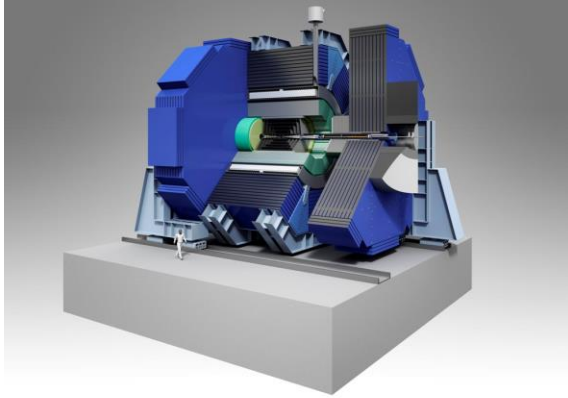


Summary:
Detector Integration/Engineering/MDI

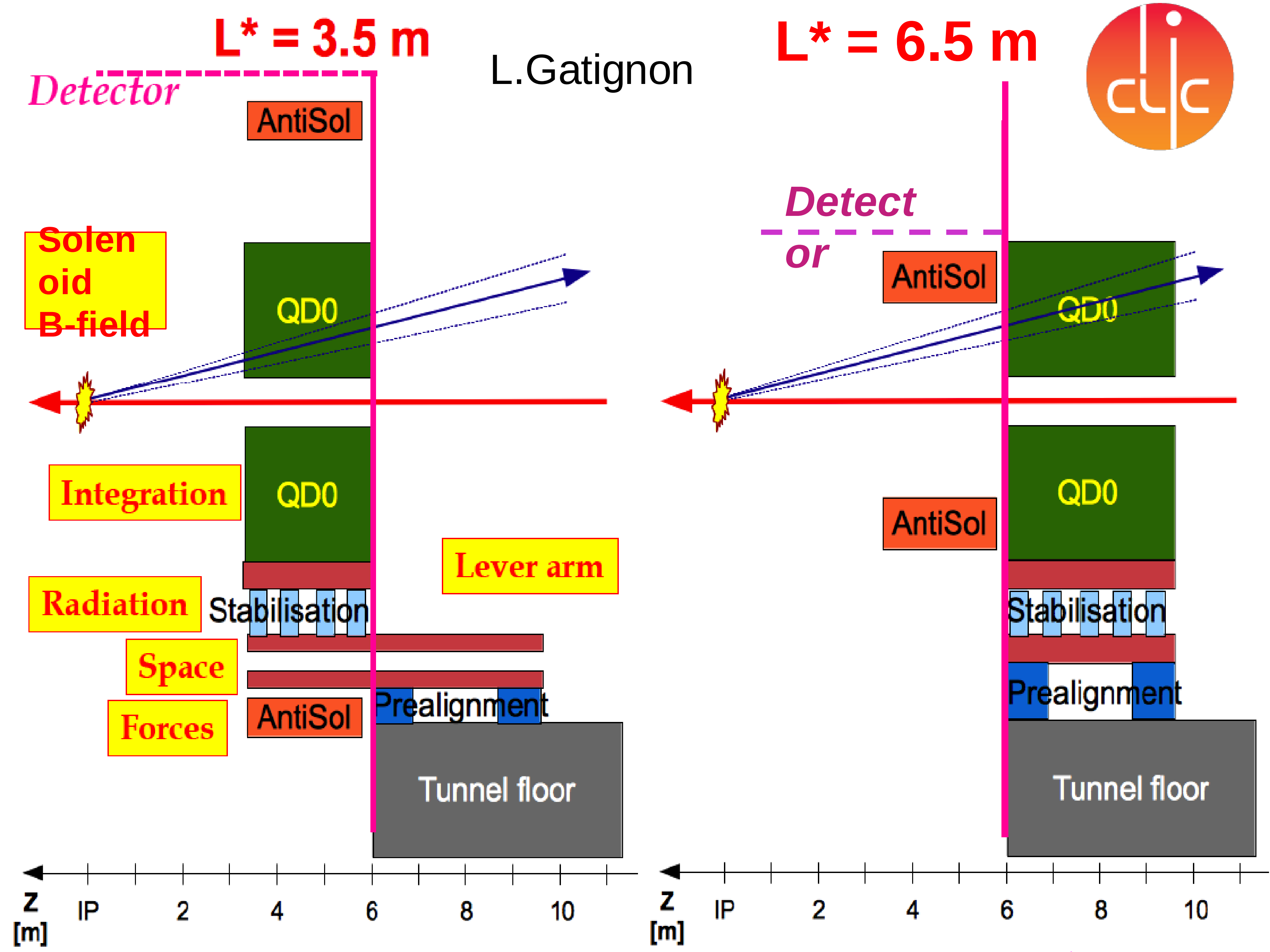
Marco Oriunno (SLAC), May 31, 2013

ECFA Linear Collider Workshop 2013, DESY

MDI Sessions co-conveners : M.Oriunno (SLAC), H.Gerwig (CERN), T.Sanuki (KEK)

17 speakers from :
Europe (CERN, DESY, ULB, Oxford, LAPP), Asia (KEK), USA (SLAC, BNL)

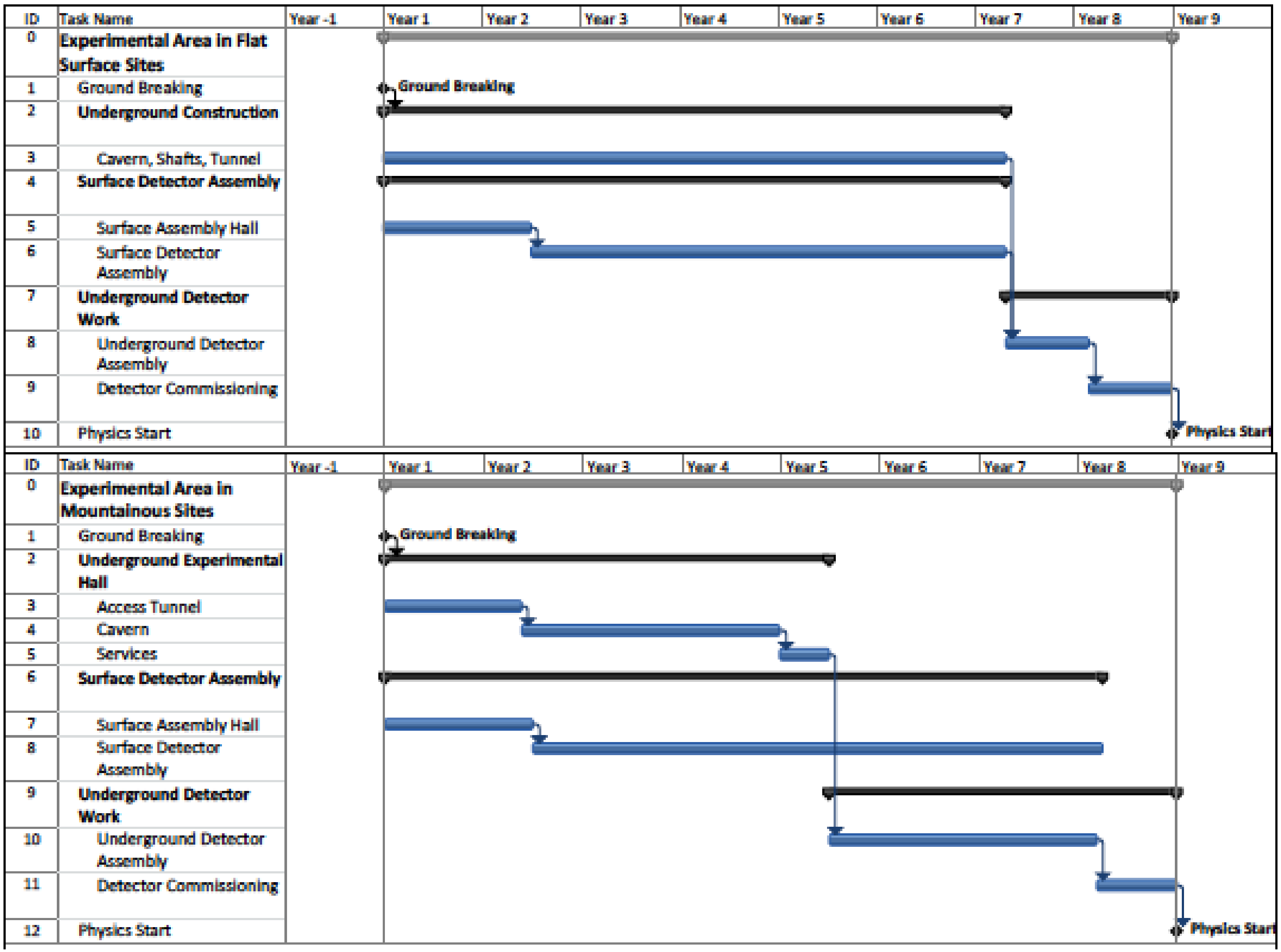
Tuesday 5/28	Wednesday 5/29	Thursday 5/30
Joint BDS/MDI	**FFS Topics**	**Detector Hall topics**
CLIC MDI Status (L.Gatignon)	ILC QD0 Status (B.Parker)	Cryogenics System (T.Okamura) Webex
ILD MDI Status (K.Buesser)	Opportunities for detector and MDI alignment: Lessons from the ATLAS SCT and new technology (A.Reichold)	LHC Power requirements (Gaddi)
SID MDI Status (T.Markiewicz)	Vibrations Update (D.Tshilumba)	Seismic (F.Duarte Ramos)
		Safety requiremnts (T.Tauchi)
Detector magnets		**Joint BDS/MDI**
ILD - Barrel, End Cap and Cryostat integration (R.Stromhagen)		CLIC QD0 field quality requirements (Y.Levinsen)
Strategy of detector solenoid construction (Y.Sugimoto)		CLIC QD0 magnet (M.Modena)
Al-Ni stabilized SC Cable (S.Langeslag)		CLIC QD0 and BDS pre-alignment(H.Mainaud-Durand)
SID Solenoid (W.Craddock) WEBEX		CLIC QD0 stabilisation (J.Allibe)


L* = 3.5 m
L.Gatignon
L* = 6.5 m
Detector
AntiSol
Solen
oid
B-field
QD0
QD0
Integration
Lever arm
Radiation
Stabilisation
Space
Forces
AntiSol
Prealignment
Tunnel floor
z
[m]
IP
2
4
6
8
10
Detect
or
AntiSol
QD0
AntiSol
QD0
Stabilisation
Prealignment
Tunnel floor
z
[m]
IP
2
4
6
8
10

Time Constraints

K.Buesser, DESY

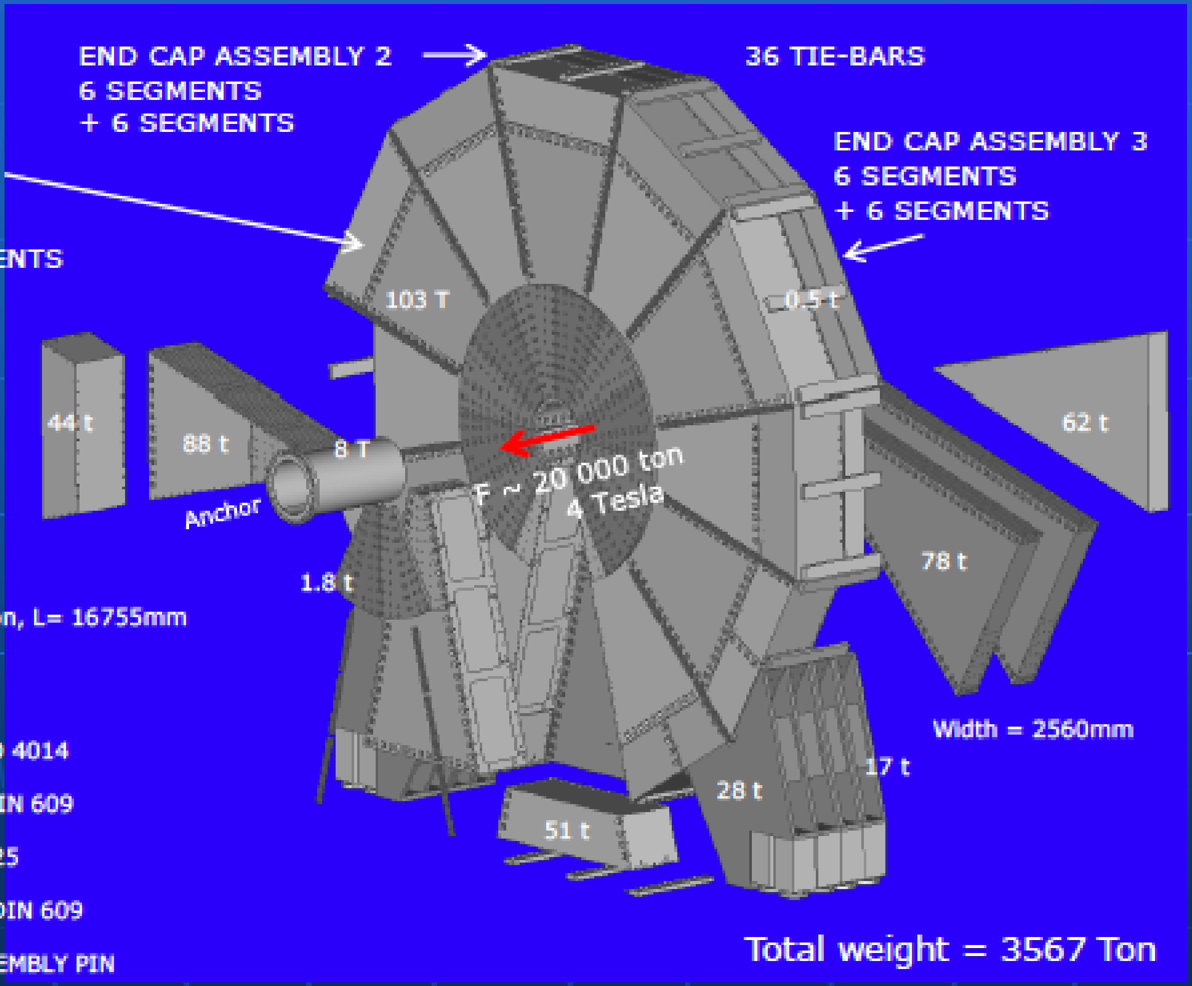
- Detector assembly possible in both site versions within 8 years
- Timelines for detector and machine assembly are less coupled in flat-top sites



End Cap Assembly Parts

The segments can be manufactured with a geometric positional tolerance of +/- 1.0 mm and 0.3 mm plan.
Complete assembly at the manufacturers site.

END CAP ASSEMBLY 1
6 SEGMENTS
+ 6 SEGMENTS
+ 12 SHUTDOWN SEGMENTS
+ 12 Z-STOPS
+ FRONT PANEL
+ Z-SUPPORT



overturning moment ~ 200 Ton, L= 16755mm

240 SHEAR PIN

~ 1600 M36 x 140 / 10.9 ISO 4014

~ 650 M36 x 140 / 10.9 DIN 609

~ diverse HV washer DIN 125

~ 300 M24 x 100 / 8.8 DIN 609

~ 32 REINFORCEMENT ASSEMBLY PIN

Access to the site

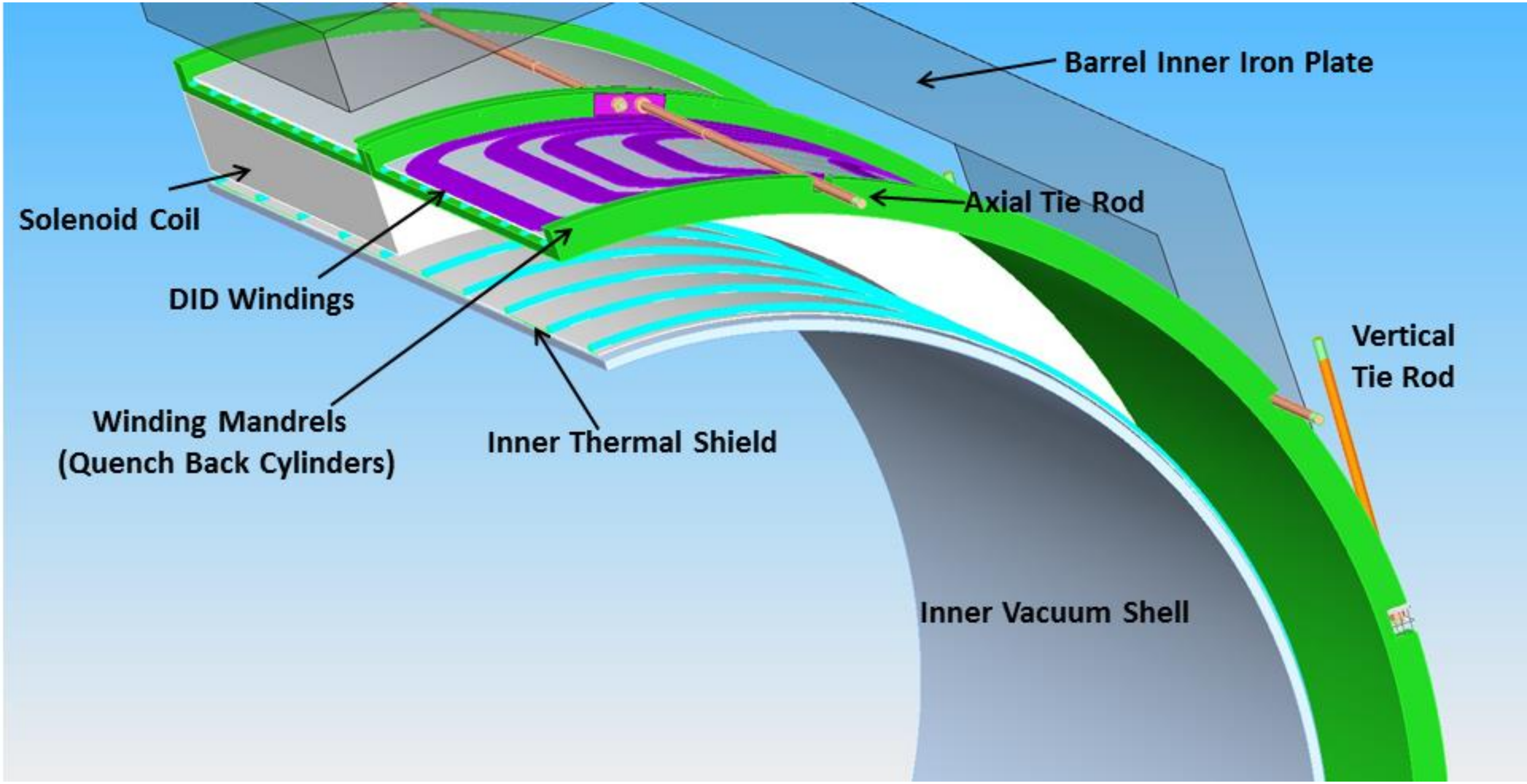
En route for Kitakami site

5T Solenoid : Superconducting Cable

CERN; Work-hardening mill; flat rolling

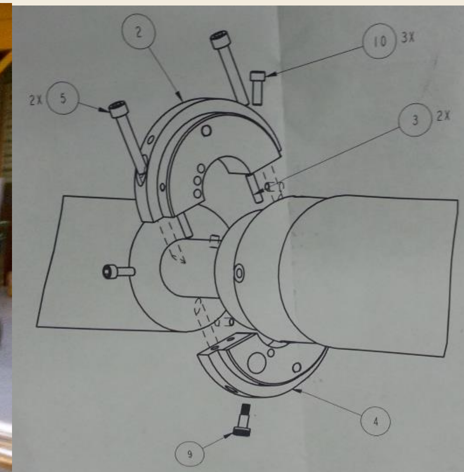
Specimen; 0% (left) and 30% (right) work

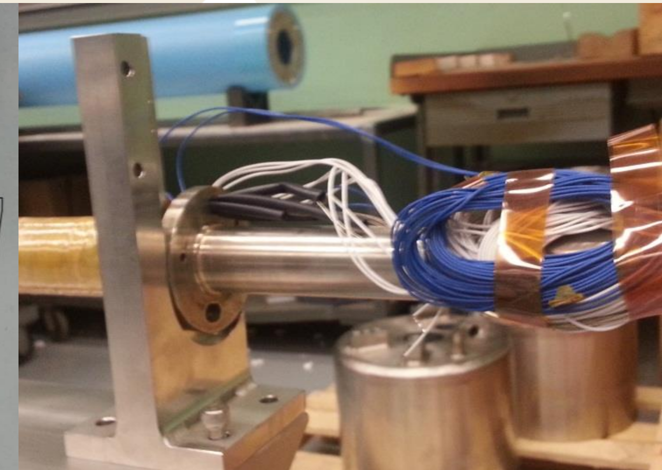
SID Solenoid, Wes Craddock (SLAC)

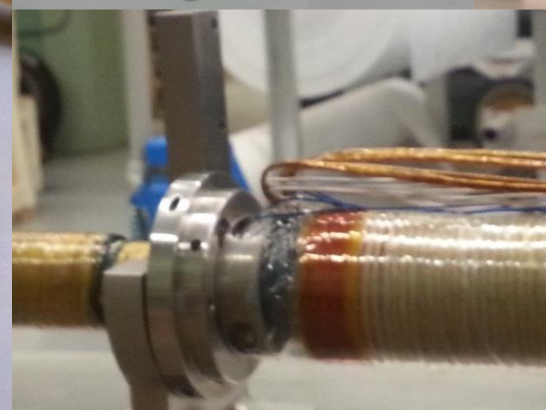


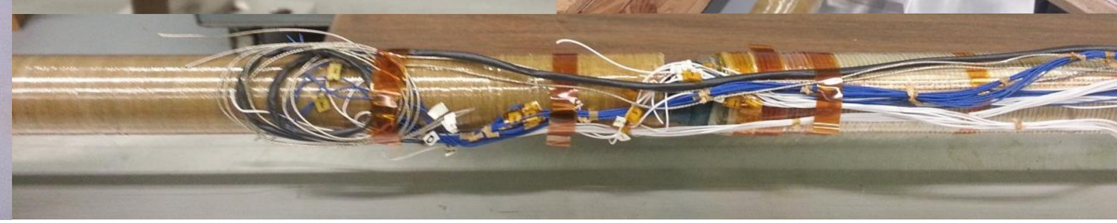
Simplified Magnet Section

QD0 Coil & Alignment Sled Assembly

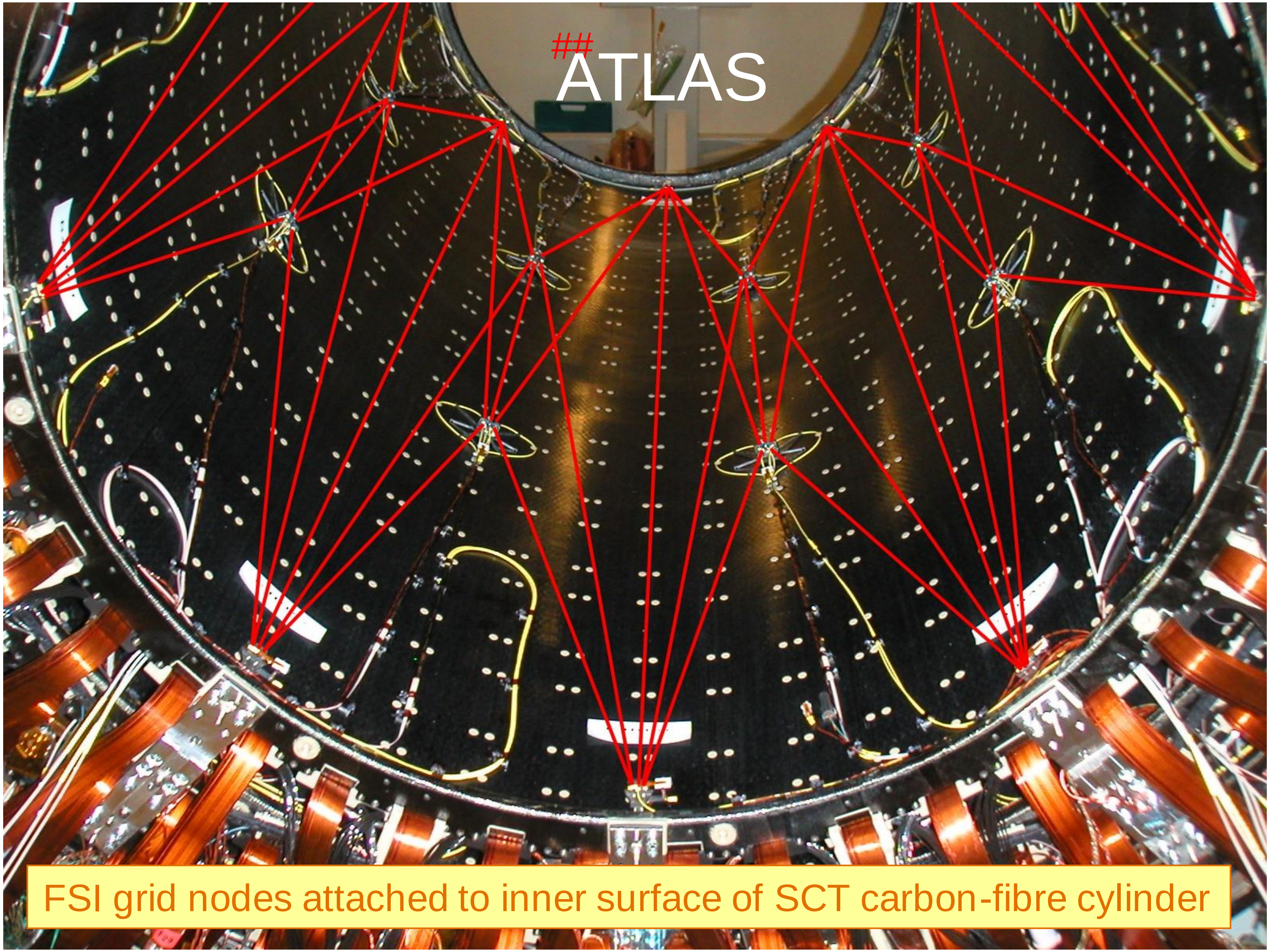




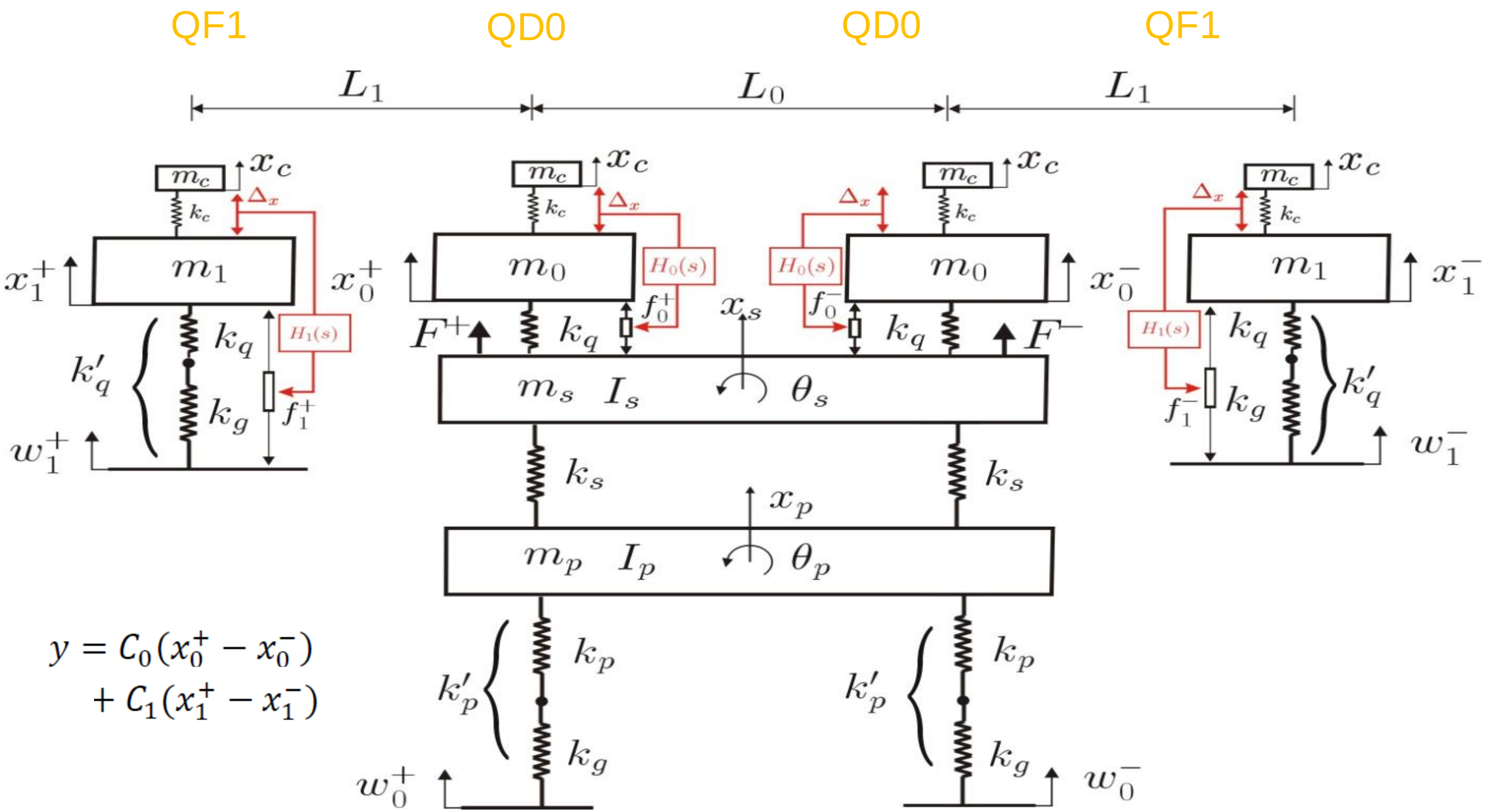




FSI alignment system, precision ~1um



Simplified Dynamic model of the SiD

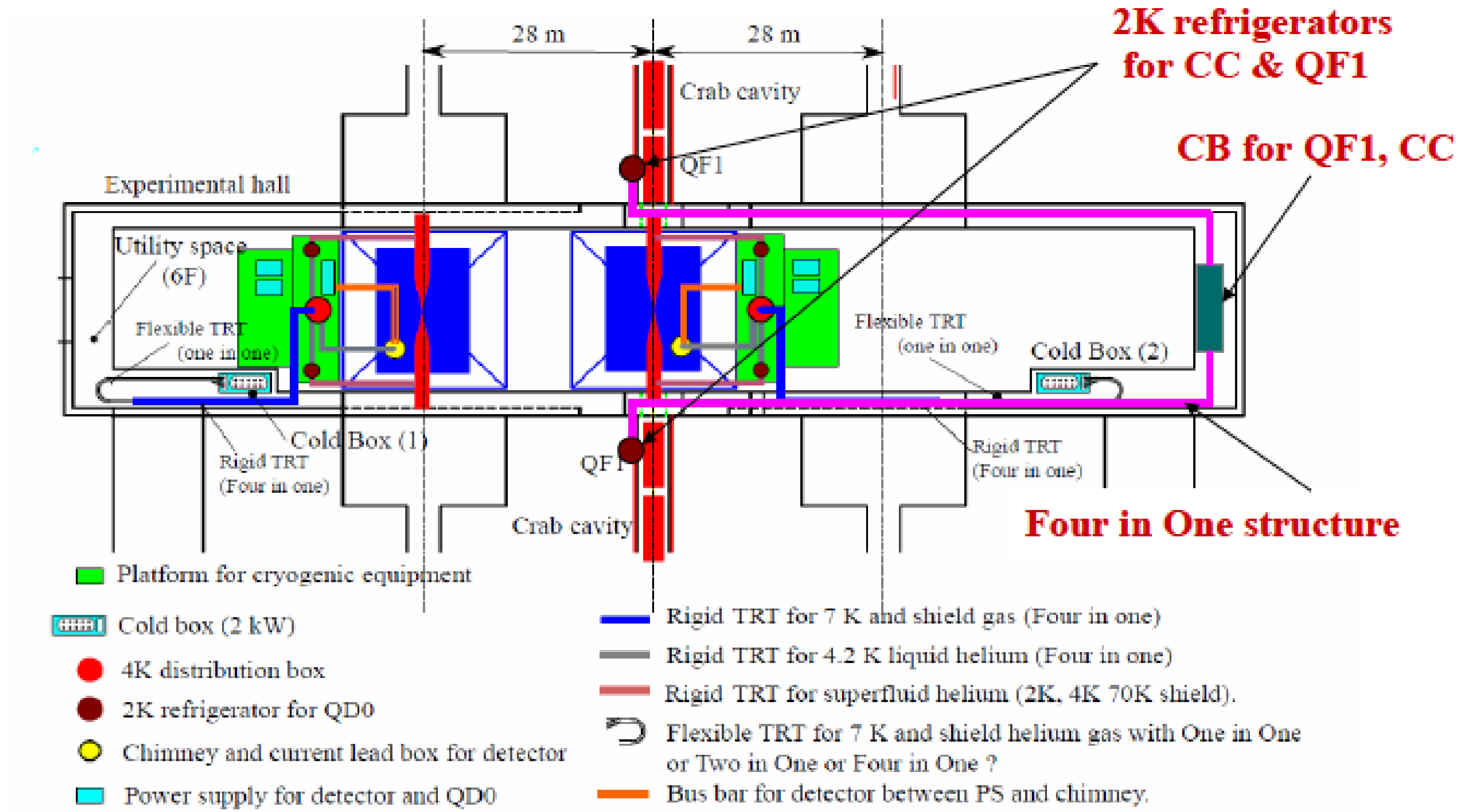


$$y = C_0(x_0^+ - x_0^-) + C_1(x_1^+ - x_1^-)$$

T.Okamura, KEKE

Cryogenic Installation for the detector hall

- A cold box for CC and QF1 will be installed in the IR hall (utility space)
- Two 2K refrigerators are installed adjacent to the both side of the QF1 (in the accelerator tunnel)



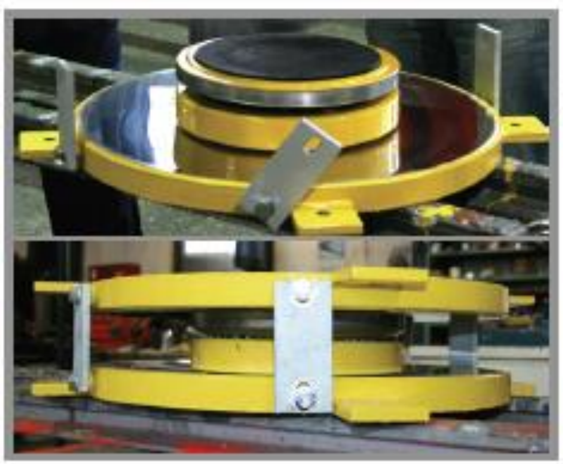
LHC Detectors power consumption (year 2011).

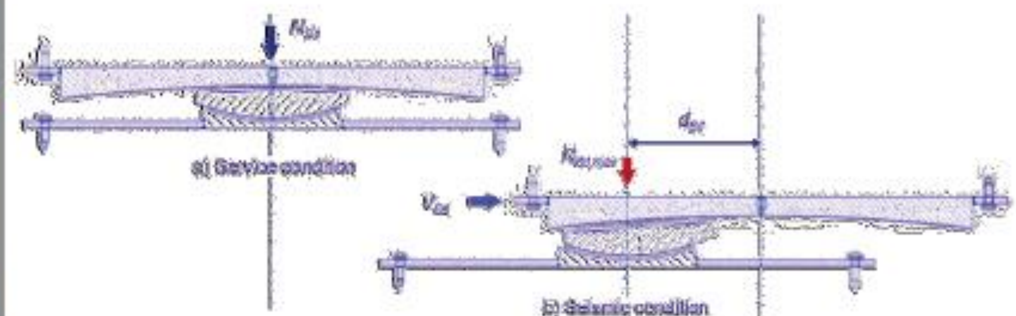
Atlas	Total	38945	MWh	
	Magnet	2030	MWh	*(superconducting magnet)*
	Cryogenics	26163	MWh	*(Toroids + Solenoid + L-Ar Ecal)*
	Electronics	10752	MWh	
CMS	Total	16117	MWh	
	Magnet	818	MWh	*(superconducting magnet)*
	Cryogenics	6217	MWh	*(Solenoid)*
	Electronics	9082	MWh	
Alice	Total	49903	MWh	
	Magnet	46897	MWh	*(resistive magnet)*
	Electronics	3006	MWh	
LHCb	Total	24607	MWh	
	Magnet	20636	MWh	*(resistive magnet)*
	Electronics	3971	MWh	

Detector Seismic isolation

- Friction pendulum isolators beneath the detector feet;
- Energy dissipation due to dynamic friction;
- Reliable technology;
- No high compliance elements (e.g. rubber) improves the positioning of the detector;

Pendulum isolators





F.Duarte Ramos, CERN

Summary on safety issues
T.Tauchi, KEK

1. Radiation shielding : has been studied by experts
2. Magnetic field leakage : followed ICNIRP guideline
3. Earthquake protection will follow the ISO3010.
4. The protection of CLIC ILD has been investigated.
   - OK at the CERN site, but NO at J_PARC
   - Rigid detector support
   - Above platform isolation
5. We would like to analyze it at the Japanese sites.
   - Rigidness of ILD detector
   - Isolation method with respect to the platform and detailed layout needed