LCTPC/LPWP-11th phonemeeting

- Date 11 October 2006
- Time
  - 7:00 west coast
  - 10:00 east coast
  - 16:00 central Europe
  - 23:00 Japan
- To join,
  Phone +494089981390 code 52872#

Agenda for 11th WP phonemeeting

(in future the meetings will be managed via http://ilcagenda.cern.ch/)

AGENDA

-1.News

a. http://ilcagenda.cern.ch/

b.Formation of the LCTPC/LP Collaboration

c.WWS-R&D-panel tracking review at Beijing

-2.WP meeting

WP meeting, other contributions (whoever is ready)

-3.Future meetings

-Eudetmeeting at MPI 18-20 October

-Valencia European WS 6-10 November

-Beijing Asian WS February 3-7 February

AGENDA

- 1a. http://ilcagenda.cern.ch/

AGENDA

-1b.Formation of the LCTPC/LP collaboration

-The proposed structure is shown on the next foil #5.

-The Collaboration-Board (CB) of group representatives is complete for the groups on foil # 6

-Names of both CB and TB are shown on foils #7,8.

-A proposal by the interim-SP for the next steps was sent to the CB and TB, a first meeting held on 20.9.2006 and a second collaboration phonemeeting held on 04.10.2006

-It was decided at the first collaboration phonemmeeting that each region should independently select a Regional Coordinator, (RC) via vote by that region's CB members, to replace the interim SPs, and that the 3 Regional Coordinators would choose a chairperson who is the sole Spokesperson.

The status is:

--America: RC is Dean Karlen

--Asia: the search committee, Keisuke Fujii and Angelina Bacala, estabilised the RC candidates who were be voted on by the Asia CB members. Result: RC is Takeshi Matsuda

--Europe: the search committee, Vincent Lepeltier and Klaus Desch, will find the RC candidates who will be voted on by the European CB members.

Formation of the LCTPC/LP collaboration

The revised structure is to have:
1)Three coordinators, one chosen by each region. These regional coordinators (RC) will work with the following two boards:

2)The collaboration board (CB), consisting of one representative from each group or set of groups (the group leader, principle investigator or other chosen member). Each CB member looks after the resources for its group(s) (money and people).

3)The technical board (TB), consisting of the existing workpackage (WP) conveners. The TB will ensure the technical integrity of their WP and compatibility with other WPs while maintaining close contact with the collaboration.

The groups and names of CB and TB members are listed in the next 3 slides.

LCTPC/LP Groups (19Sept06)

Americas

Carleton
Montreal
Victoria
Cornell
Indiana
LBNL
Purdue (observer)

Asia

Tsinghua
CDC:
Hiroshima
KEK
Kinki U
Saga
Kogakuin
Tokyo UA&T
U Tokyo
U Tsukuba
Minadano SU-IIT

Europe

LAL Orsay
IPN Orsay
CEA Saclay
Aachen
Bonn
DESY
U Hamburg
Freiburg
MPI-Munich
TU Munich (observer)
Rostock
Siegen
NIKHEF
Novosibirsk
Lund
CERN

Other groups

MIT
MIT (LCRD)
Temple/Wayne State (UCLC)
Yale
Karlsruhe
UMM Krakow
Bucharest

The CB members are:
==========

--Americas-
Carleton: Madhu Dixit
Montreal: Jean-Pierre Martin
Victoria: Dean Karlen
Cornell: Dan Peterson
Indiana: Rick Van Kooten
LBNL: Mike Ronan

--Asia-
Tsinghua: Yuanning Gao
For the following CDC groups: Akira Sugiyama
Hiroshima
KEK
Kinki
Saga
Kogakuin
Tokyo U A&T
U Tokyo
Tsukuba
Mindanao

--Europe-
LAL Orsay/IPN Orsay: Vincent Lepeltier
CEA Sacly: Paul Colas
Aachen: Stefan Roth
Bonn: Klaus Desch
Desy/UHamburg: Ties Behnke
Eudet: Joachim Mnich
Freiburg: Andreas Bamberger
MPI-Munich: Ariane Frey
Rostock: Henning Schroeder
(deputy: Alexander Kaukher)
Siegen: Ivor Fleck
Nikhef: Jan Timmermans
Novosibirsk: Alexei Buzulutskov
St.Peterburg: Anatoliy Krivchitch
Lund: Leif Jonsson
CERN: Michael Hauschild
(deputy: Lucie Linsen)

--Groups with Observer status-
TU Munich: Bernhard Ketzer
Purdue: Ian Shipsey

--Since replies are still missing from:
MIT
Yale
Karlsruhe
Krakow
Bucharest,
these groups are included as "observer groups" at the moment

The TB members are:

==========

1) Workpackage Mechanics — Ron Settles
  a) LP design (incl. endplate structure) — Dan Peterson
  b) Fieldcage, laser — Ties Behnke
  c) GEM panels for endplate — Akira Sugiyama
  d) Micromegas panels for endplate — Paul Colas
  e) Pixel panels for endplate — Jan Timmermans
  f) Resistive foil for endplate — Madhu Dixit
2) Workpackage Electronics — Leif Jonsson
  a)"Standard" RO/DAQ sytem for LP — Leif Jonsson+Postdoc
  b) CMOS RO electronics — Harry van der Graaf
  c) Electronics for LCTPC — Luciano Musa
3) Workpackage Software — Peter Wienemann
  a) LP SW, simul./reconstr.framework — Peter Wienemann
  b) TPC simulation, backgrounds — Stefan Roth
  c) Full detector simulation — Keisuke Fujii
4) Workpackage Calibration — Dean Karlen
  a) Field map — Lucie Linssen
  b) Alignment — Takeshi Matsuda
  c) Distortion correction — Dean Karlen
  d) Radiation hardness of materials — Anatoliy Krivchitch
  e) LP Gas/HV — Eudet Postdoc

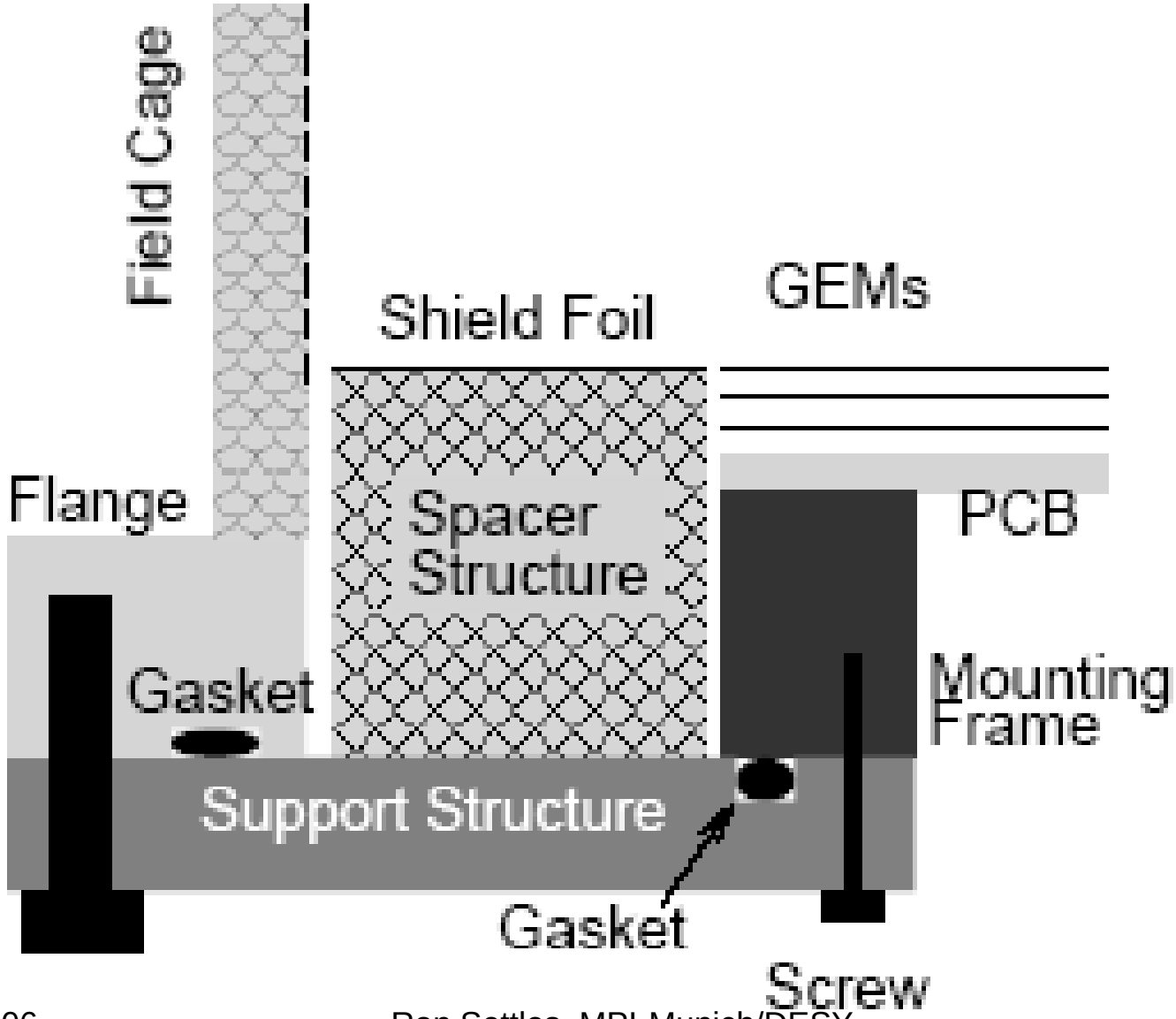
AGENDA

-1c.Tracking review at Beijing:

……some info……

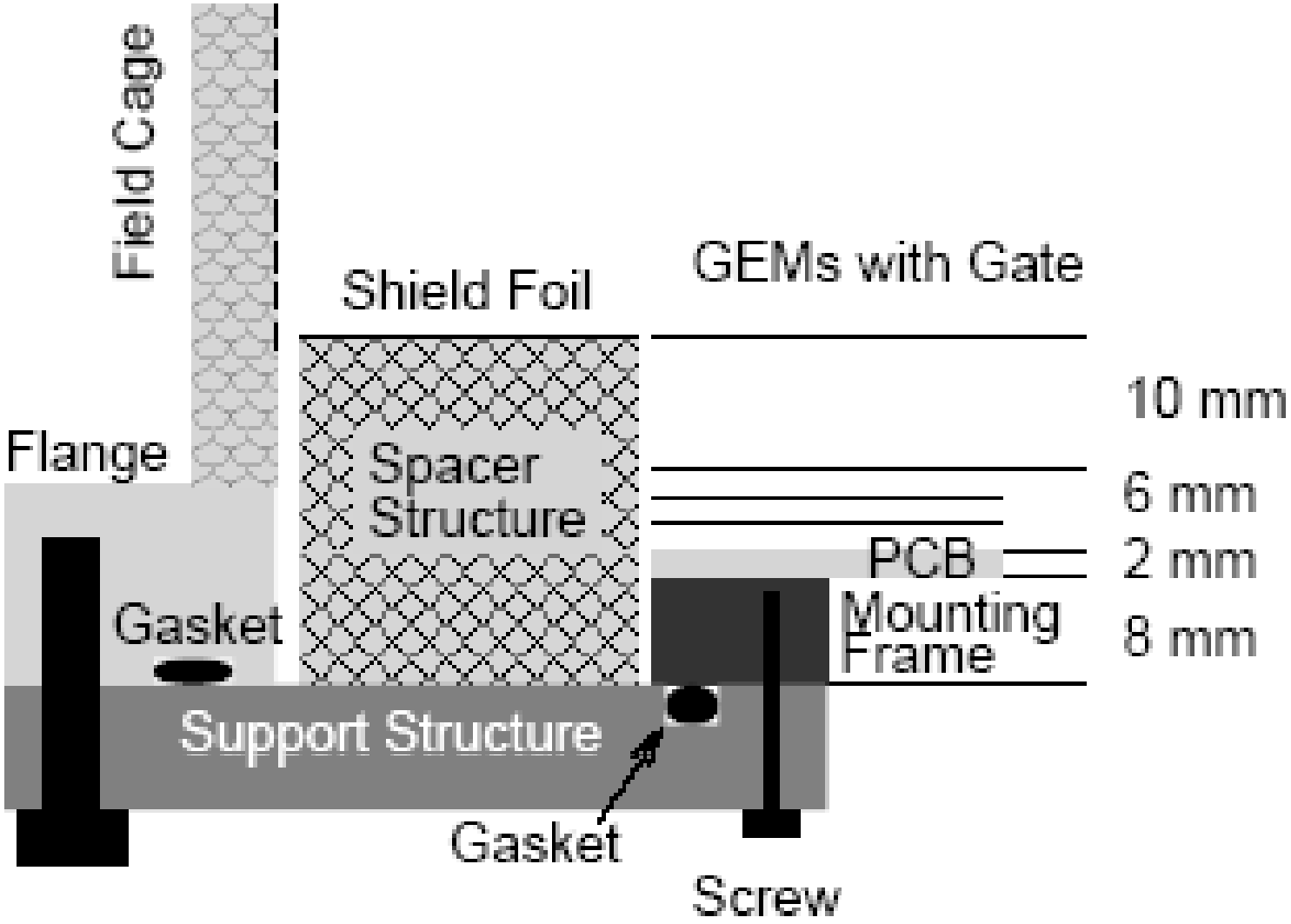
AGENDA

-2. WP meeting (Martin GemLP)



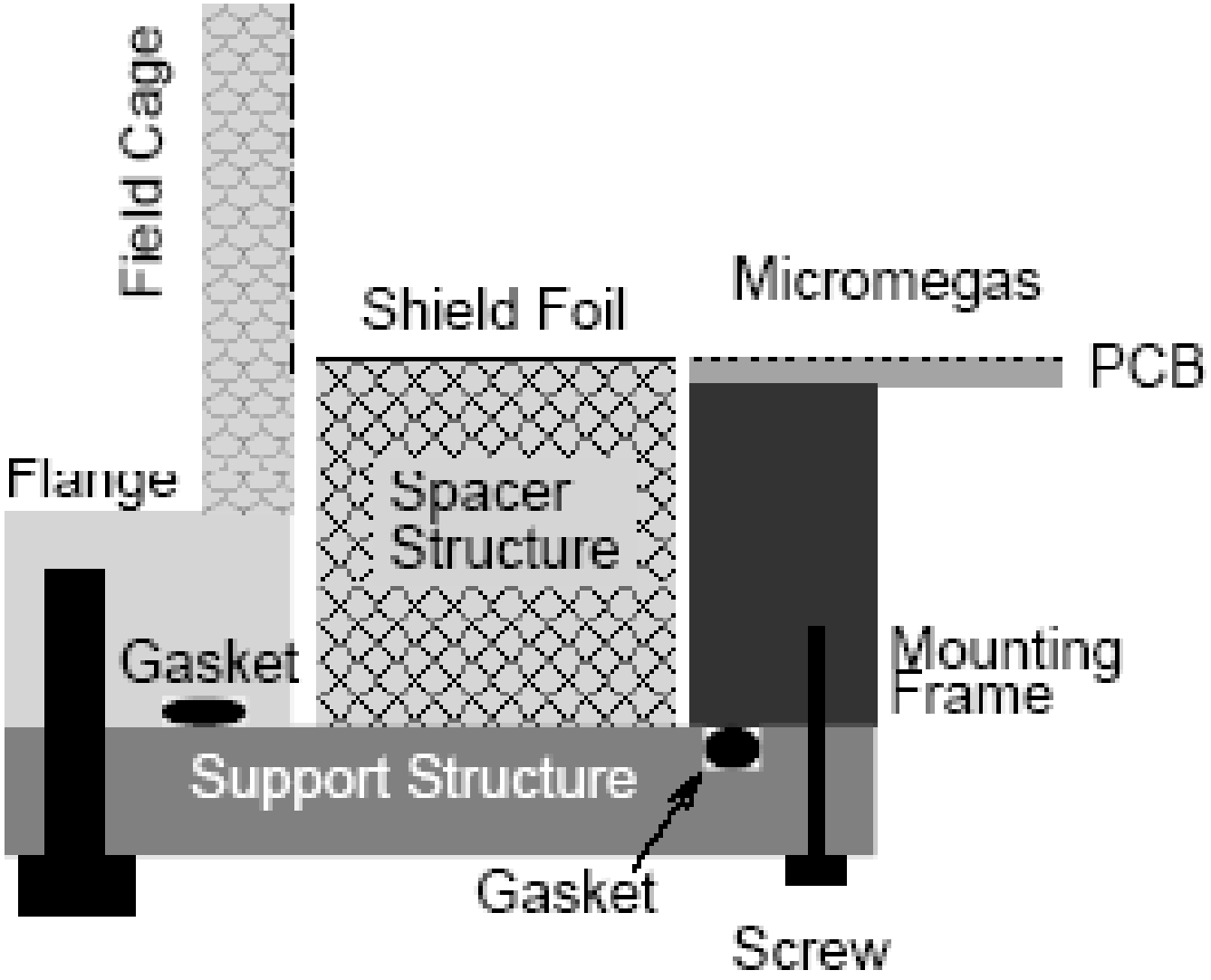
AGENDA

-2. WP meeting (Martin-GemLP w/gate)



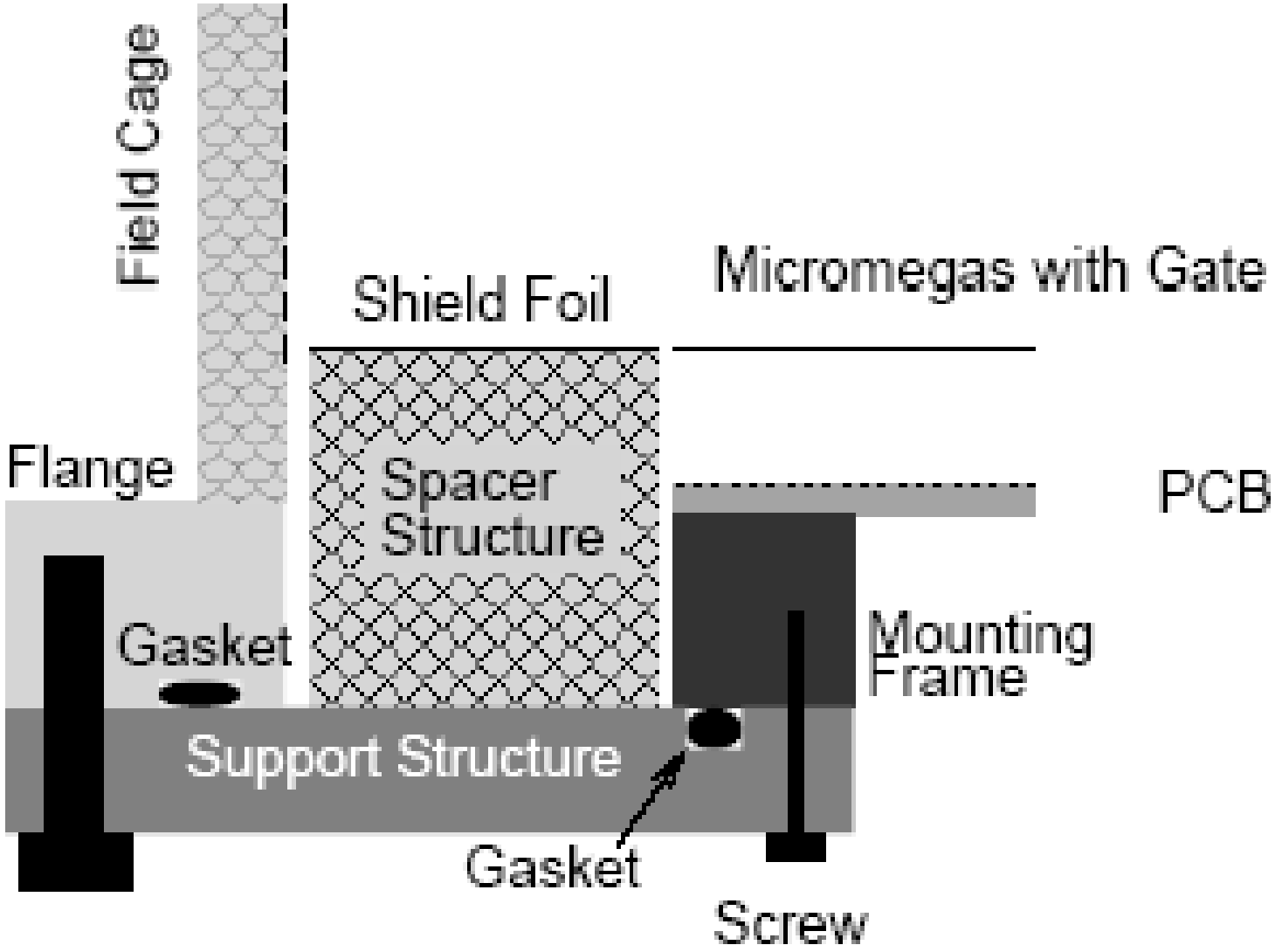
AGENDA

-2. WP meeting (Martin-MicromegasLP)



AGENDA

-2. WP meeting (Martin-MicromegasLP w/gate)



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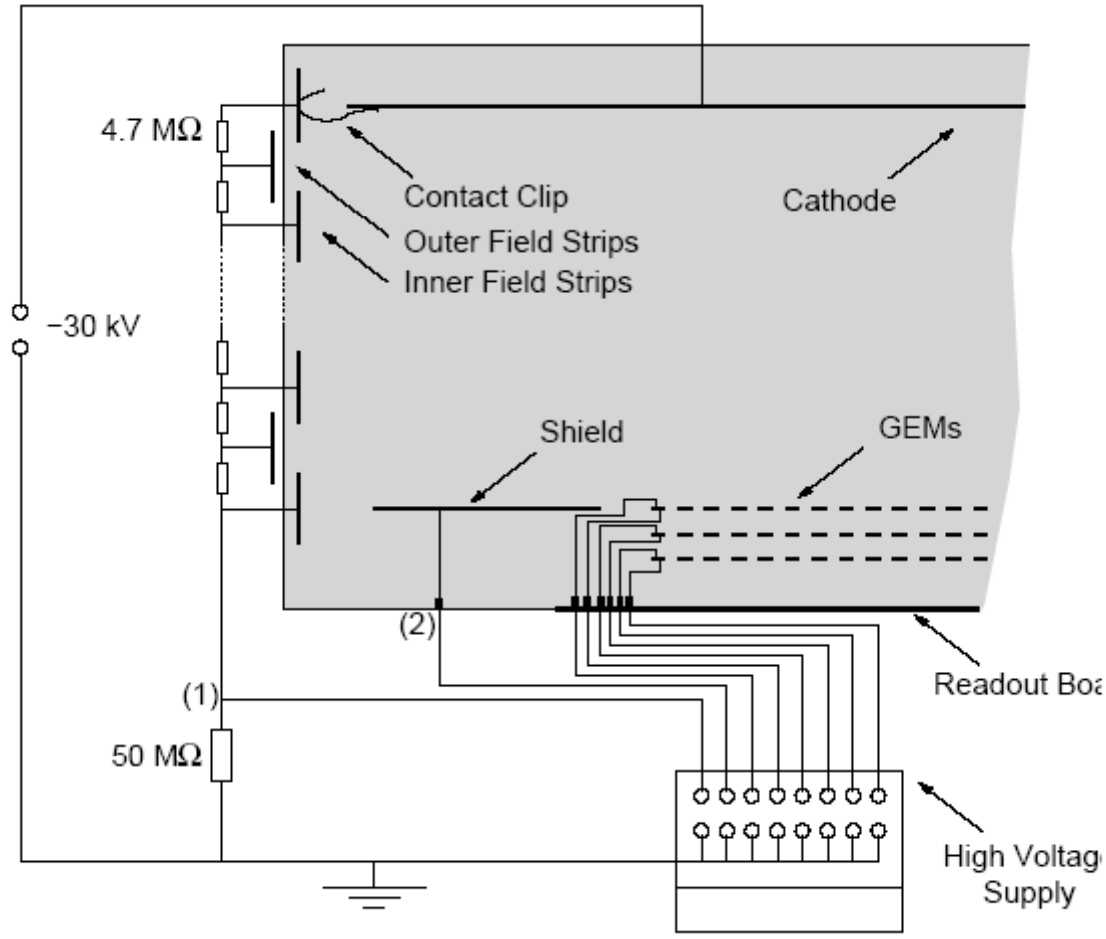
-2. WP meeting (Martin-LPelectro)



AGENDA

-2. WP meeting (Yannis idea)

AGENDA

-2. WP meeting (Leif & Dan on connectors, Peter on the field cage -> see the meeting summary).

AGENDA

-3.Future meetings

There are (in addition to bi-weekly phonemeetings):

-Eudet annual meeting MPI-Munich (18-20 October 2006) with website:

http://www.eudet.org/AnnualMeeting2006/AnnualMeeting2006.html

The LCTPC CB/TB meeting will be at 10:30 on Wednesday 18 Oct., before the start of the Eudet one at 14:00.

-European LC workshop Valencia (6-10 November 2006), see

http://ific.uv.es/~ilc/ECFA-GDE2006/

-Asian LC workshop Beijing (4-7 February 2007)

Website:

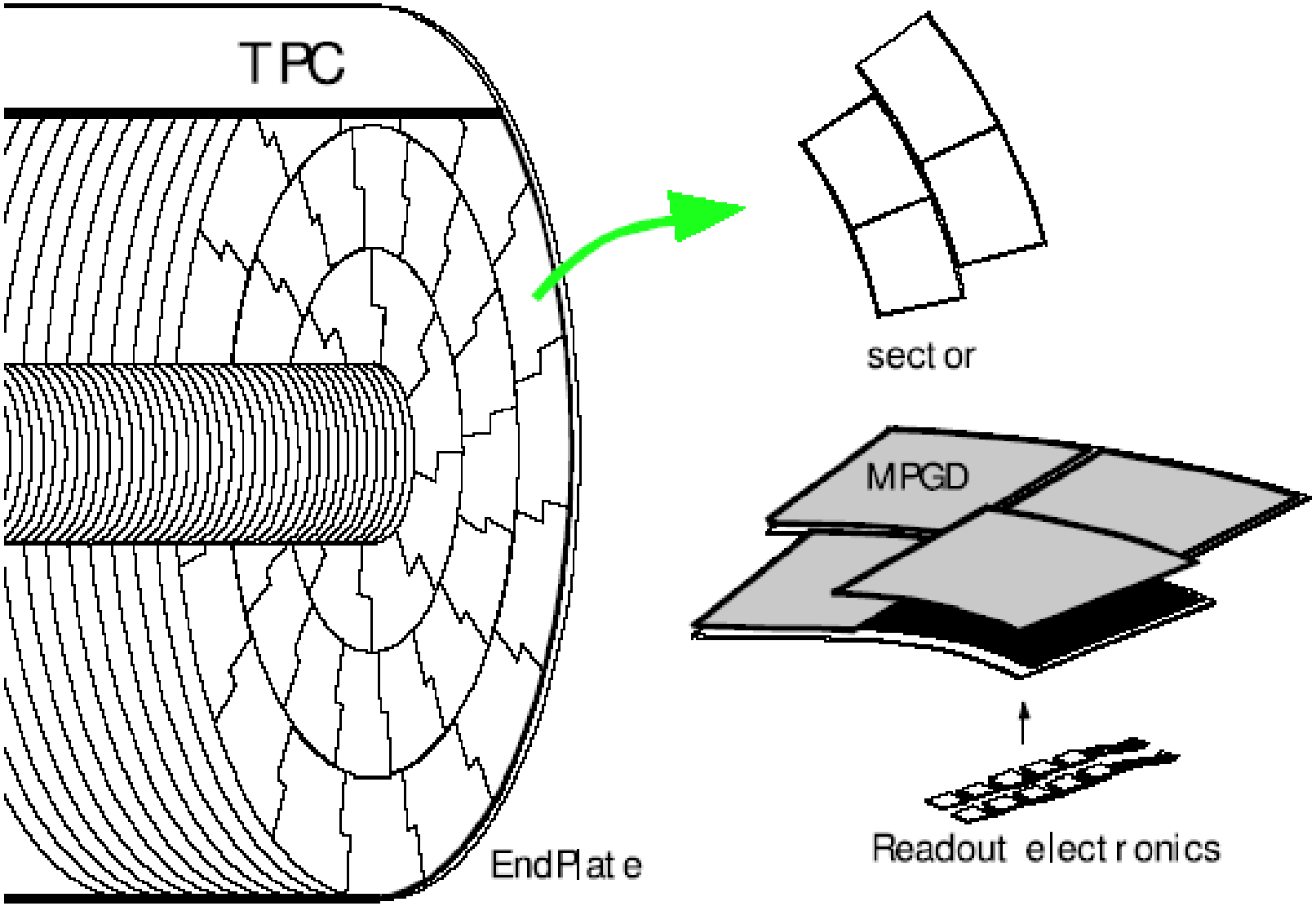
http://bilcw07.ihep.ac.cn/

AGENDA

-4. AOB

Back up slides, for reference

Akira Sugiyama – GLD DOD

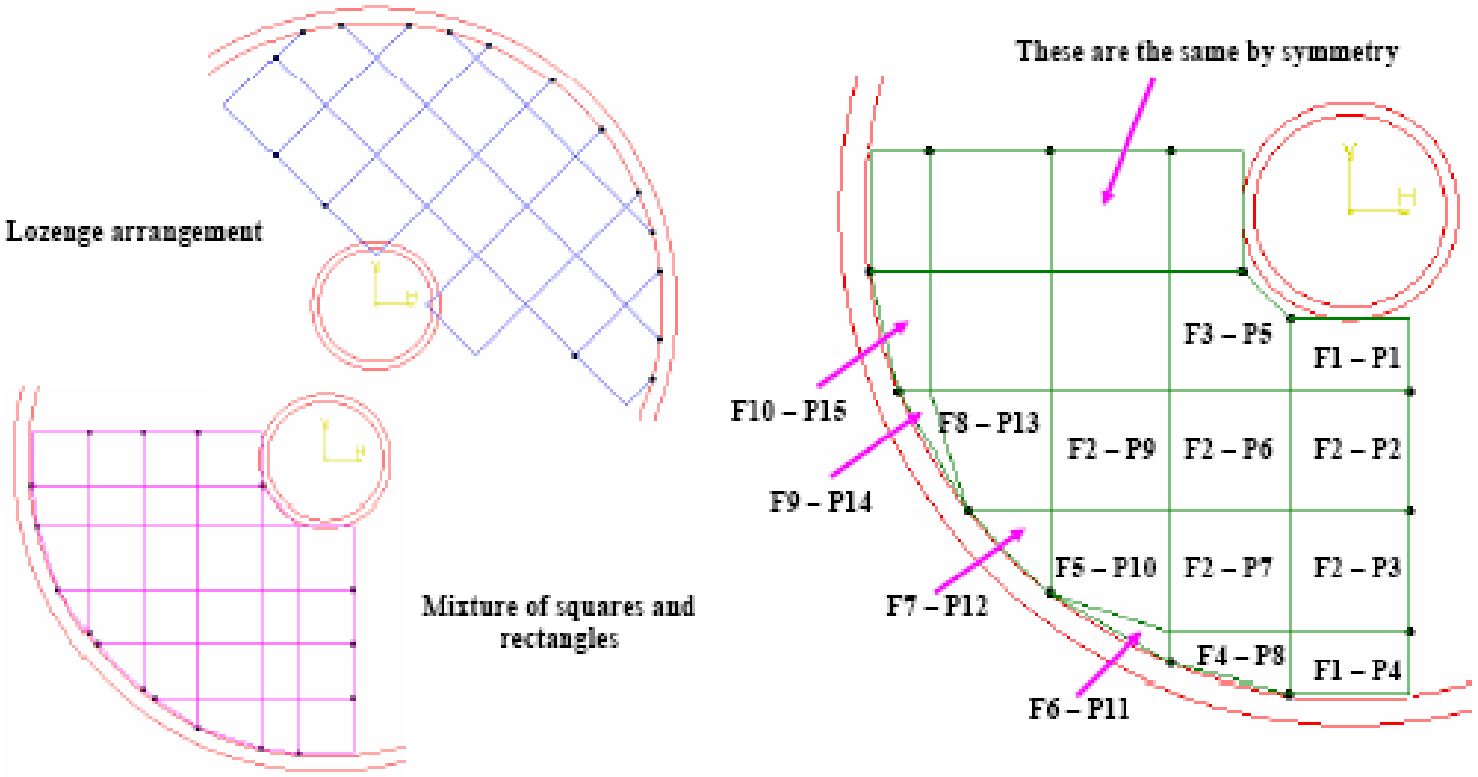

TPC
sector
MPGD
Readout electronics
End Plate

RS study - LDC DOD - together with

Joel Pouthas
Philippe Rosier
(IPN Orsay)

Arrangements of detectors on the active area of the end cap (1/2)
Squares, rectangles, lozenge of 300/350 mm or 400 mm size

Annotations: F is the type number of frames / P is for the PADS board



These arrangements need too much different sorts of frames and PADS boards, even if the right drawing is the simplest

Page 1
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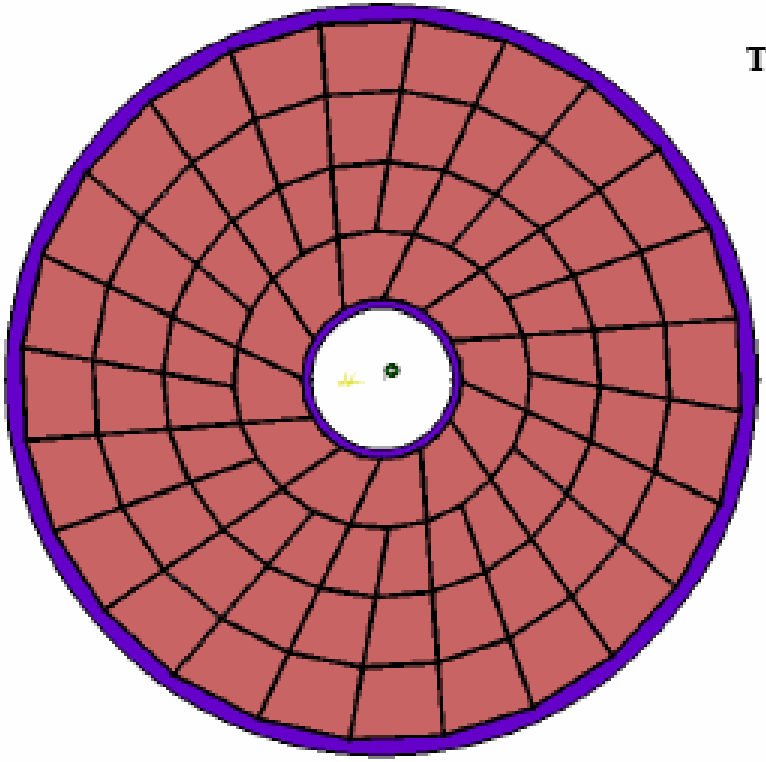
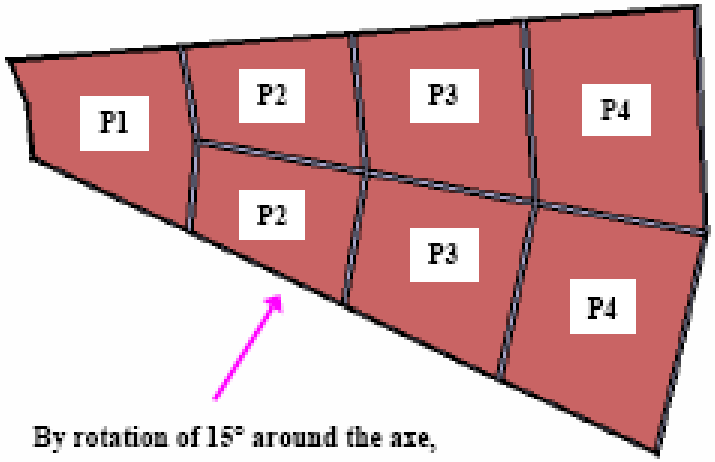
Arrangements of detectors on the active area of the end cap (2/2)
Trapezoidal shapes assembled in iris shape

Annotations: Px is the type number of PADS boards or frames

12 sectors (30° each) as super modules are defined

On each, 7 modules are fixed
The sizes of detectors are varying from 180 to 420 mm





By rotation of 15° around the axe, these frames are the same

These arrangement seems to be the best as only 4 different PADS are necessary

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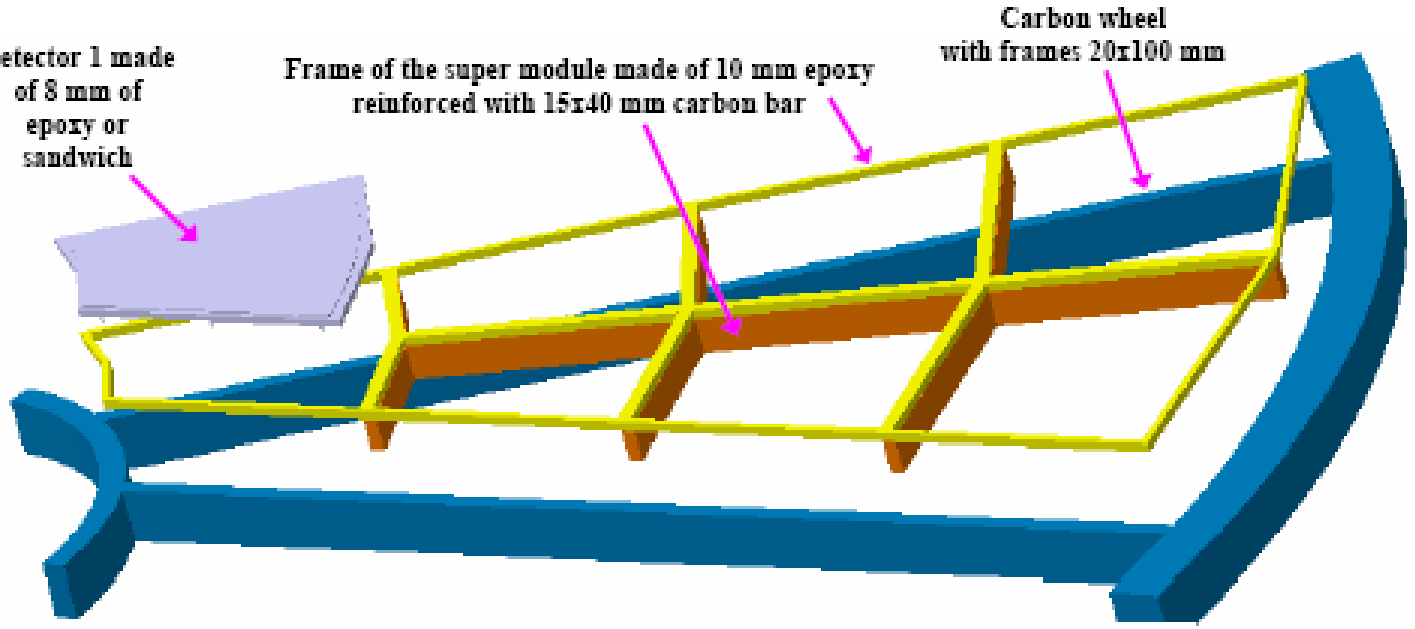
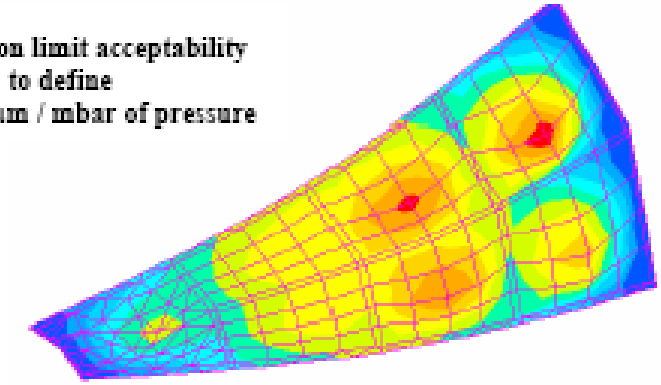
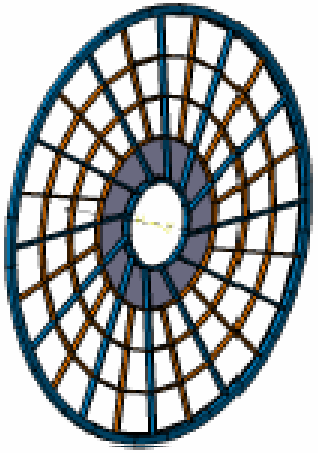
Principle for a Super Module equipped with detector 1

End cap – TPC - LC



Deformation limit acceptability to define
Here is 20 µm / mbar of pressure





Complete wheel with 12 super modules

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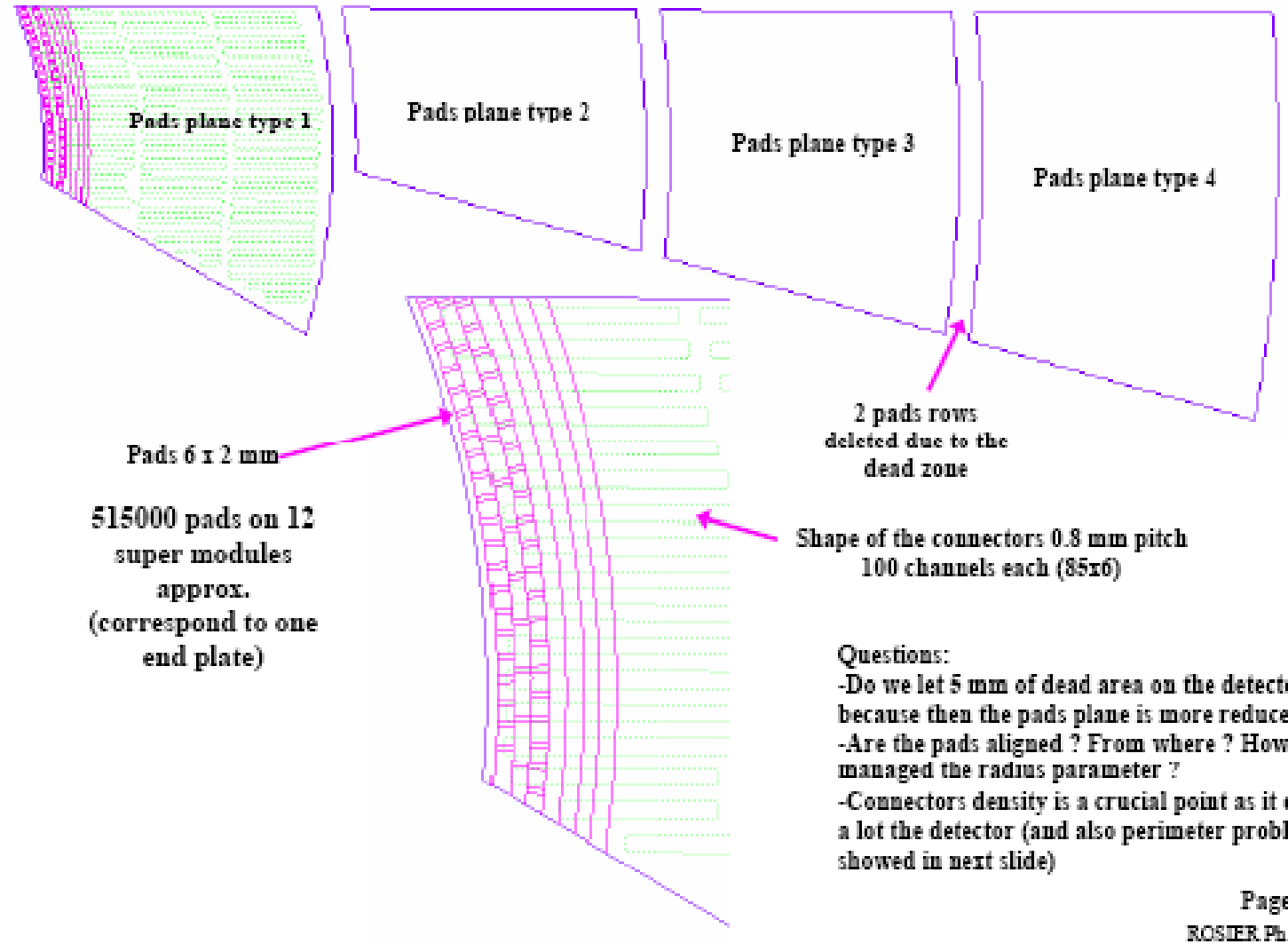
Principle for the 4 types of Pads plane

End cap – TPC - LC



Questions:
-Do we let 5 mm of dead area on the detector, because then the pads plane is more reduced ?
-Are the pads aligned ? From where ? How is managed the radius parameter ?
-Connectors density is a crucial point as it drills a lot the detector (and also perimeter problem showed in next slide)

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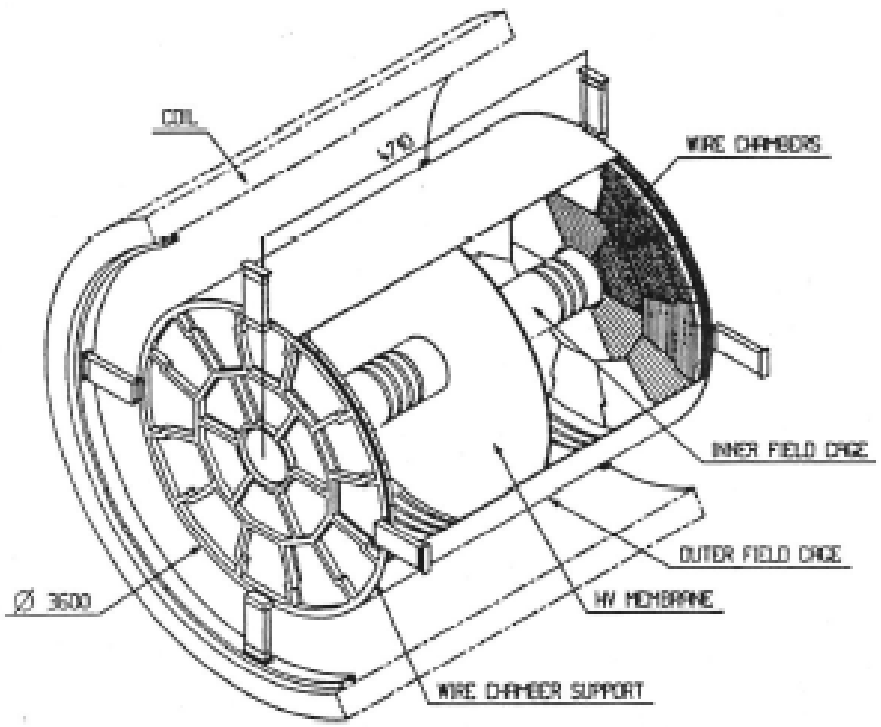
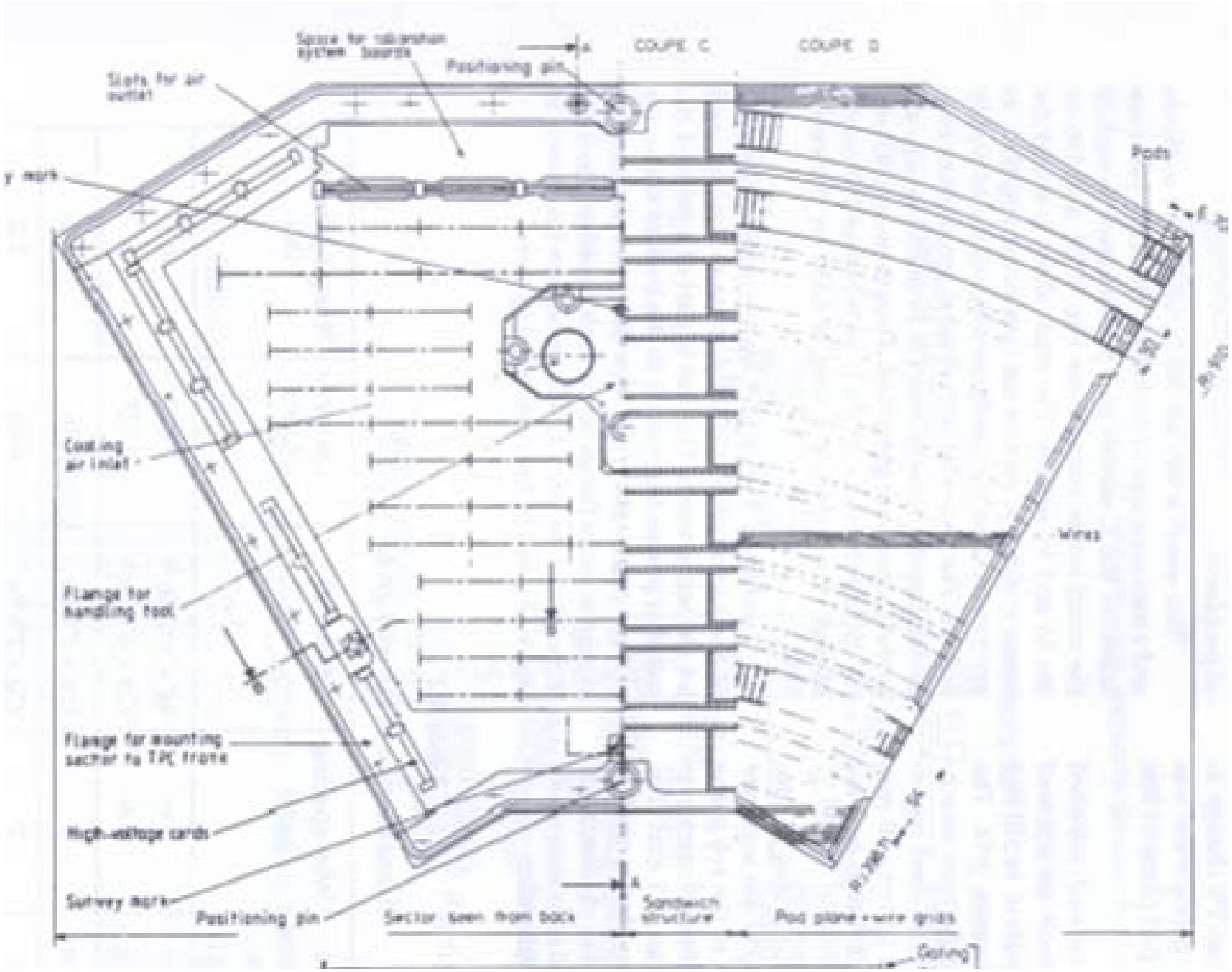
Aleph Endplate

TPC



- Length = 4.7 m
- Outer radius = 1.8 m
- Total weight = 3.6 t
- Drift length 2×2.2m
- Up to 21 space points / track
- 18 wire chambers / endplate
- 47340 channels in total
- B = 15 kG
- HV (Membrane) = −27.5 kV
- Gas
  - Volume $43\,m^3$
  - Argon/Methan (91:9) at atmospheric pressure
- Angular coverage
  - 2π in φ
  - 21 pad rows hit for $|\cos\Theta| \leq 0.8$
  - At least 3 pad rows for $|\cos\Theta| \leq 0.97$

- rφ from pad position
- z from drift time (pads + wires)
- dE/dx from wires and pads


COUPE C
COUPE D
Positioning pin
Pads
Cooling air inlet
Flange for handling tool
Flange for mounting sector to TPC frame
High-voltage cards
Survey mark
Positioning pin
Sector seen from back
Sandwich structure
Pad plane + wire grids
Cooling
Wires

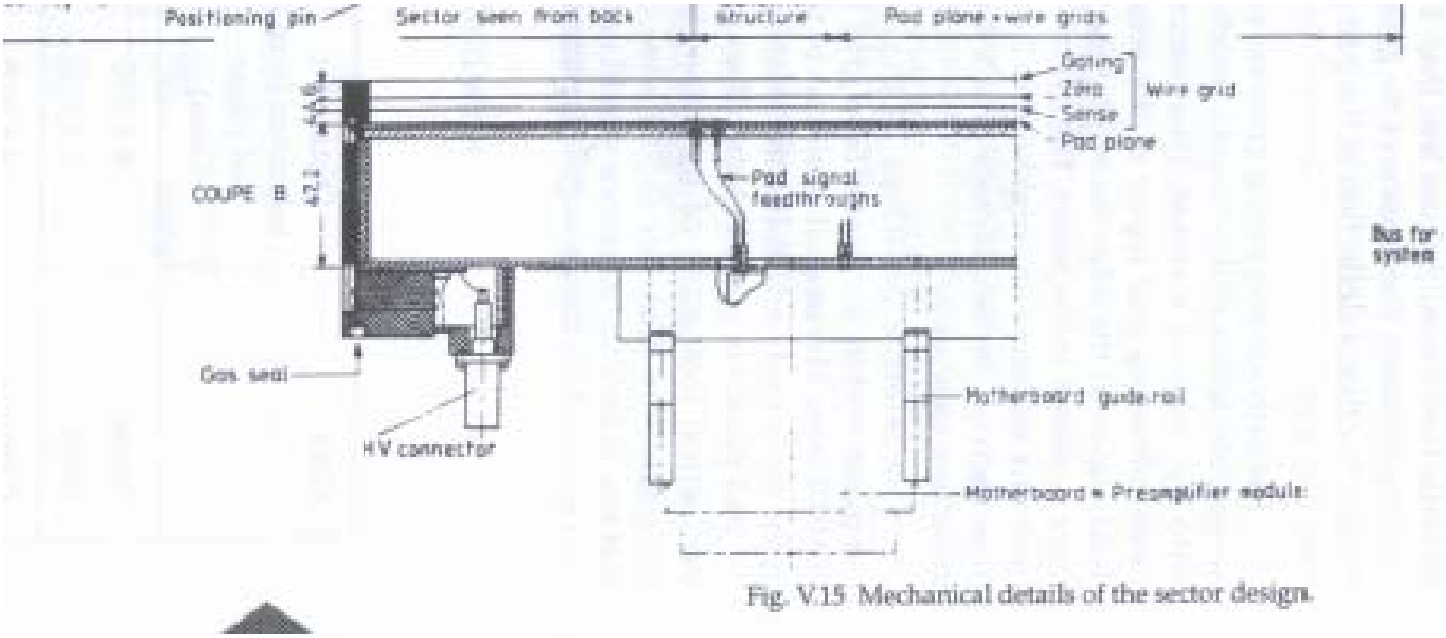
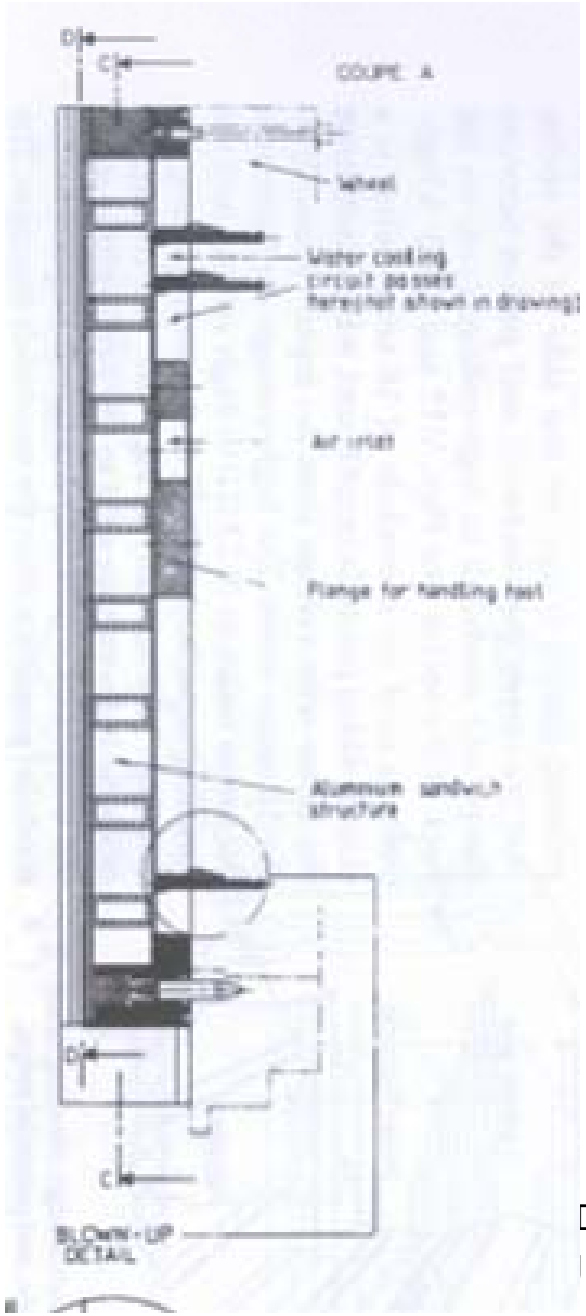


Fig. V.15 Mechanical details of the sector design.


COUPE A
Wheel
Water cooling
circuit passes
(here) (not shown in drawing)
Air inlet
Flange for handling tool
Aluminum sandwich
structure
BLOWN-UP
DETAIL

Some features

- Zigzag structure prevented loss of tracks > θ~22°
- Sectors mounted from inside using a "handling tool" to minimize the dead space between sectors. This straight-forward operation which was performed at least 30 times during the lifetime of Aleph.
- Alu sandwich structure stiff, lightweight to
  - contain 7mb overpressure
  - provide forced-air thermal insulation between electronics and TPC volume
- Water cooling of 1kW electronics/side in addition
  - 22K channels per side
- Combination water/air cooling blocked all heat to TPC
- Overall thickness ~ 25%Xo (average) w/o cables
- Bending of endplate
  - 20 micrometers due to 7mb overpressure
  - 5 micrometers due to wire tension

R&D Planning

- 1) Demonstration phase
  - Continue work with small prototypes on mapping out parameter space, understanding resolution, etc, to prove feasibility of an MPGD TPC. For CMOS/Si-based ideas this will include a basic proof-of-principle.
- 2) Consolidation phase
  - Build and operate the LP, large prototype, (Ø ≥ 75cm, drift ≥ 100cm), with EUDET infrastructure as pedestal, to test manufacturing techniques for MPGD endplates, fieldcage and electronics. Design is starting---building and testing will take another ~ 3 years.
- 3) Design phase
  - After phase 2, the decision as to which endplate technology to use for the LC TPC would be taken and final design started.