

# **The 21th ATF2 Project Meeting and the ATF Technical Board meeting**

supported by TYL-FJPPL program

Welcome and status  
Nobuhiro Terunuma, KEK

March 21, 2018, LAL, Orsay

# ATF2 Project Meetings

1st	SLAC	3-5 February 2006	11th	SLAC	13 - 14 January 2011
2nd	KEK	30-31 May and 1 June, 2006	12th	Granada, LCWS	28 September 2011
3rd	KEK	18-20 December, 2006	13th	KEK	11 - 13 January 2012
4th	DESY	31 May, 2007	14th	KEK	26 - 28 June 2012
5th	KEK	19-21 December 2007	15th	KEK	23-25 January, 2013
6th	BINP	26-28 May 2008	16th	DESY, ECFA LC	29 May, 2013
7th	KEK	15-18 December 2008	17th	KEK	12-14 February.2014
8th	KEK	8-11 June 2009	18th	LAPP	24-26 Feburuary, 2015
9th	KEK	14-17 December 2009	19th	LAL	13-15 January,2016
10th	KEK	30 June - 2 July 2010	20th	CERN	14-15 March 2017
			21st	LAL	21-23 March, 2018

# FY2017 ATF Beam : 15 weeks

FY2017

 Beam weeks

 events

April						
Su	Mo	Tu	We	Th	Fr	Sa
						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						

May						
Su	Mo	Tu	We	Th	Fr	Sa
	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			

June						
Su	Mo	Tu	We	Th	Fr	Sa
				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	

July						
Su	Mo	Tu	We	Th	Fr	Sa
						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					

5/14-19 IPAC17

6/26-30 AWLC17

August						
Su	Mo	Tu	We	Th	Fr	Sa
		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		

September						
Su	Mo	Tu	We	Th	Fr	Sa
					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

October						
Su	Mo	Tu	We	Th	Fr	Sa
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						
Su	Mo	Tu	We	Th	Fr	Sa
			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		

8/14-16 KEK closed

10/23-27 LCWS17

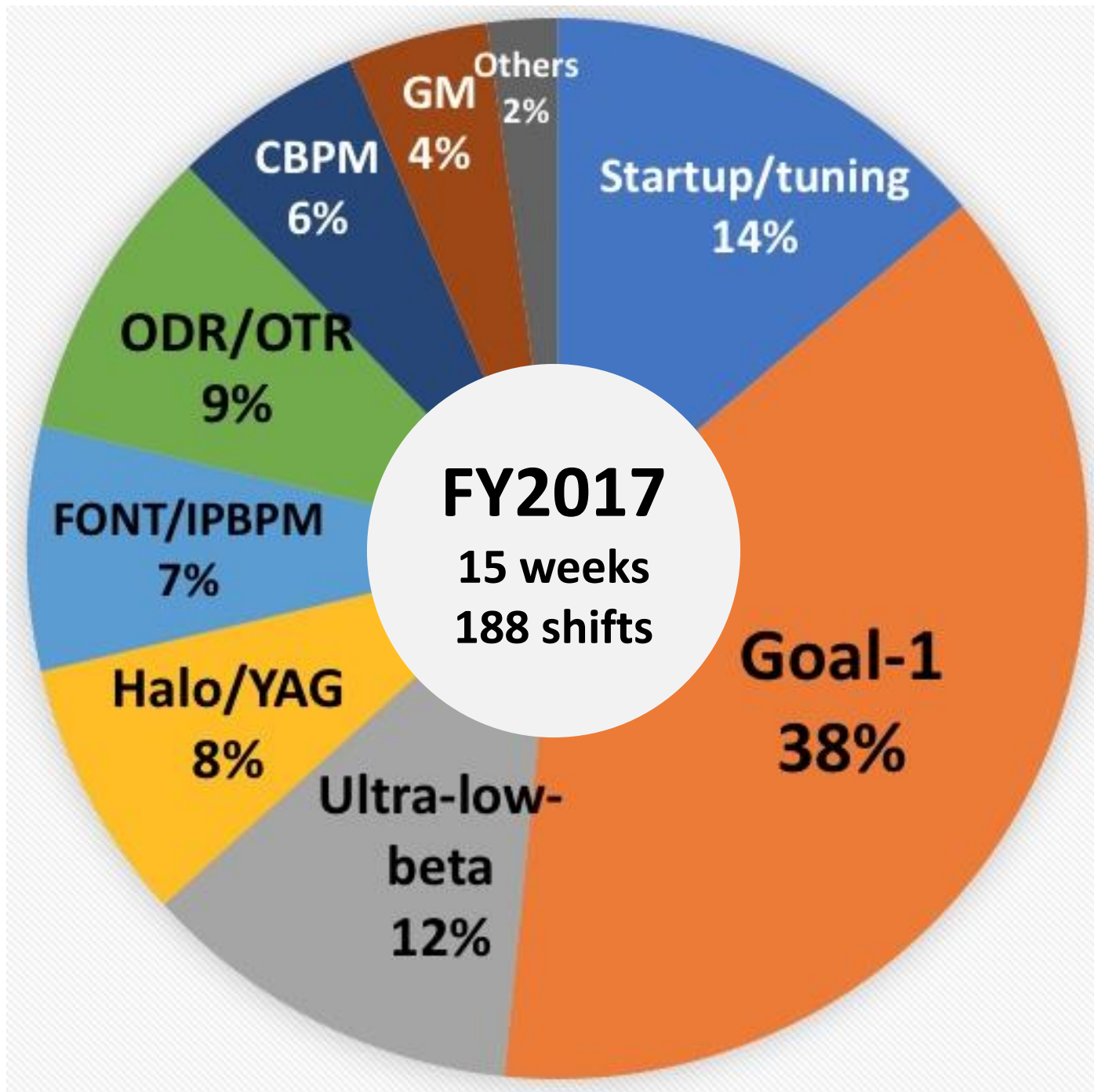
December						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

January						
Su	Mo	Tu	We	Th	Fr	Sa
	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			

February						
Su	Mo	Tu	We	Th	Fr	Sa
				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			

March						
Su	Mo	Tu	We	Th	Fr	Sa
				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

1/22-26 CLIC WS



# Maintenance status of ATF in FY2017

We have a lot of maintenance works; repairs, exchanges, cleaning, etc.,...

Here, I would like to notice some of major status for beam studies.

## Accelerator and beam monitors

### ■ Electron source: RF Gun

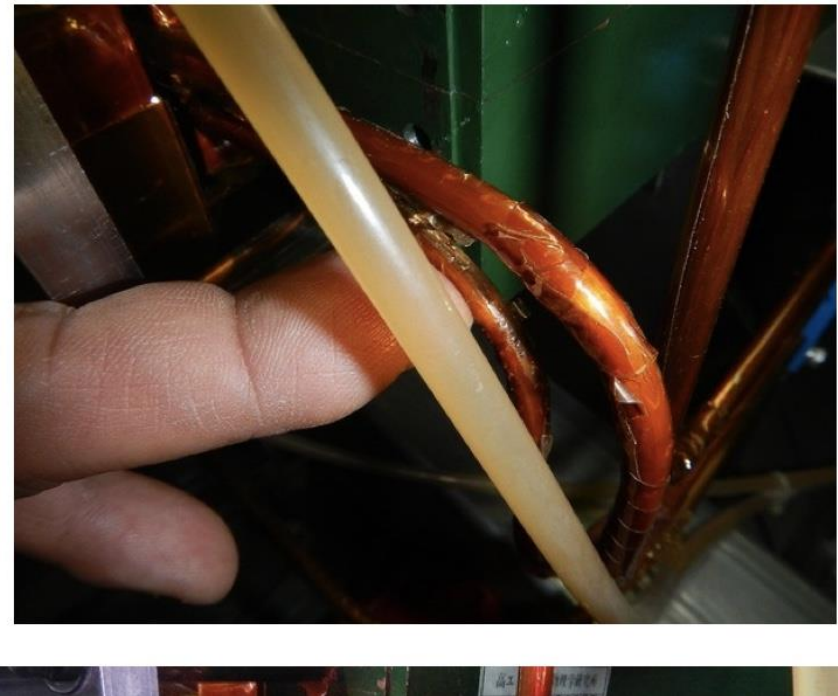
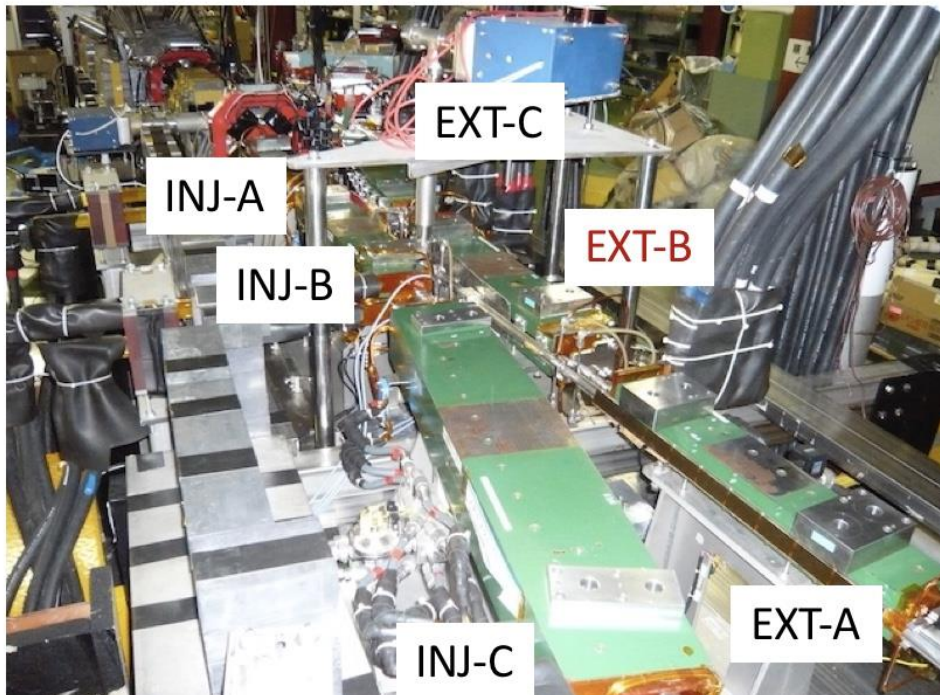
**Laser for photocathode:** One of the mirror control on the laser oscillator (178.5MHz) was lost in November 2017. Temporary replaced by an old laser system (357MHz) which had been used by 2010. This laser needs manual retuning in a few days to keep mode-locking.

**Now 178.5MHz laser was repaired and will be back in operation in next week.**

## ■ Septum magnet

**A pin-hole water leak** from a cooling pipe for the EXT-B Septum magnet was happen just before starting the beam on January 2018. This trouble on Septum system was repeated by several years.

**Repaired** but No fundamental redesigning is expected.  
**Repair it when happen.**



## ■ Multi-OTR at ATF2

**Controller (box-PC):** One of the mover controller was dead-locked sometimes, and frequently in spring runs 2018. It was caused by the malfunction of CPU board.

**New CPU board is delivered and will be set up by the next beam runs.**

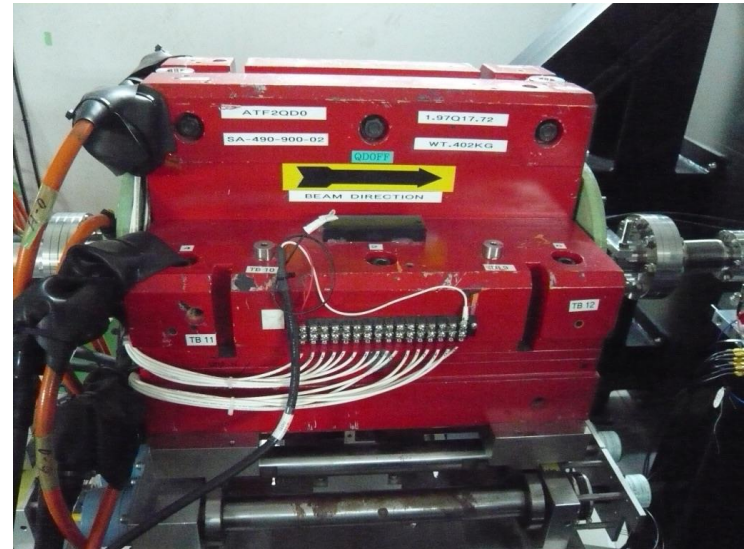
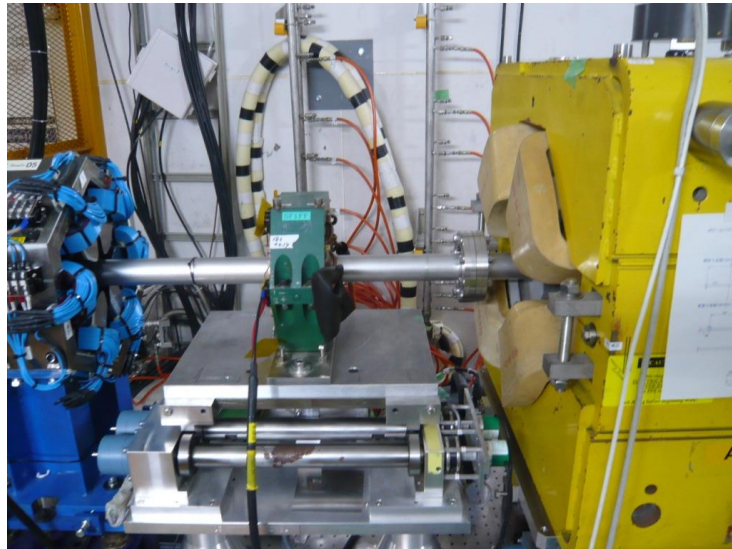
**Camera:** one camera was replaced in January 2018.



## ■ Multi-OTR at ATF2 –continued -

**The broken controller (XPS) was also control the mover for SD4FF and QD0FF which were used for a small beam tuning. When the XPS was dead-locked, we had to reboot XPS and recover these magnet positions every time.**

Investigation of the control circuit and software was done then moved connections of SD4FF and QD0FF to another XPS. **It worked successfully and small beam tuning was recovered by the end of March operation.**





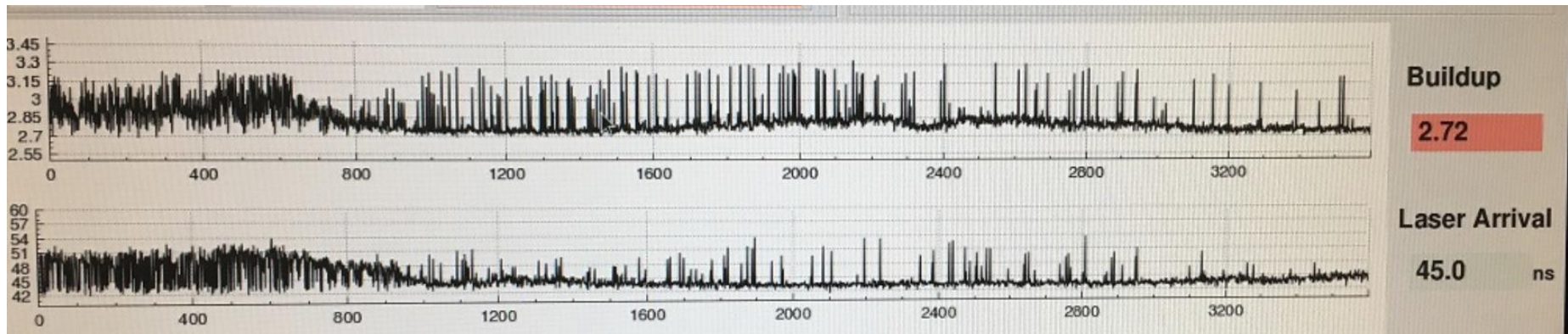
## ■ IPBSM laser

The IPBSM (Shintake monitor) uses a high power pulse laser based on the Q-switching YAG flash lamps.

**The stability of positions and arrival timing at IP is an issue on the small beam measurement.**

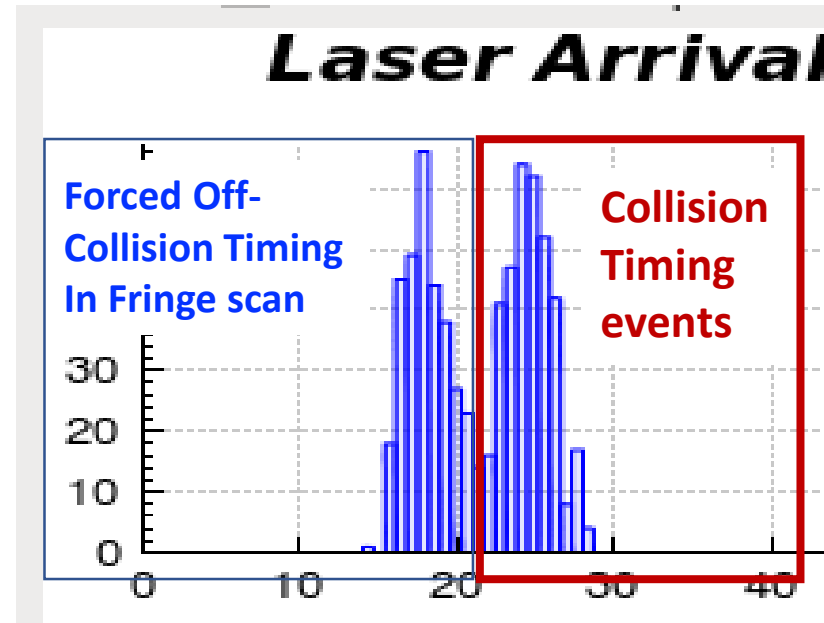
It is very sensitive to not only for the environment (air and cooling water) but also aging of the lamps. The drift caused by the transport mirrors in the transport line is an additional difficulty.

**Monitoring of the laser pulse at near IP was installed in DAQ. It can be effective to reject off timing collisions.**

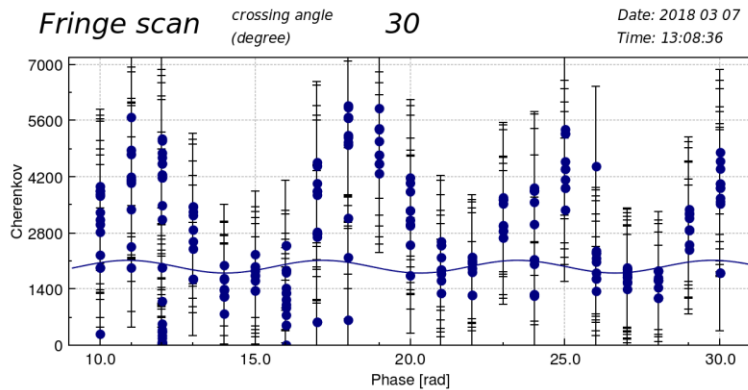


# Example of new IPBSM DAQ

- Apply the laser-arrival-timing cut on Collision timing events. (unlimited  $\rightarrow$   $\pm 3$  nsec)
- Reject off collision events



The difference on a fringe scan is as follows.

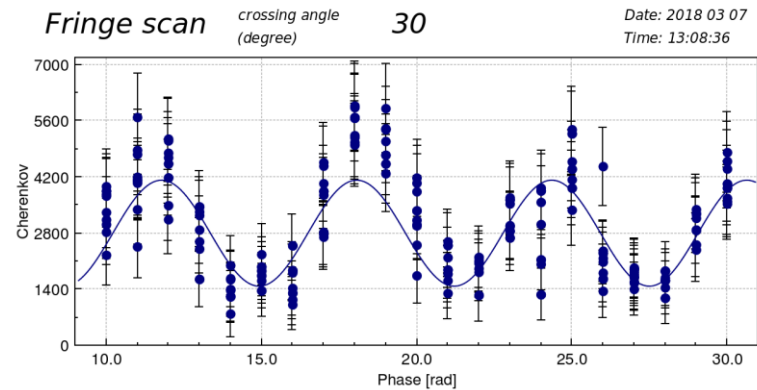


Dataset: base180307\_130836.binary Fit results:  $Av*(1.0+M*cos(x+Ph))$  CONVERGED

Event selection Data: Cherenkov  
 Point/step: 10  
 Intensity cut [e9]:  $4.00 < I < 10.00$   
 Phase scan direction: Positive

**Modulation: 0.080 +/- 0.074**  
 Beam Size: 356.5 + 158.2 - 53.1 nm  
 Average: 1971.742 +/- 97.820  
 Phase: 1.679 +/- 0.810  
 Chi2/ndf: 2.4282e+02 / 244

F30U -3.0 F30L -2.0 Prism 12.00 Lambda/2 0.00  
 M30UX 10.1860, M30LY 10.4659, M30LX 10.7300, Mirror4X 5.2730, Mirror8X 8.7536, Mirror7X 9.7750,  
 M30UY 9.8780, M30LY 9.8028, M30LY 10.4900, Mirror4Y 9.5650, Mirror8Y 8.3650, Mirror7Y 6.6100,



Dataset: base180307\_130836.binary Fit results:  $Av*(1.0+M*cos(x+Ph))$  CONVERGED

Event selection Data: Cherenkov  
 Point/step: 10  
 Intensity cut [e9]:  $4.00 < I < 10.00$   
 Phase scan direction: Positive

**Modulation: 0.471 +/- 0.029**  
 Beam Size: 180.5 + 9.2 - 9.1 nm  
 Average: 2806.855 +/- 57.464  
 Phase: 0.792 +/- 0.060  
 Chi2/ndf: 2.2292e+02 / 204

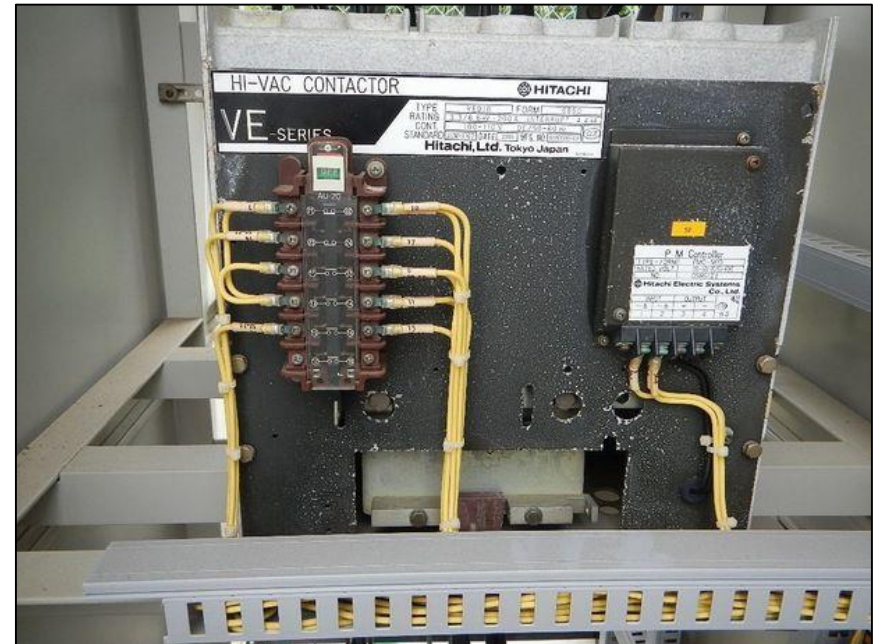
F30U -3.0 F30L -2.0 Prism 12.00 Lambda/2 0.00  
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 M30UY 9.8780, M30LY 9.8028, M30LY 10.4900, Mirror4Y 9.5650, Mirror8Y 8.3650, Mirror7Y 6.6100,

# Utilities

## ■ Power station for DR main dipoles/quads

The 20-years aged vacuum breakers were lost their function after the KEK summer maintenance of power.

Recovery took 2 months (mostly delivering them) by October so **we had no delay on beam schedule.**



# Utilities

## ■ LINAC cooling water system

**A lot of repairs were done on the cooling facility.**

Repairs were scheduled in the maintenance weeks.

**No severe beam-stop was done in FY2017, fortunately.**



Water leak on the cooling pump for LINAC; repaired.

# Utilities

## ■ DR cooling water system

- A heat exchanger of the auxiliary unit on the DR magnet cooling system was broken in January 2018.
- We had to bypass it then a water flow was down from 1400 L/min to 1330 L/min.
- Repair is not easy and very expensive.
- We decided to operate under this flow condition by changing a water temperature.
- We need to watch and retune the beam condition in DR especially for warmer seasons; i.e., May and June operation.