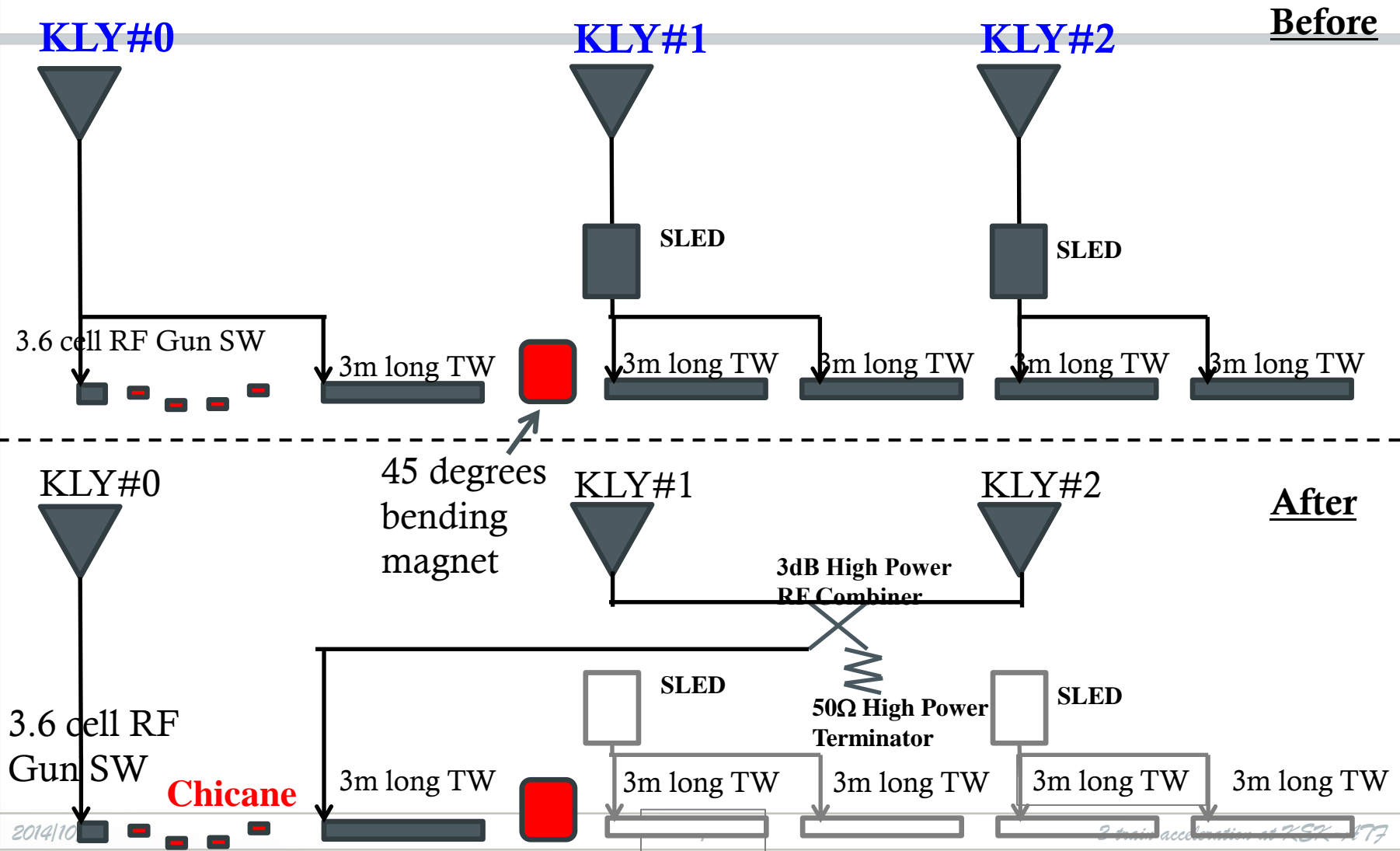


- Andrea and Marcin stay at ATF, Sep. 30~ Oct. 10
- QF1 (came from PEP-II)
 - It is a sensitive magnet but not yet measured
 - Check the rigidness of the fixture on the mover
 - Coherency
 - versus distance
 - between 2 magnets
- QD0...
- QD20...

BEAM LOADING COMPENSATION TEST FOR e^+ PRODUCTION R&D

- **Approved by TB meeting, Feb 2014**
- As part of important R&D pursued at KEK for alternative or initial/conventional positron sources
- a test of a newly proposed method for beam loading compensation of the very high intensity bunches to be accelerated in the ILC linac is proposed to be conducted in the ATF linac.
- Linac RF distribution system was reconfigured in August.
- Experiment had been done from September to last week.
- Linac RF distribution system is already re-configured to the original setup until yesterday.

Waveguide circuit

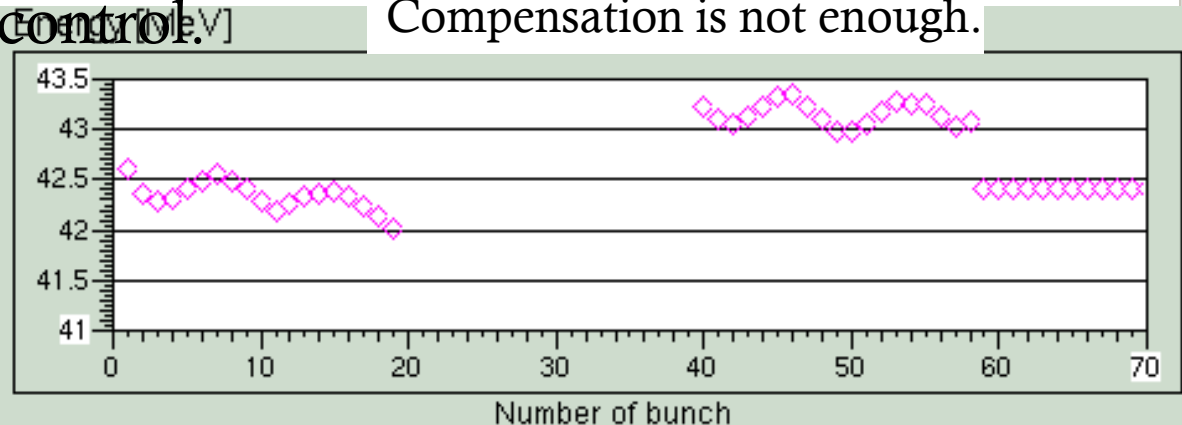


2 train acceleration

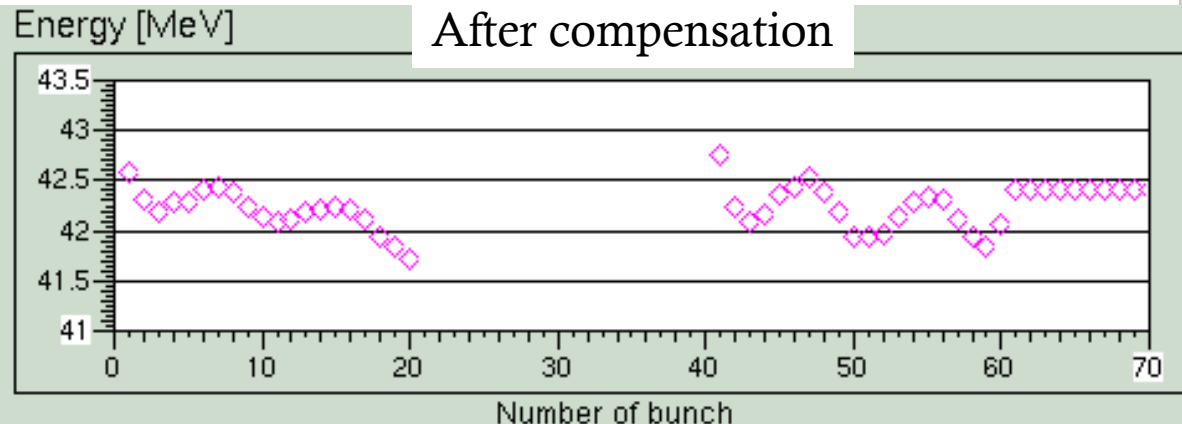
Two trains with 1.5×10^{10} e⁻/bunch and 20 bunches are accelerated.

Energy difference at the train gap is compensated by amplitude modulation by phase control. Compensation is not enough.

1.5×10^{10} e⁻/bunch
20 bunches/train
60ns train gap
2.8ns bunch spacing



After compensation, the energy difference is within 0.5MeV (pk-pk)



Two train acceleration at KEK-ATF

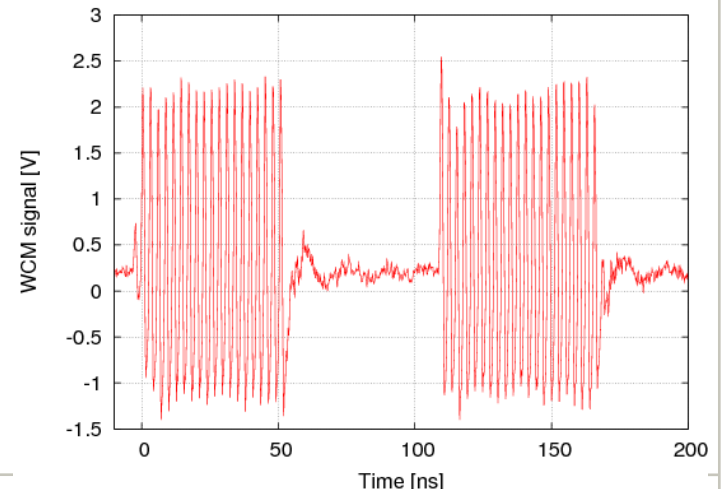
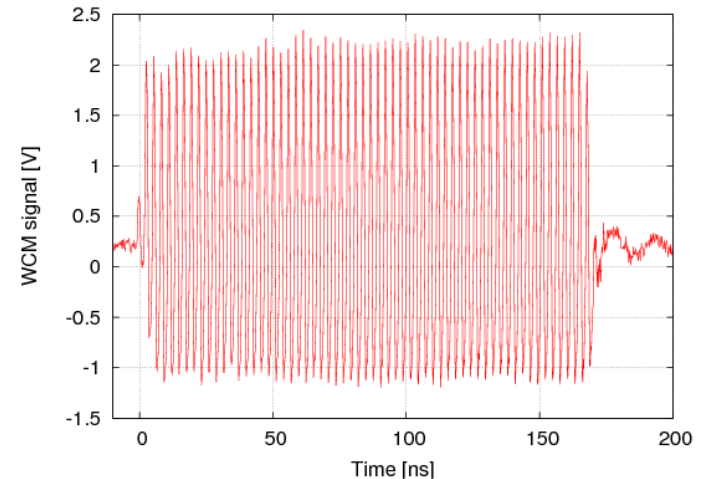
In this experiment at KEK-ATF, 2 train beams are accelerated.

Multi-bunch beam:

2×10^{10} with 6.15ns bunch spacing corresponds to 0.9×10^{10} in the case of 2.8ns bunch spacing as same beam loading in multi-bunch trains.

Two train beam :

2×10^{10} with 100nsec train gap and 2.8n bunch spacing corresponds to 1.5×10^{10} in the case of 2.8ns bunch spacing as same energy difference between trains at train gap



3.6 cell RF Gun

3m long



Bending magnet

Beam Plans in FY2014

- Original plan of 2014, we will have 5-week beam runs in fall and nothing until the next April.
- We are trying to have additional 2 weeks in December by the external funds which expected to be realized in a month.

Original plan of 2014

October

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

December

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Under Consideration

October

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November

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30						

December

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What's planned in fall runs?

- Goal-1
 - continuous challenge to 37 nm with studies of beam intensity dependence
- Goal-2
 - feedback study with a presently installed IP-BPM
 - install and commission the newly fabricated IP-BPM
 - install and commission the diamond sensor by LAL
 - test of the wakefield free steering by CERN