MDI / Integration WG status report

T. Tauchi, 5th March, 2008

First ILD workshop, DESY, Zeuthen

14-16 January 08 ; Brief summary of MDI/I has been distributed

MDI/Integration Webex-phone meetings

18 February 08 ;　ILD1 activity,
Iron yoke (B-H curve, stray field, uniformity, splitting), CAD systems (compatibility), Qs to TPC (endcap, field cage), Beam pipe (3 shapes in LDC) etc. , and plan for TILC08.

Issues which have been discussed at the ILD workshop and the brief summary

1. Task sharing

1. KEK iron structure, 12-shape, CMS-like assembly, coil and cryostat
   W-support tube on the floor - rigidity of structures
   for ILD(1), coordinated by H. Yamaoka
   - Estimation of wakefield in the LDC cone beam pipe, Y. Suetsugu (tbc)
   - Estimation of minimum thickness of W-support tube, T. Abe
   - Vacuum at IP, 10n or 1n Torr, hadron production in residual gas interaction, T. Abe
   - Solenoid integrated with (anti-)DID, M. Kawai
   - Estimation of time for the re-commissioning beam lines, T.Okugi (tbc)
   - Self-shielding property of ILD, T. Sanami (tbc)
2. France LDC detector update to ILD
   for ILD(2), coordinated by M. Jore (tbc)
   - CFRP support tube rigidness estimation with FCAL collaboration
3. Sub-detector structures should be prepared by each sub-group
4. Performance of precise luminosity measurement with cone and straight beam pipes, FCAL group
5. questions on the TPC structure (field cage and endcap), forced water cooling and B-field uniformity to LCTPC (R.Setteles)

6. Next phone meeting (tba) will concentrate on B-field issues, optimisation WG will be invited!

2. 3d-CAD

1. CAD master in French group Matthieu Joré (LAL, French technical coordinator)
    - to integrate iron structure and sub-detectors for an ILD detector
    - to coordinate a common file such as STEP and files of material properties
    - to prepare a web-site where the files can be uploaded and downloaded
2. CATIA possibility at KEK will be considered, if it is cheap !
3. Common data base
   If we choose the EDMS system for common data base, we need detailed introduction as we discussed at phone meetings.
   Since EDMS will be considered as future plan, we will use the ILD homepage , where STEP files and material property files are stored.
4. Present CADs and engineers for ILD group
    - Solid Edge(H.Yamaoka) and OneSpace Modeling 2007 (KEK machining center);
      2 engineers at KEK
        - suggestion to use AUTOCAD and STEP common file for 3d-CADs
        - e.g. magnetic field calculation needs detailed information from CAD-data.
        - need a cheap CAD as a common tool especially at universities
    - Inventor for 3d-CAD of Lumical; 1 engineer in Poland
    - CATIA and Inventor; 5 engineers in France
        - EDMS is used in CALICE, which is not easy.

    - I-DEAS and Solid Edge; 2 engineers at DESY
        - Since I-DEAS is complicated, we must use it on a daily basis.

3. Meeting before/after Sendai meeting

If we like to discuss with more engineers , KEK is preferable place for the meeting
" suggestion to have MDI face-to-face meeting before or after the Sendai meeting. Optimum place must be KEK for meeting with engineers at KEK for discussion on the technical issues in details. If it is accepted, we would like to invite ILD engineers as much as possible."

Since it is too late for planning such meeting, we will have meetings in parallel as this workshop.

4. Future MDI/I phone meetings

- "EDMS for common data basis" will be postponed for future option.
- B-field issues - VTX inner radius with the optimization group
- stray field tolerance - iron thickness
    - 300 Gauss for electric device
- structure stability/strength with 12- and 8-shape (iron yoke)
- opening method (LDC and GLD methods)
- beam pipe structure; strength and wakefield with the expert
- TPC endcap and field cage thickness,and inner radius with LC-TPC group
    - hadron production in two photon process

ILD1 : MDI/Integration (FFIR) meetings

29 January 08 ; Task assignment and
B-field issues for next Webex meeting

14 February 08 ; Permanent QD0, loss factor at
step/cone beam pipe, 3D GLD sol.
and plan at TLC08, Sendai

28 February 08 ; Wakefield estimation of “LDC-cone beam pipe”, discussion for ILD meeting at TILC08

http://ilcagenda.linearcollider.org/categoryDisplay.py?categId=103
in Japanese

Task assignment from the ILD workshop

H. Yamaoka: The technical coordinator at KEK

Overall structure of ILD1 (GLD')

- design of solenoid-cryostat for the CMS style assembly
- strength of 12-shape iron structure and assembling method with supporting structure of HCAL with respect to the 12 shape
- support tube with canti-lever system

Update on the design of coil and cryostat

- ID/OD of the cryostat=3.3/3.85m, z=3.75m, E/M=12
- stray field=100G at 10m from IP, $dB/B < 4 \times 10^{-4}$ for R<1.75m, Z<0.5m

Y. Suetsugu: Beam pipe design

Estimation of wakefield in the LDC cone beam pipe

- its strength and possible location of vacuum pumps

M. Kawai: 3D magnetic calculation of solenoid

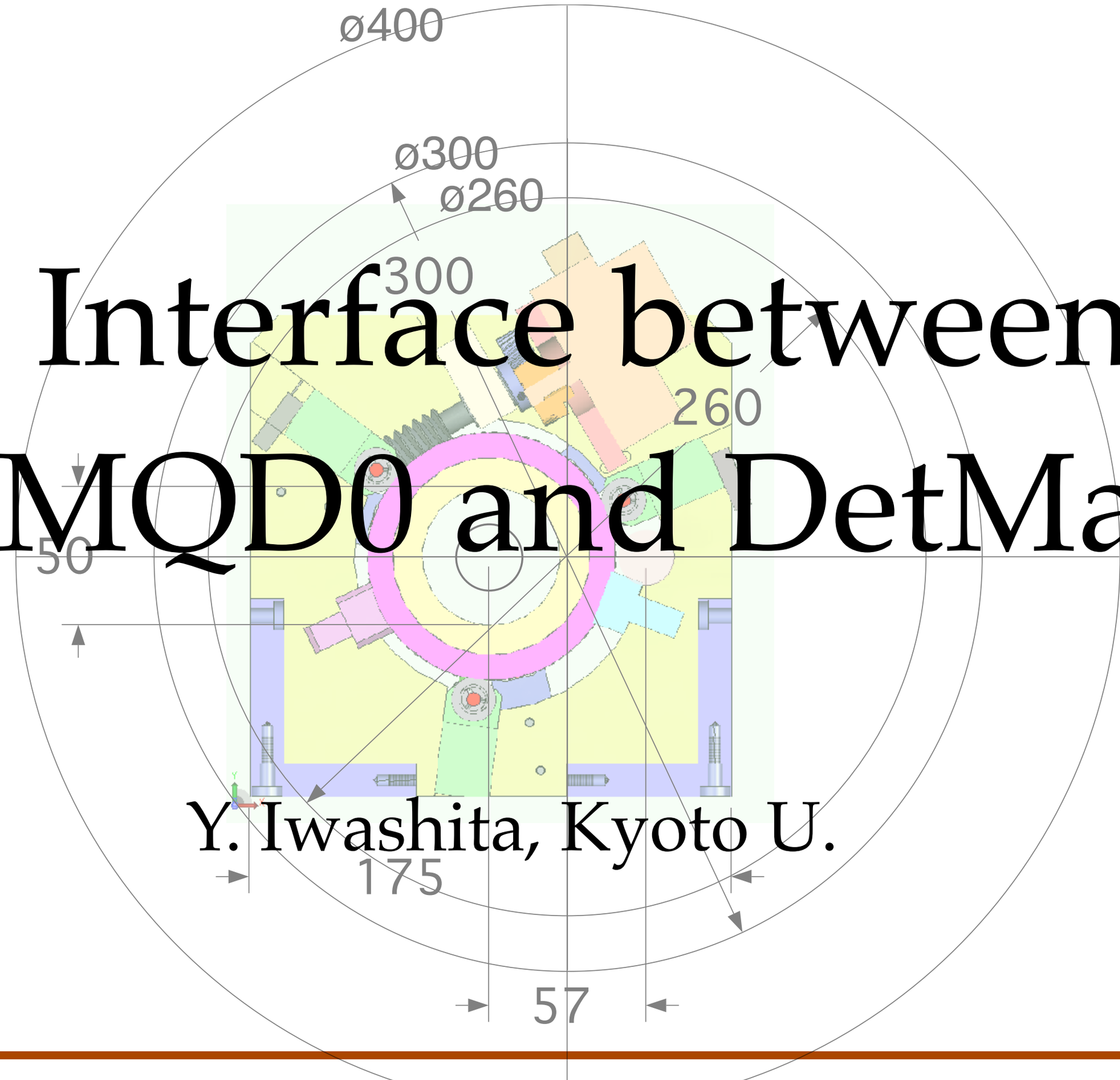
- 3D B-field with and without anti-DID, especially at the pair monitor

T. Sanami: Self-shielding property of ILD

T. Abe: Background study

Interface between PMQD0 and DetMag.

Y. Iwashita, Kyoto U.

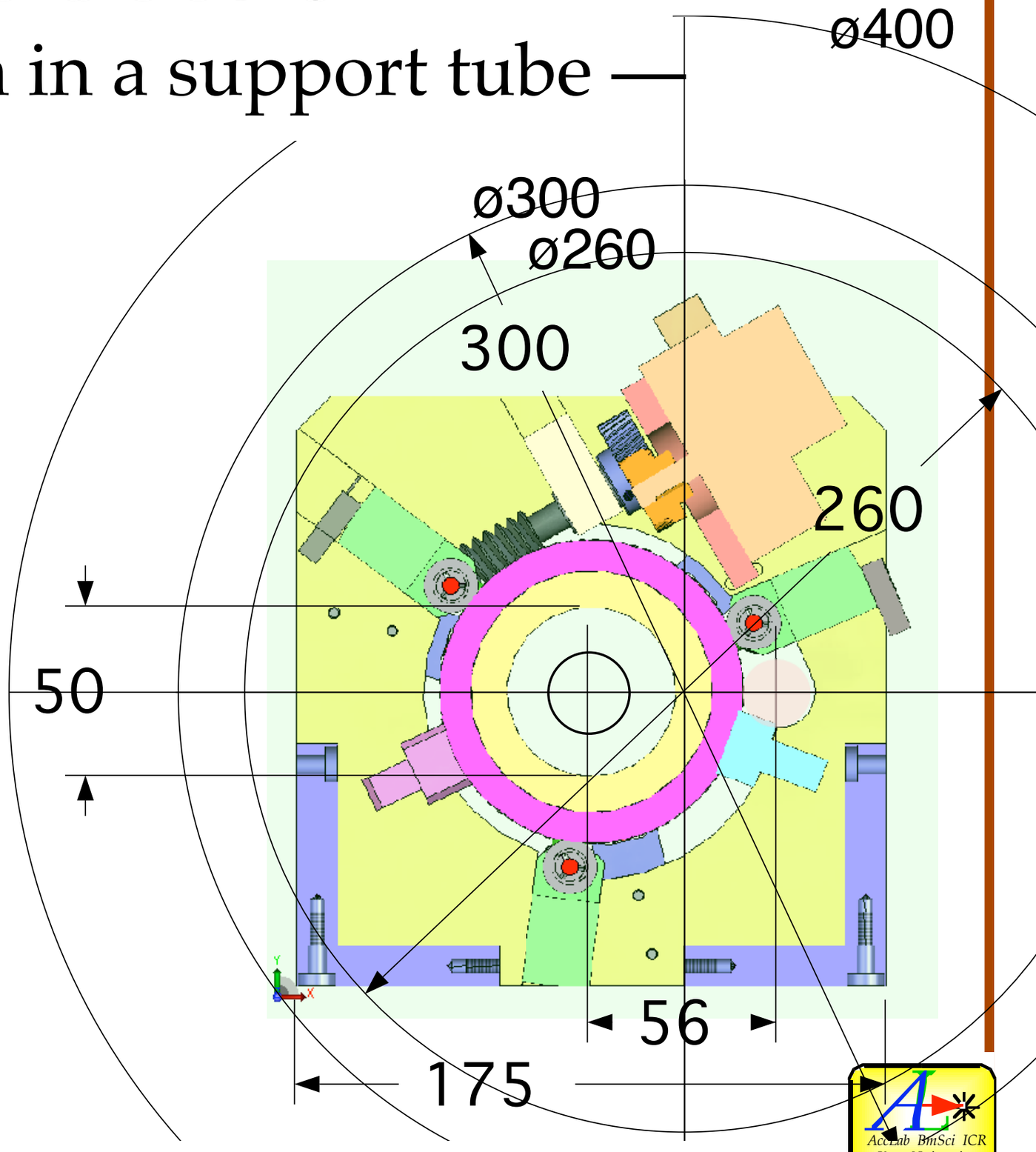


AccLab BmSci ICR KyotoUniversity

Cross Section

— ATF2 version in a support tube —

- Separation:
  - 14mr x 4.0 = 56mm
  - 14mr x 4.5 = 64mm
  - 14mr x 5.0 = 70mm
- Corners may be cut.
- No magnetic mat'l.
- SS Motor.
- Mover to be installed
- How to support?



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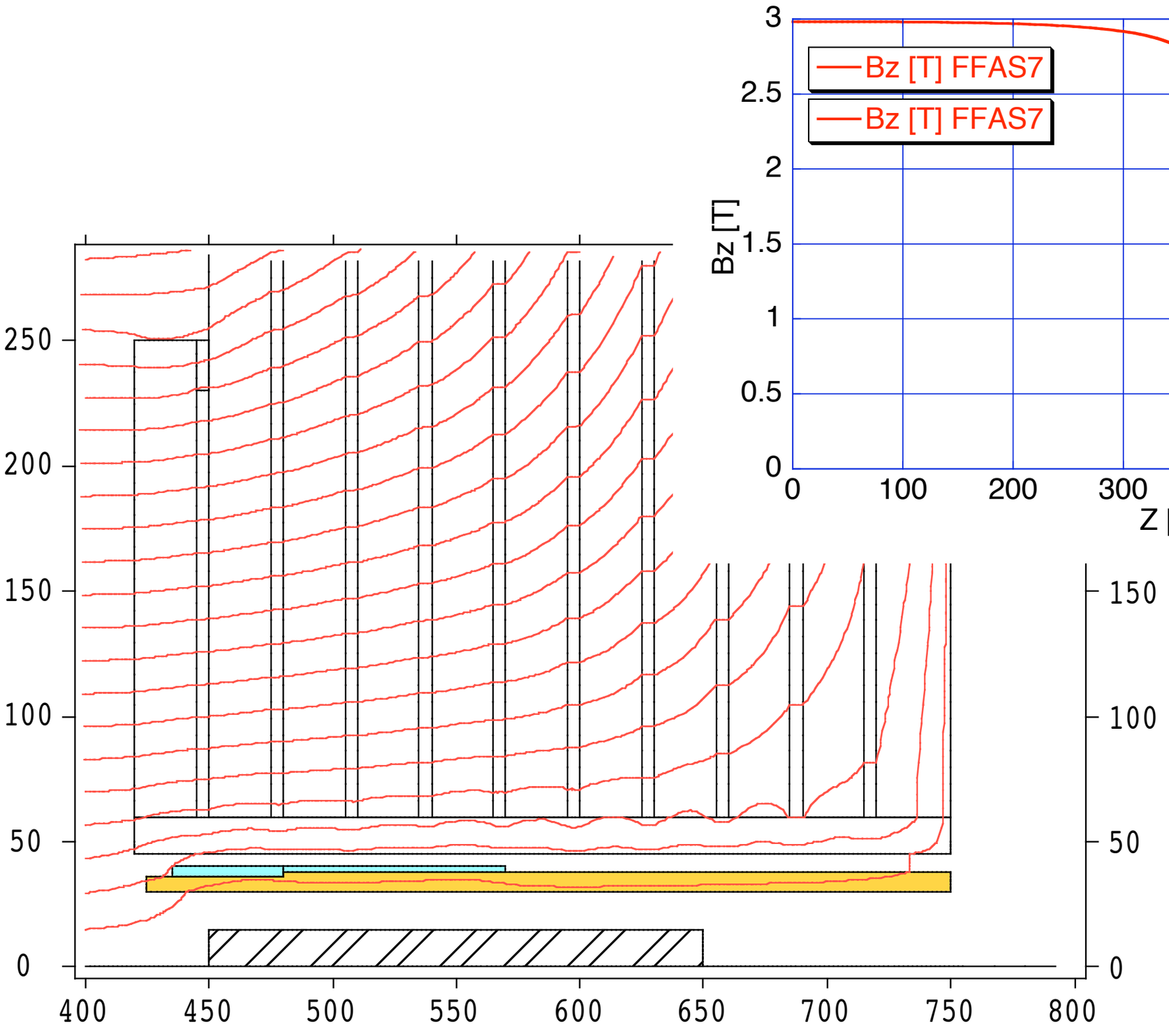
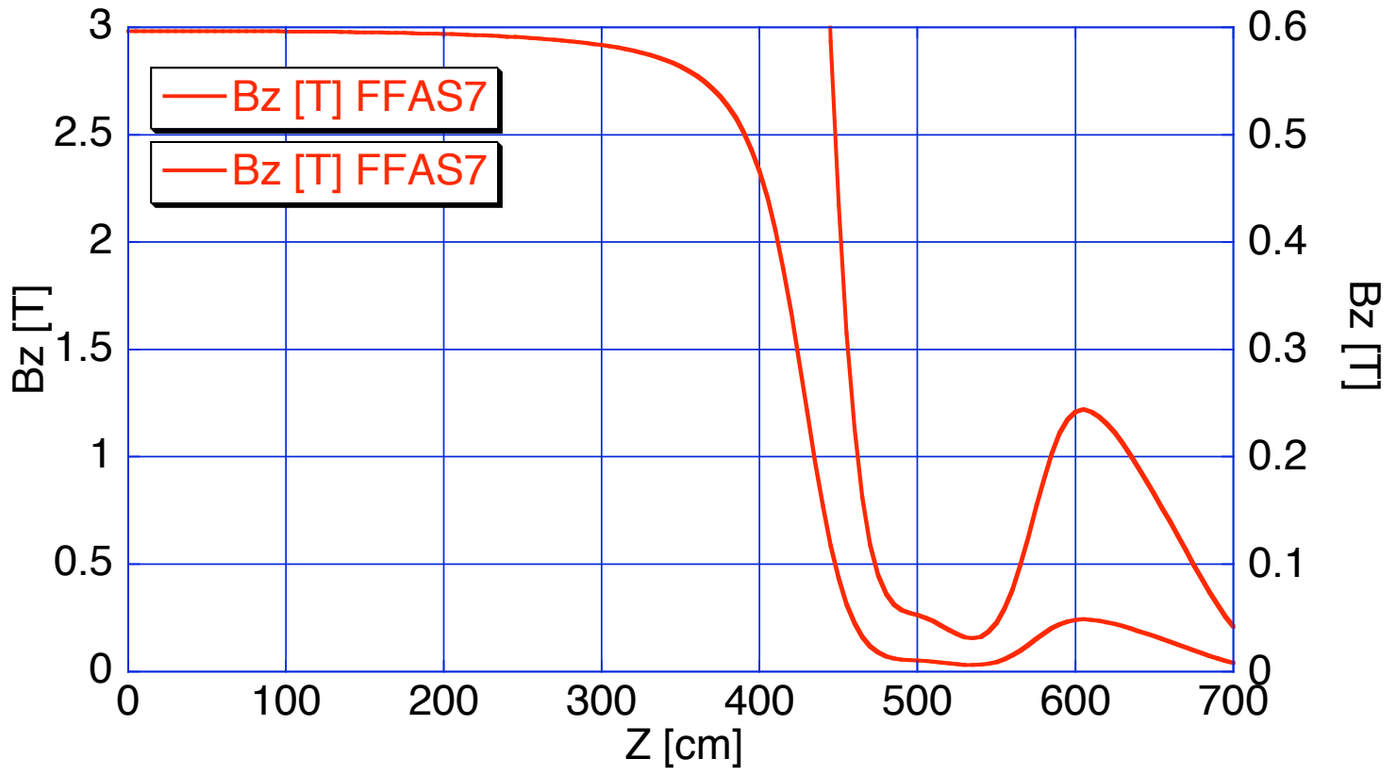
Reduced Force Anti-Solenoid





+4.03E5 [N]
-6.07E4 [N]
-3.51E5 [N]
=-0.9t

AccLab BmSci ICR
KyotoUniversity

3D magnetic calculation of solenoid by M. Kawai

ANSIS calculations : B field without anti-DID

1/4 model of GLD with the 12 shape iron structure (DOD)
3D B-field at 8000A, i.e. B= 2.8T at 2.0167 x 10^7 A・turn

mesh sizes : 0.1m, 0.5m in air and iron, respectively, at present,
limited by CPU time, will be smaller

computer power : 32 bit
memory 4 GB, mesh making for 2 h, analysis for 1h

ILD2 Activity

Exchange of CAD models by using STEP files

by Matthieu Joré and Marc Anduze

- From Autodesk inventor -> CATIA : OK
  (tested with the LumiCAL CAD model)
- From Solidedge -> CATIA : OK (tested with QD0 model)

We have put the complete CAD model of LDC(ILD2) in our CAD data base (SMARTEAM). For the moment , this database is only accessible to in2p3 laboratories, but we are studying a way to enlarge the access via a website .

Development of ILD2 model

Updates of Iron structure, opening procedure etc.

Exchange of information in ILD-MDI

Home | Users | News | Events | Documents | Groups

You are here: Home → Groups → Integration and MDI → Private folder → ILD2

Contents | View | Edit

Actions ▼ | Display ▼ | Add new... ▼ | State: Public draft ▼

ILD2

by Catherine Clerc — last modified Feb 06, 2008 06:41 AM

evolution of LDC toward ILD

Detector Section — by Catherine Clerc — last modified Feb 06, 2008 06:44 AM

Beampipe — by Catherine Clerc — last modified Feb 07, 2008 12:34 AM

different designs of beam pipe

3 shapes to be used in analysis by Y.Suetsugu

BH curves — by Catherine Clerc — last modified Feb 18, 2008 08:12 AM

BH curves used by LDC and GLD

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You are here: Home → Groups → Integration and MDI → Private folder → ILD1

Contents | View

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ILD1

by Catherine Clerc — last modified Feb 06, 2008 06:41 AM

evolution of GLD toward the ILD

3D-CAD — by Toshiaki Tauchi — last modified Feb 17, 2008 06:52 AM

STEP files will be stored for the common data base of CADs.

STEP file of ILD1 (GLDc) for compatibility study

Send this — Print this —

ILD-MDI plan at TLC08

In addition to scheduled presentations;

Meetings with engineers as much as possible

Tasks of the technical coordinators

Should they collect engineering studies of each detector ?

What is the integration task ?

- structure of sub-detector
  for the sub-detector groups
- support structure for MDI/I WG

So, all the engineering studies will be coordinated by the technical coordinators ?

Subdetector Contacts and Engineers

Candidates will be nominated by each R&D group.

ECAL -

HCAL -

TPC - R.Settles, K.Fujii

VTX -

FCAL - W.Lohmann

SiLC -

Muon - nobody. Structure is covered by MDI

Solenoid -

Pacman -

Integration (including support structures of sub detectors) -

M.Jore (LAL), C.Clerc, M.Anduze(LLR)
K.Sinram, N.Meyners(DESY)
H.Yamaoka, Y.Higashi, N.Higashi (KEK)

Summary

Following two engineering studies are on going with exchanging information at the Webex-phone meetings;

ILD1 - evolution of GLD toward the ILD
ILD2 - evolution of LDC toward the ILD

We would like to ask more engineering studis in sub-detectors.