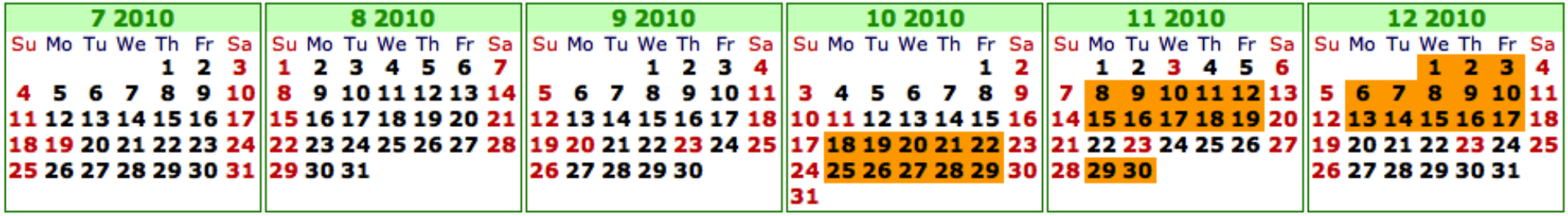
11th ATF Technical Board and System Group Coordinators Joint Meeting

- **Status Report and Summary; after 10th TB meeting (2010 Jun)**
  - Report on the maintenance and installations
  - Report on the Fast Kicker R&D
  - Summary on the ATF2 project meeting
- **Discussions**
  - ATF beyond 2012
  - others

Report on the maintenance and installations

N.Terunuma, KEK

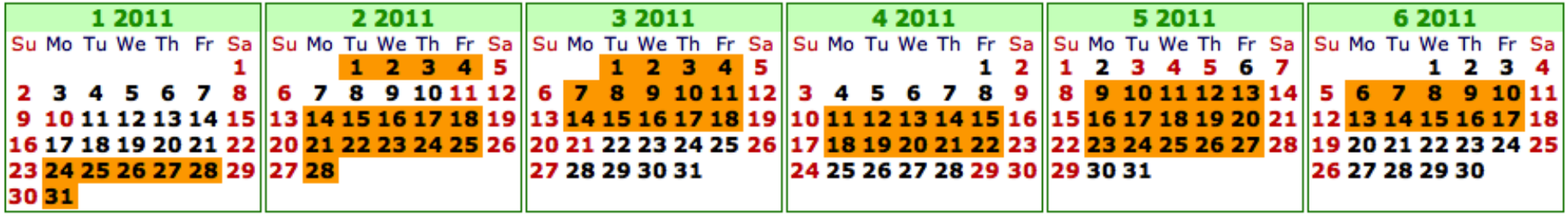
2010 Autumn/Winter Run



Beam operation: 7 weeks

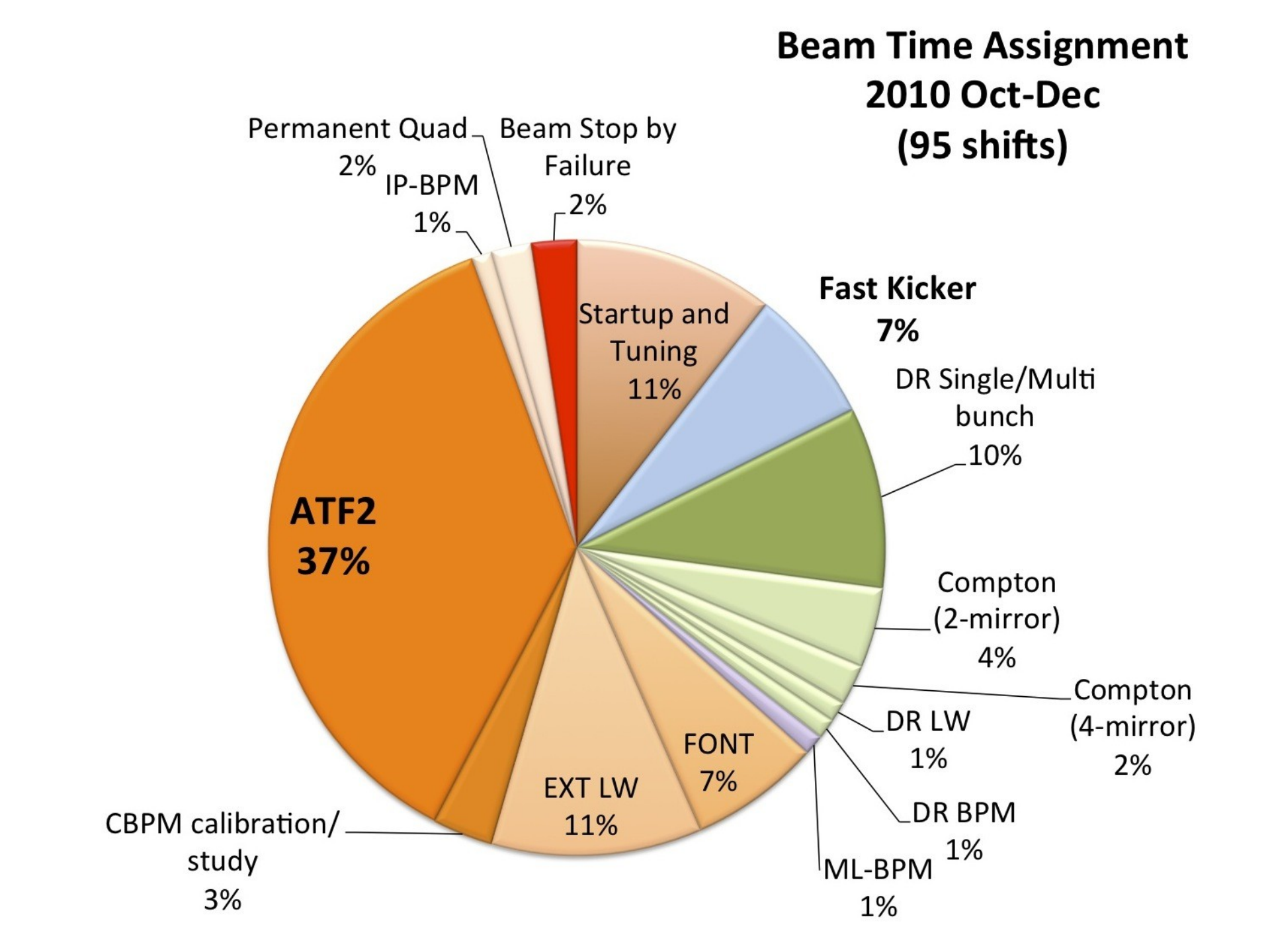
- Fast kicker mode … 2 weeks
- ATF2 continuous run … 1 week

2011 before summer



First priority is ATF2-37 nm until the end of March.

… 7 weeks


Beam Time Assignment
2010 Oct-Dec
(95 shifts)
Permanent Quad
2%
IP-BPM
1%
Beam Stop by
Failure
2%
Startup and
Tuning
11%
Fast Kicker
7%
DR Single/Multi
bunch
10%
ATF2
37%
Compton
(2-mirror)
4%
Compton
(4-mirror)
2%
DR LW
1%
DR BPM
1%
ML-BPM
1%
FONT
7%
EXT LW
11%
CBPM calibration/
study
3%

Maintenance and Installations

After the last TB/SGC meeting, we had some of important hardware works.

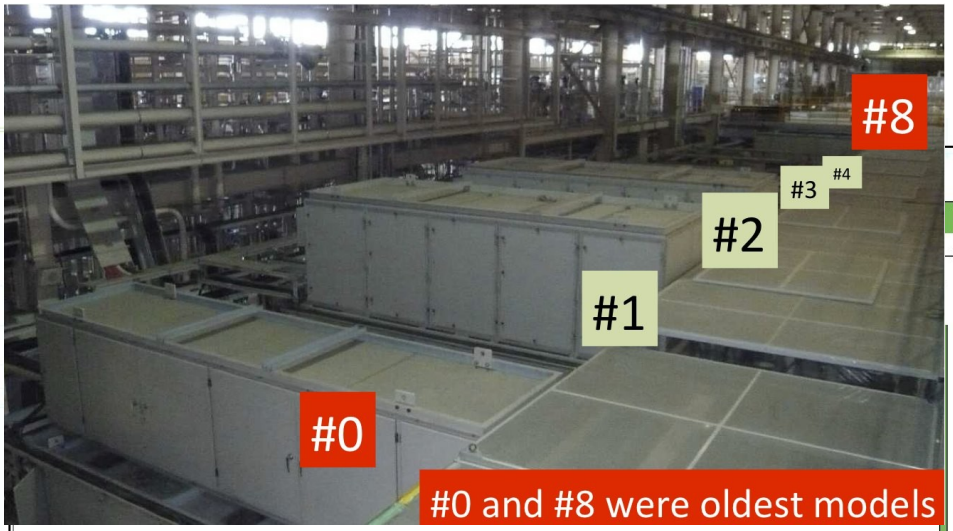
Installations:

- **Two old LINAC klystron modulators were renewed.**
- **New RF gun (3.5 cells) was installed by replacing the 1.6 cell gun.**
- **We are proceeding the re-alignment of the beam line.**
- **The 4-mirror optical cavity based Compton system (LAL) was installed in DR.**

Maintenance:

- **Repair the cooling water facility for ATF2 magnets.**
- Exchange the flash lamps on Laser system; RF gun, EXT-LW and IP-BSM
- More than 50 fans for magnet power supplies.
- Timing system: Old synthesizers were renewed and a base clock was changed from 357MHz → 178.5MHz
- More …

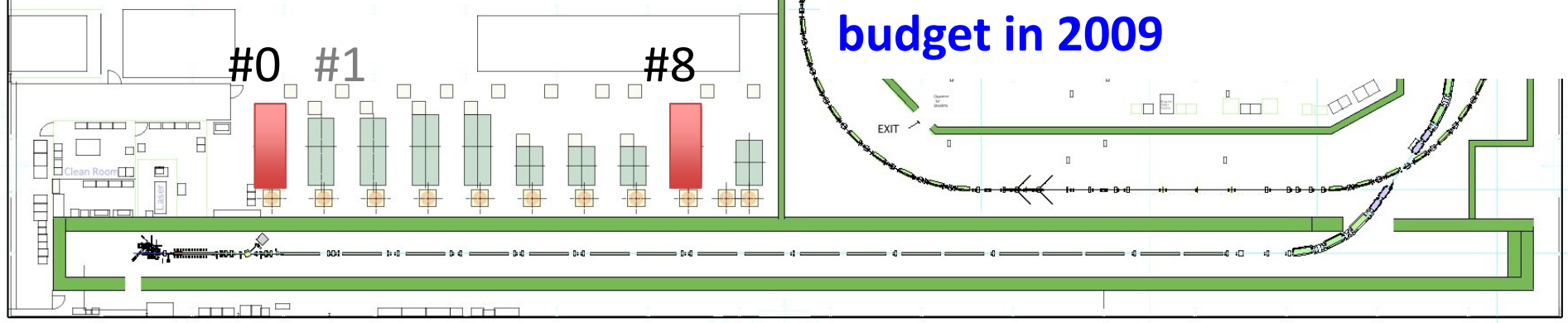
Renewal of the LINAC klystron modulators(#0 and #8)



Manufactured in 1988

- **Less Availability**
  Heavy maintenance work to keep the beam operation
  - Trigger/control/charging-unit
- **Fixed charging interval 12.5Hz**

New klystron modulator were ordered by supplementary budget in 2009



Two new klystron modulators(#0,8)

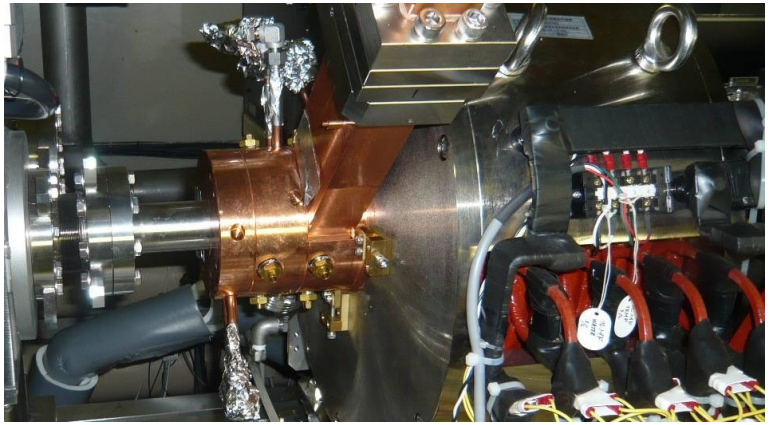
2009 Oct: Ordered to Toshiba Co Ltd.
2010 Mar: Delivered to ATF
2010 Jul: Removed old modulators(#0,8)
Jul-Sep: Installation and commissioning
2010 Oct: Beam on

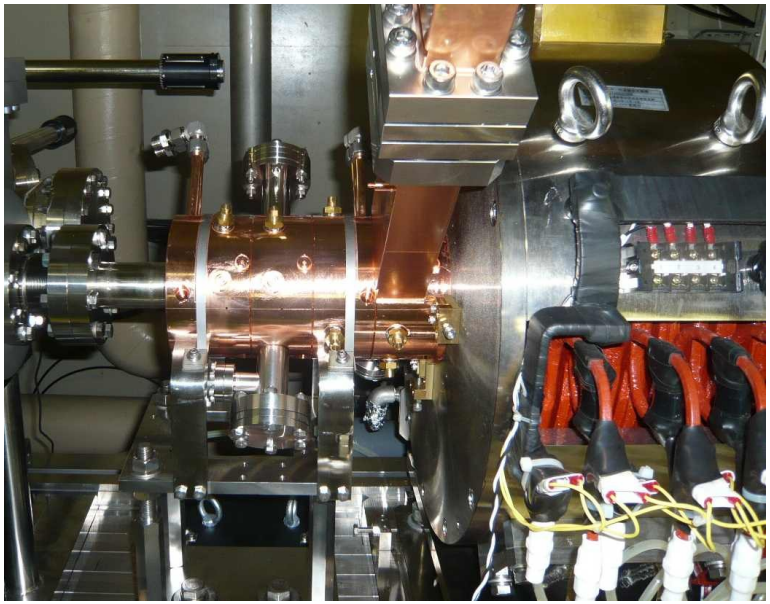
- **Inverter based charging**
- **Smaller size (~1/2)**
- RF Stability: 0.2%(p-p), Flattop ~4 us
- Repetition: 3.125 or 12.5 Hz

#0:
RF-Gun and 80MeV injector
#8:
acceleration and energy adjustment

The 3.125 Hz operation decreases the heat load 16% then releases the load on the old cooling water system.
→ **Expect an improvement on the temperature control of the Linac RF**
→ **Stable Linac operation**

RF Gun Renewal





2009 Oct: Upgraded **1.6 cell RF gun** was installed.

2010 Oct: **New 3.5 cell RF gun** **was installed** to assist the developments on Compton X-ray program (LUCX).

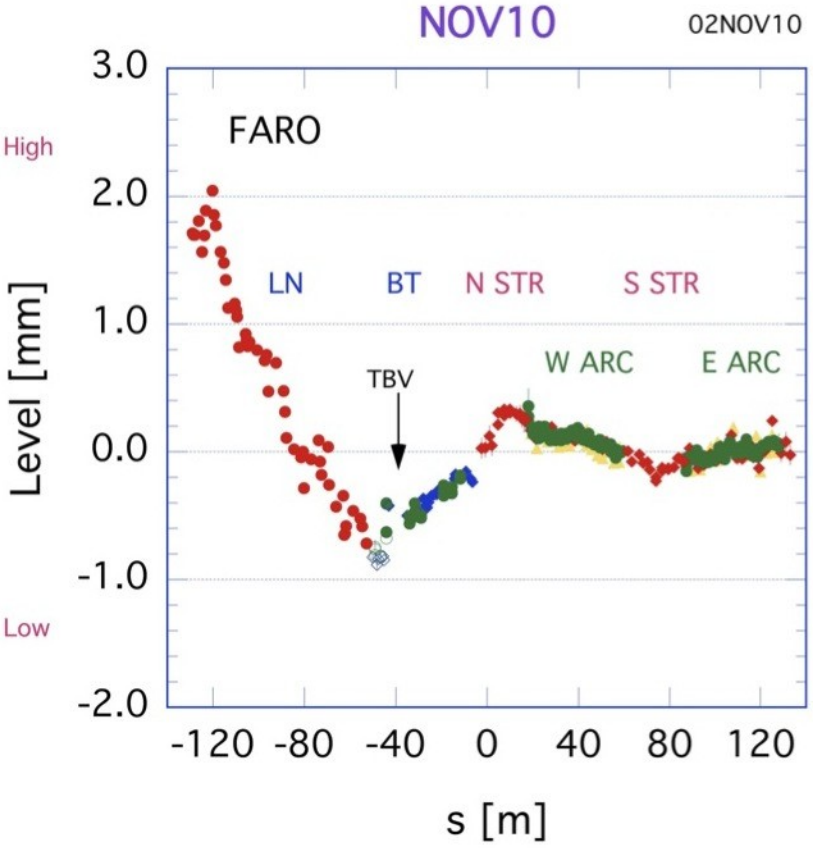
- No difficulty to supply a beam to ATF
- It is a mode-separated RF gun based on the LUCX RF-gun (1.6 cell) installed in 2009.
- Increase the tolerance of phase stability
- Aim to increase the beam energy 5→10 MeV

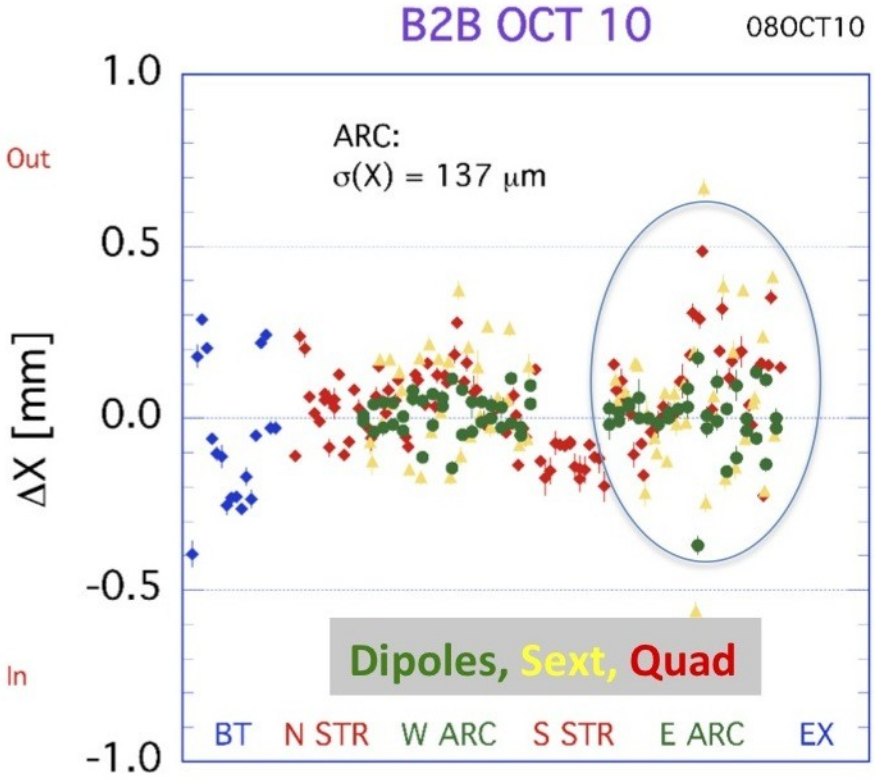
Performance will be studied in end of Jan 2011.
It will be kept for ATF electron source.

Alignment: Gun to DR

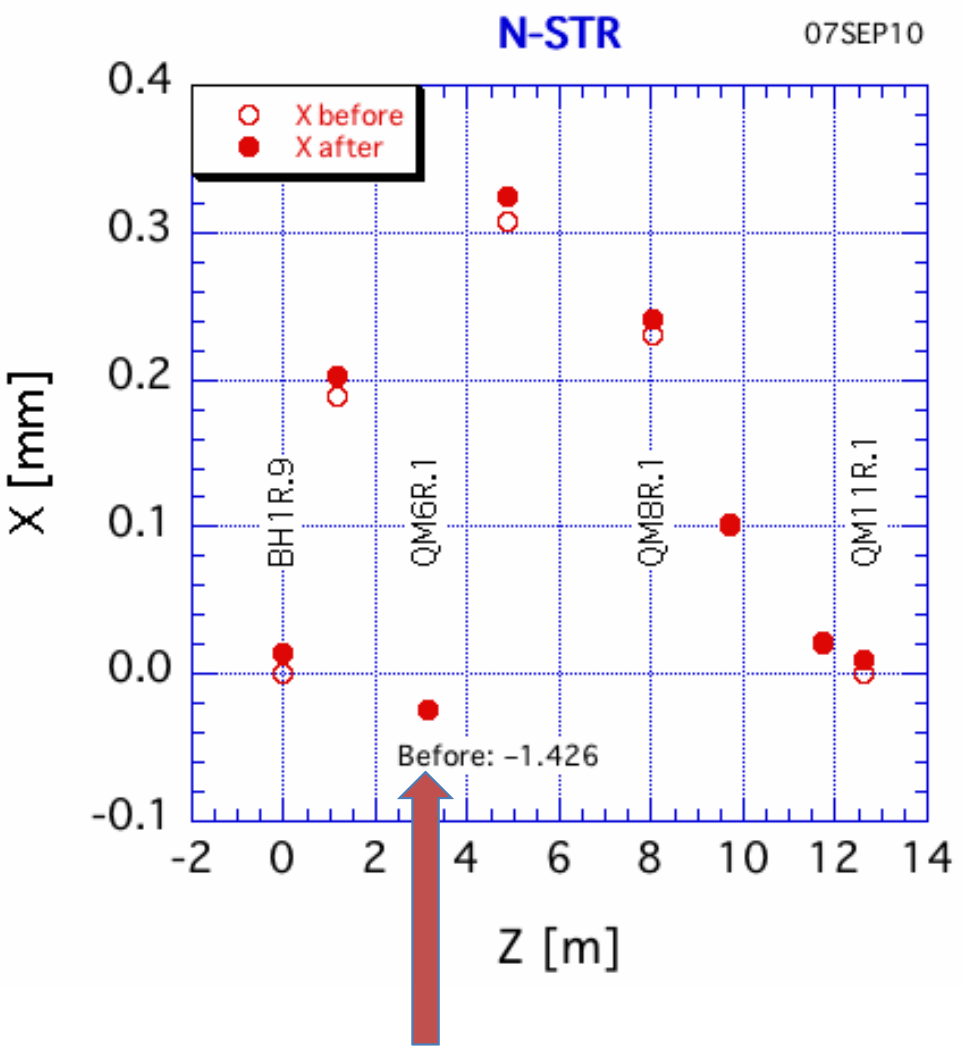
In the summer shutdown, we surveyed the magnet positions of whole ATF beam line.

We found the bigger rotation in some DR tables especially in the east arc.
→
correcting now with the north section's.





Alignment: DR North(Inj/ext)

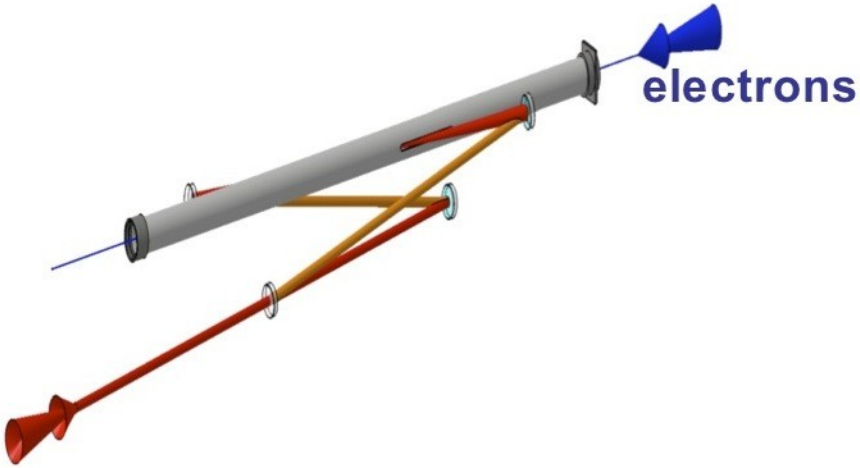


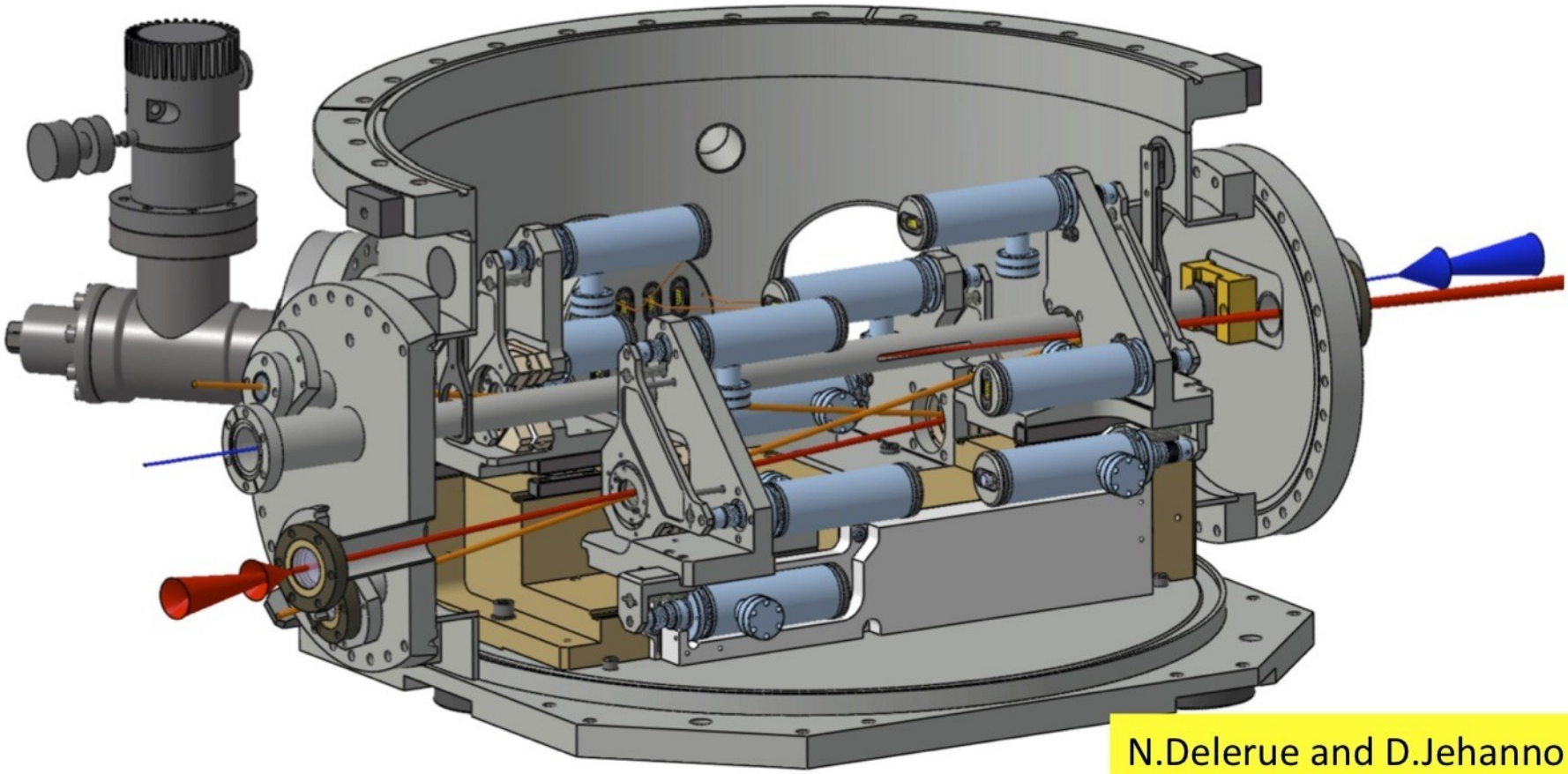
During the survey of the magnet positions in summer, we found a huge position shift on QM6R.1 (just after the ext-kicker); X~1.4mm, Y~0.25mm.

We do not know when it happens.

- during the fast kicker installation??
- **Corrected in September**.

LAL 4-mirror laser-cavity





N.Delerue and D.Jehanno

Mightylaser Milestones

2010

08 | 09 | 10 | 11 | 12

Installation

No laser

No laser

07/27

08/21
Laser locked to 4M cavity

08/30
4M cavity alignment to beam

09/06
4M cavity connected to beam

4M cavity locked to ATF Clock
09/24

10/25

1st Compton gamma observed

11/01
Laser Failure

Laser shipped
to Zurich

11/17
Laser repaired

12/08
Compton gamma observed

Laser shipped
to Zurich
HW update

12/20

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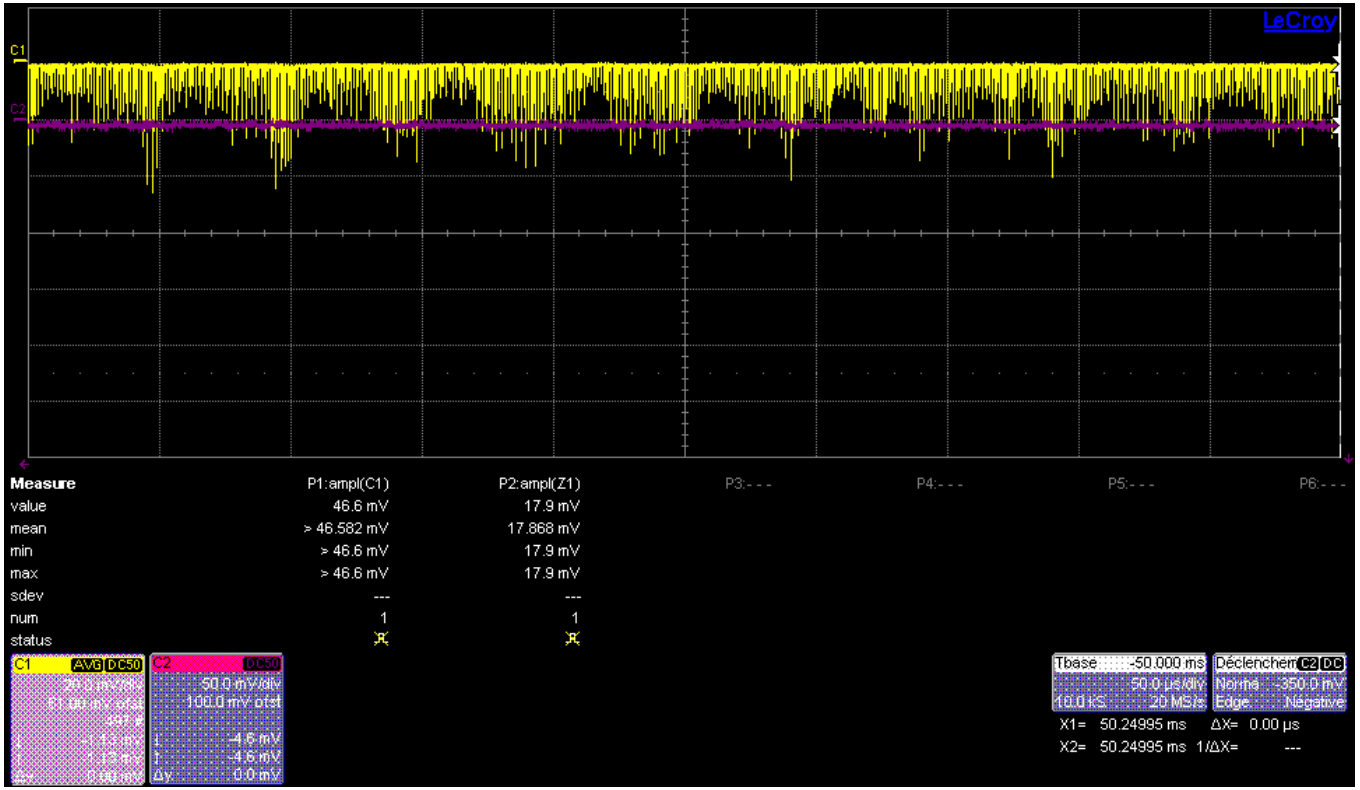
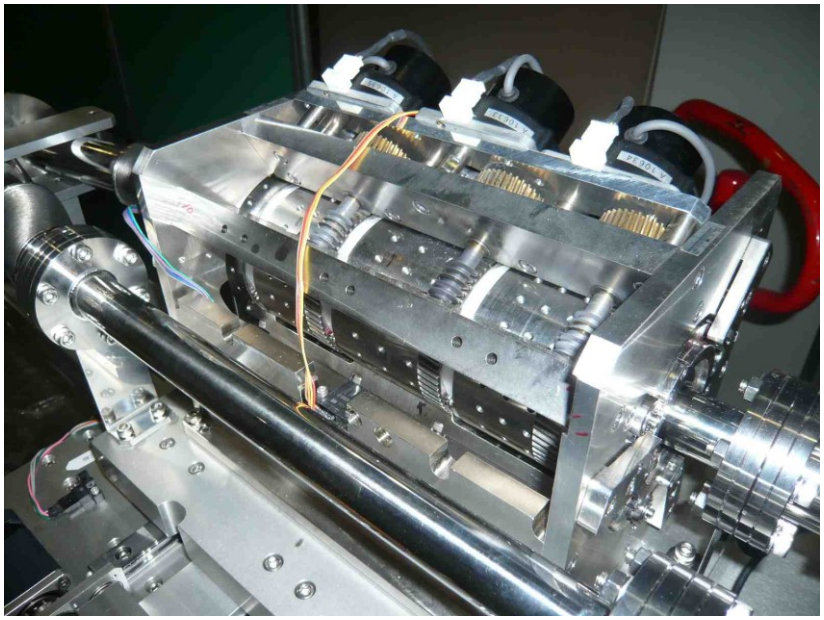
Compton production



- Production of Compton photons (yellow trace) achieved regularly during weeks where the laser was available.
- Our cavity can remain locked on the ATF beam for more than one hour.
- However we see laser power fluctuations in the cavity indicating that our locking must be improved.

N.Delerue and D.Jehanno

Extra beam operation on Dec 23rd
Permanent Magnet Final-Quad (Kyoto Univ.)



The magnet was assembled in Kyoto Univ in last fall.
It was delivered to KEK from Kyoto in the end of November.

- Field measurement by a rotating coil was done.
- It was temporally installed in ATF2 line from Dec. 21st to 25th.
- Demonstration with beam was done on Dec. 23rd for the master thesis.

- Results should be reported in next meeting (ATF2 or TB).

Failure on the cooling water facility

One of the bigger refrigerator on the cooling water system for ATF2 magnets was broken in middle August.

- **Fortunately, we were in the summer shutdown.**
- **It forced about two months shutdown and was recovered in early October.**

- It was caused by a pin-hole on one of the heat exchangers.
- We surveyed other possible source of future failure during the repair works. **It seems that we may be free from this trouble for several years.**

Summary

After the last TB/SGC meeting, we had some of important hardware works, especially in the summer shutdown (2010 Jun-Oct).

- **Two old LINAC klystron modulators were renewed.** They are in operation since last fall.
- **The 4-mirror optical cavity based Compton system (LAL) was installed in DR.** The first Compton signal was observed on Oct 25th.
- **New RF gun (3.5 cells) was installed by replacing the 1.6 cell gun.** It is successfully in operation as an electron source of ATF.
- **We are proceeding the re-alignment of the beam line**, especially for the injection/extraction area in DR to make a stable beam handling.
- **Cooling facility for ATF2 magnet was broken in summer shutdown.** It was repaired before re-start the beam operation.

As for the beam operation,

- **We had seven beam weeks in autumn/winter 2010.** The details will be reported in a summary of the ATF2 project meeting.
- We also had an extra two-days operation before Christmas for Permanent-Quad (Kyoto Univ.) and IP-BPM electronics (KNU).