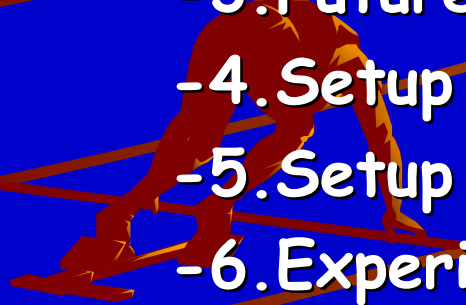
WP-conveners 2nd phone meeting

- Date 7 June 2006
- Time
  - 07:00 west coast
  - 10:00 east coast
  - 16:00 central Europe
  - 23:00 Japan
- Phone +494089981390 code 52872#

Agenda for 2nd phonemeeting

AGENDA

- 1. General information
- 2. Overall time schedule for the LP work
- 3. Future phonemeetings
- 4. Setup for email lists
- 5. Setup for the LCTPC/LP web page
- 6. Experience with the endplate for the Aleph TPC and comparison with ideas up to now
- 7. AOB



AGENDA

-1. General information

Latest version of PRC written report at
http://mppmu.mpg.de/~settles/tpcprc08052006r.pdf

This gives an overview of design issues and related R&D to be organized for the LP

My comments to the PRC closed session are at
http://mppmu.mpg.de/~settles/lctpcremarks.ppt

The PRC recommendations are expected to be released this week and will be circulated, with a proposal for next steps for the LCTPC/LP collaboration

Agenda

-2. Overall time schedule for the LP work

Upcoming milestones for the Eudet facility

PCMAG magnet available ----------12/2006
Prototype TPC altro preampboard avaiable-- 12/2006
Prototype TimePix available ---------- 12/2006
TPC fieldcage available ---------- 6/2007
1000 altro channels available ----------12/2007
SiTPC ready (Gem or Micromegas) ---------12/2008

Most urgent point for LP is to

- Design layout of endplate --- finalize 12/2006?

Then

- Manufacture/test endplates ----- by 12/2007?
- Figure out order of installation, R&D for 2008/9

AGENDA

-3.Future phonemeetings

Since the ideas are very diverse at the moment (see point 6. of the agenda), we need rather frequent 1-hour phonemeetings to work through the options.

Proposal:

Bi-weekly meetings: Tuesdays (or Mon.,Wed.?)
20/06,04/07,18/07(Vancouver)

At Vancouver, we can decide frequency of next meetings.

After Vancouver there are (in addition to phonemeetings):

-Paris, WP1 workshop? (between 4 and 15 September)

-Eudet annual meeting MPI-Munich (18-20 October)

-Valencia LC workshop (6-10 November)

AGENDA

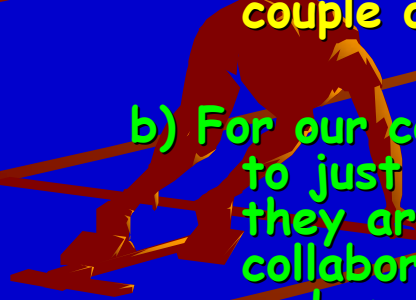
-4. Setup for email lists

a) For the latest list of groups: see next 5 slides.
Each WP can generate its mailing list from that list of groups and the Cornell wiki site:

https://wiki.lepp.cornell.edu/ilc/bin/view/Public/WWS/TrackLCTPCcollab

(Feedback from the groups not urgent and will take care of itself after a while; however we have to know by autumn)

N.B. This website has recently been redesigned (there are still a couple of problems).



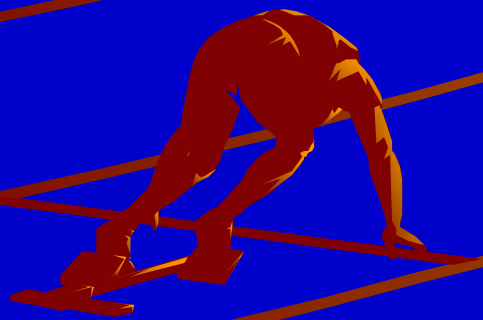
b) For our convener meetings it would be simplest (less administraion) to just announce them to the full LCTPC/LP mailing list, so that they are informed of the convener meetings; the whole collaboration should get the minutes also. This should simplify and open the discussion to include everyone. (Ties has generated a new LCTPC/LP maillist based on Cornell wiki.),

What do you think?

Work Packages for the LP/LCTPC

0) Workpackage: TPC R&D programme

A job for the whole LC TPC collaboration to define



Work Packages for the LP/LCTPC

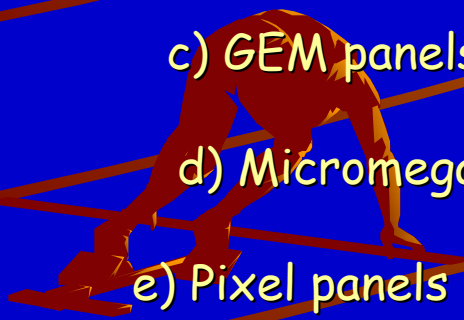
convener in white color

1) Workpackage MECHANICS

Ron Settles

Groups expressing interest to date

a) LP design (incl. endplate structure) Dan Peterson	Cornell, Desy, IPNOrsay, MPI, +contribution from Eudet
b) Fieldcage, laser, gas Ties Behnke	Aachen, Desy, St.Petersburg, +contribution from Eudet
c) GEM panels for endplate Akira Sugiyama	Aachen, Carleton, Cornell, Desy/HH, Karlsruhe, Kek/CDC, Novosibirsk, Victoria
d) Micromegas panels for endplate Paul Colas	Carleton, Cornell, Kek/CDC, Saclay/Orsay
e) Pixel panels for endplate Jan Timmermans	Cern,Freiburg,Nikhef,Saclay,Kek/CDC, +contribution from Eudet
f) Resistive foil for endplate Madhu Dixit	Carleton, Kek/CDC, Saclay/Orsay



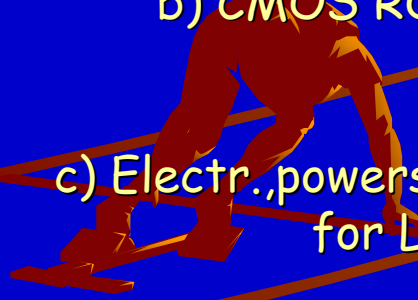
Work Packages for the LP/LCTPC

2) Workpackage ELECTRONICS

Leif Jonnson

Groups expressing interest to date(others?)

a)"Standard" RO/DAQ for LP: Leif Jonnson + ?	Aachen, Desy/HH, Cern, Lund, Rostock, Montreal, Tsinghua, +contribution from Eudet
b) CMOS RO electronics: Harry van der Graaf	Freiburg, Cern, Nikhef, Saclay, +contribution from Eudet
c) Electr.,powerswitching,cooling for LC TPC: Luciano Musa	Aachen, Desy/HH, Cern, Lund, Rostock, Montreal, St.Petersburg, Tsinghua, +contribution from Eudet



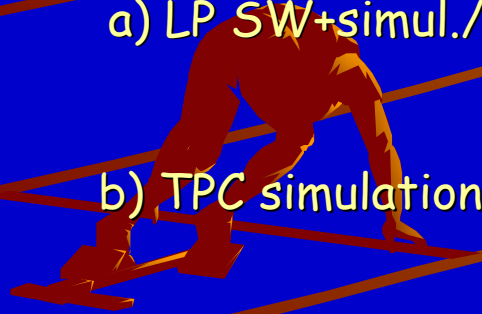
Work Packages for the LP/LCTPC

3) Workpackage SOFTWARE

Peter Wienemann

Groups expressing interest to date(others?)

a) LP SW+simul./reconstr.framework: Peter Wienemann — Bucharest,Desy/HH,Cern,Freiburg, Carleton,Victoria, +contrib. Eudet



b) TPC simulation, backgrounds Stefan Roth — Aachen, Carleton, Cornell, Desy/HH, Kek/CDC, St.Petersburg,Victoria

c) Full detector simulation — Desy/HH, Kek/CDC, LBNL

Keisuke Fujii

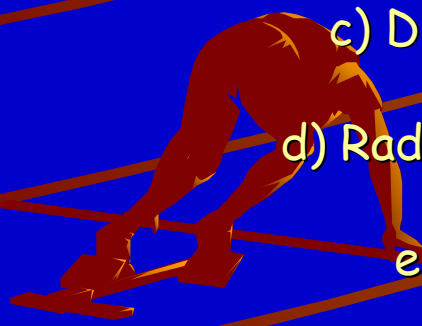
Work Packages for the LP/LCTPC

4) Workpackage CALIBRATION

Dean Karlen

Groups expressing interest to date(others?)

a) Fieldmap Lucie Linssen	Cern, +contribution from Eudet
b) Alignment Takeshi Matsuda	Kek/XCDC
c) Distortion correction Dean Karlen	Victoria
d) Rad.hardness of material Anatoliy Krivchitch	St.Petersburg
e) Gas/HV/Infrastructure Desy Postdoc	Desy, Victoria, +contribution from Eudet



AGENDA

-5.Setup for the LCTPC/LP web page

To start with this will be at

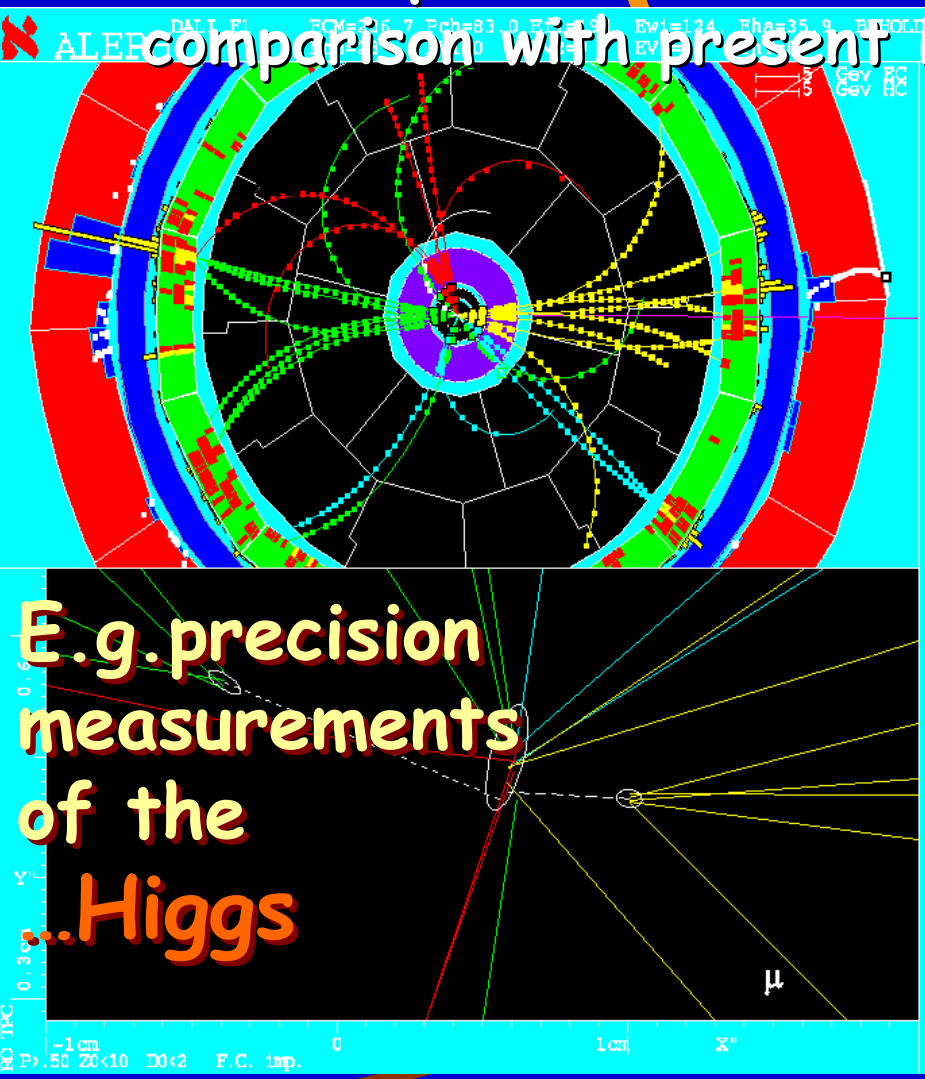
http://mppmu.mpg.de/~settles/tpc/lp

and I hope to get a version up and running within next few days.

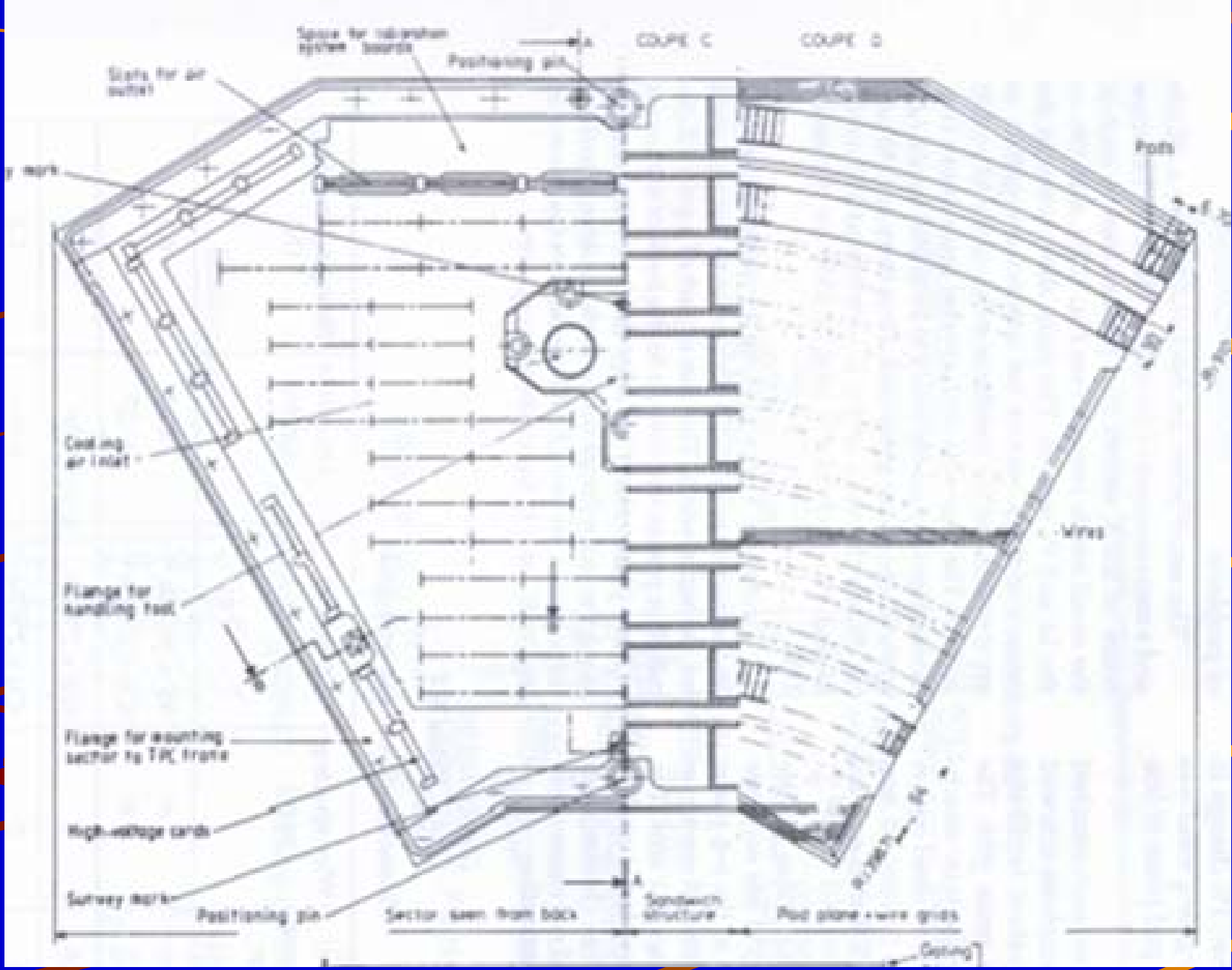
Where should the final website go? Desy? Cornell? Other?

AGENDA

-6.Experience with the endplate for the Aleph TPC and comparison with present ideas



	Expt	(GeV)	Decay Channel	(GeV/c^2)	ln(1+s/b) 115 GeV/c^2
1	ALEPH	206.7	4-jet	114.3	1.73
2	ALEPH	206.7	4-jet	112.9	1.21
3	ALEPH	206.5	4-jet	110.0	0.64
4	L3	206.4	E-miss	115.0	0.53
5	OPAL	206.6	4-jet	110.7	0.53
6	Delphi	206.7	4-jet	114.3	0.49
7	ALEPH	205.0	Lept	118.1	0.47
8	ALEPH	208.1	Tau	115.4	0.41
9	ALEPH	206.5	4-jet	114.5	0.40
10	OPAL	205.4	4-jet	112.6	0.40


COUPE C
COUPE D
Positioning pin
Posts
Cooling air inlet
Wires
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

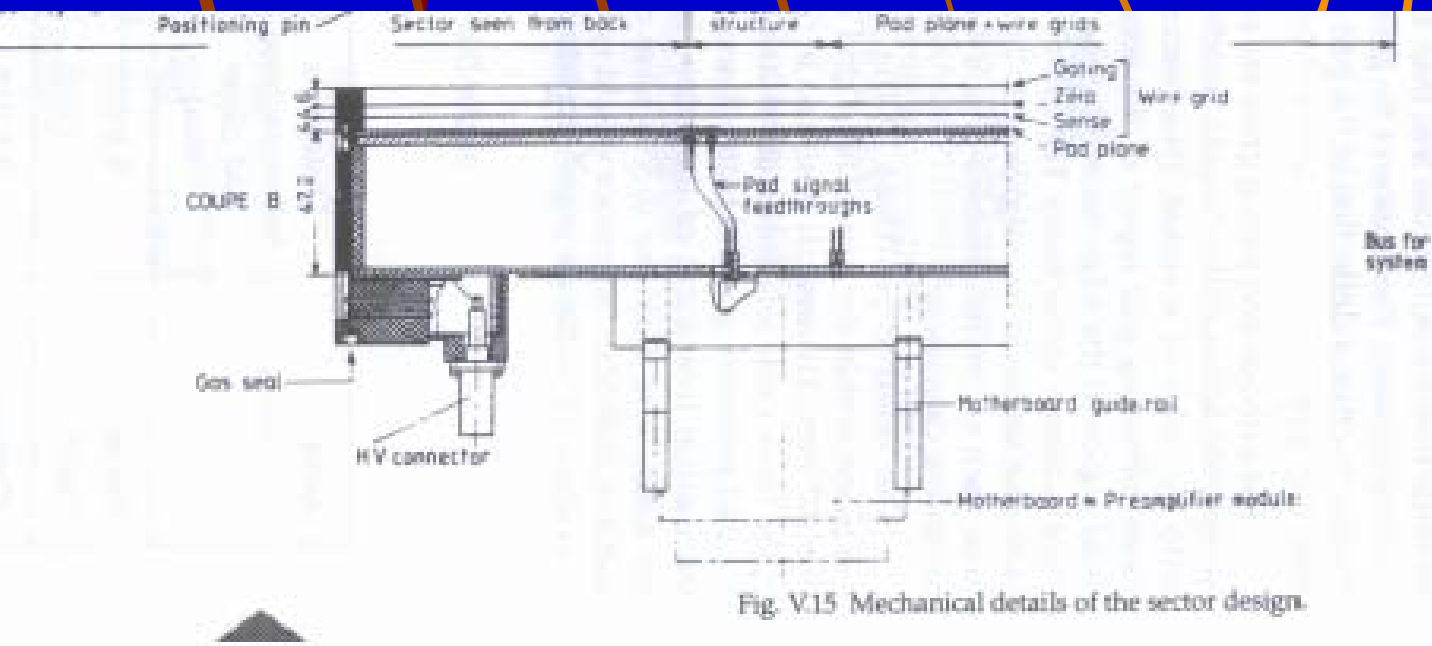
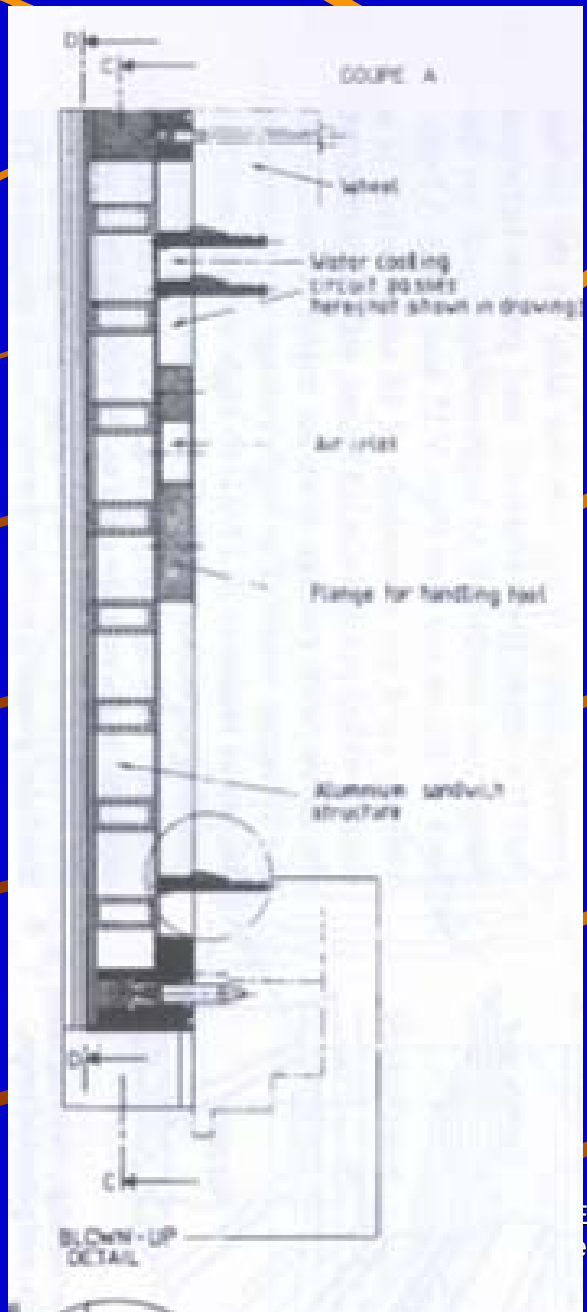


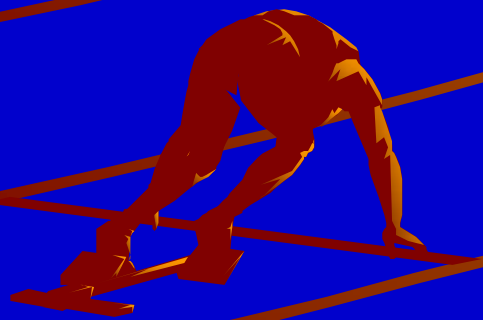
Fig. V.15 Mechanical details of the sector design.

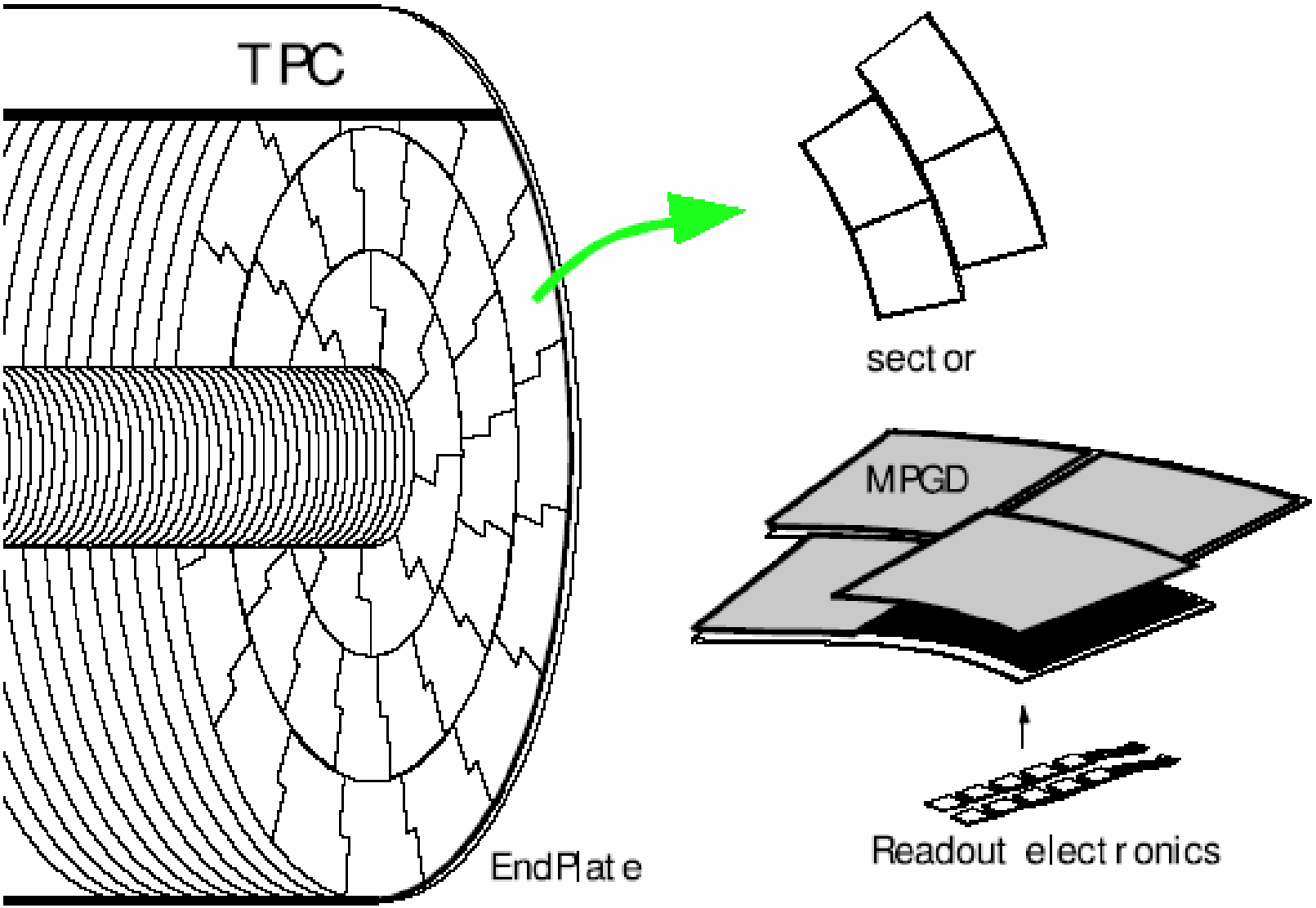

COUPE A
wheel
Water cooling
Air inlet
Flange for handling tool
Aluminum sandwich
structure
BLOWN - UP
DETAIL

Some features

- Zigzag structure prevented loss of tracks > θ~22°
- 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

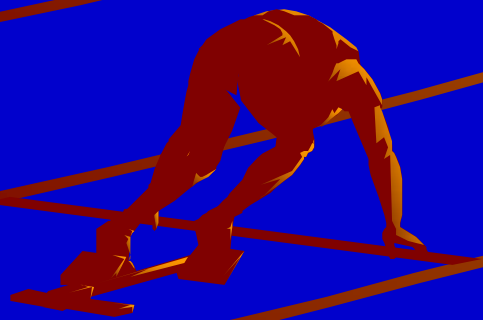
Akira Sugiyama – GLD DOD




TPC
sector
MPGD
Readout electronics
EndPlate

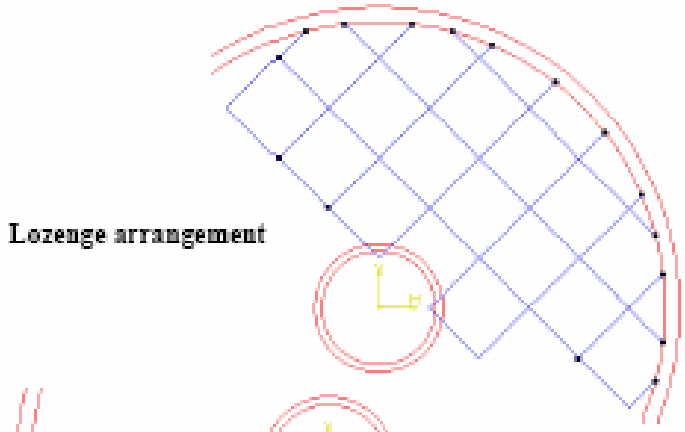
RS study - LDC DOD - together with

Joel Pouthas
Philippe Rosier
(IPN Orsay)

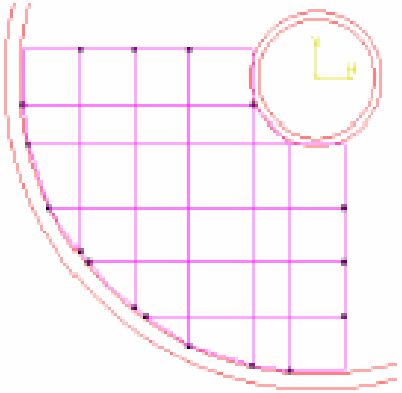


Arrangements of detectors on the active area of the end cap (1/2)
Squares, rectangles, lozenge of 300/350 mm or 400 mm size

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

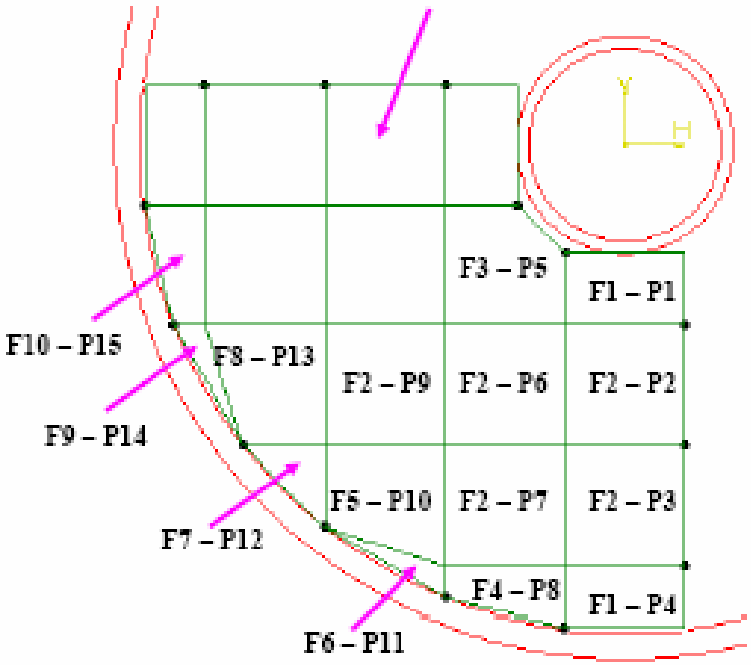


Lozenge arrangement



Mixture of squares and rectangles

These are the same by symmetry



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

Page 1

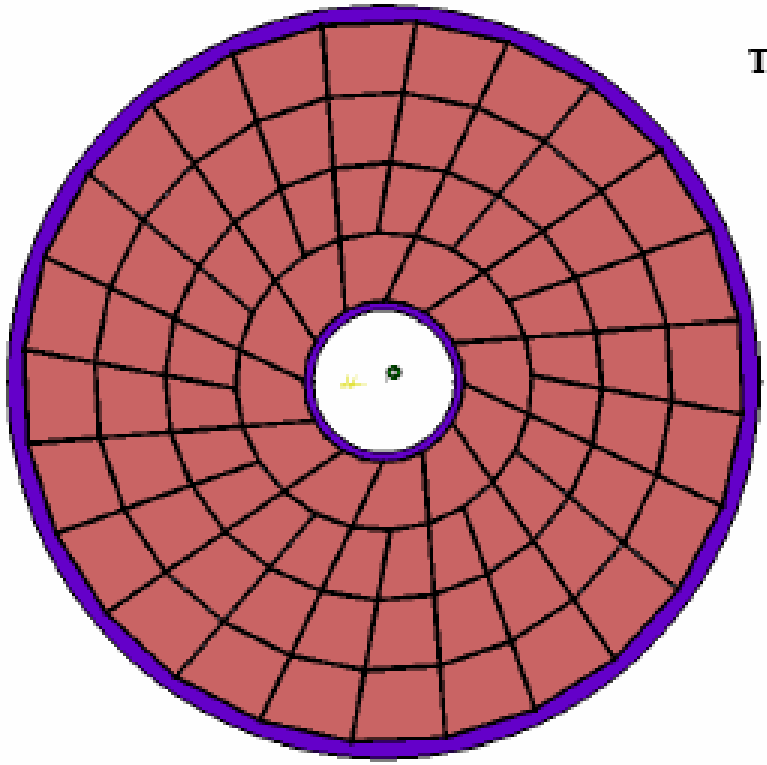
ROSIER Ph. 26-11-03

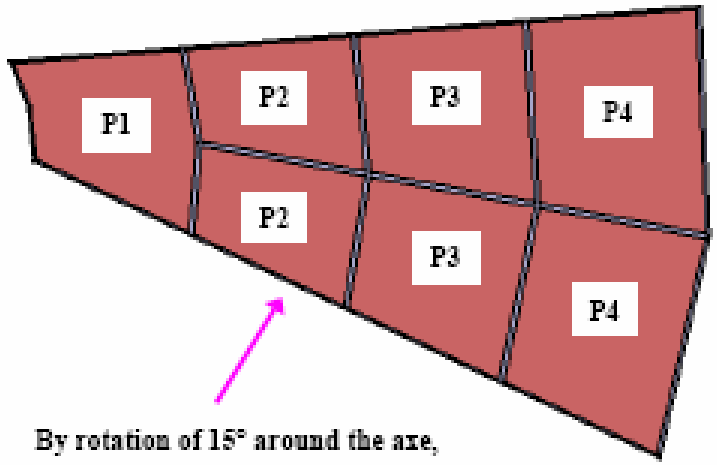
Arrangements of detectors on the active area of the end cap (2/2)
Trapezoidal shapes assembled in iris shape

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



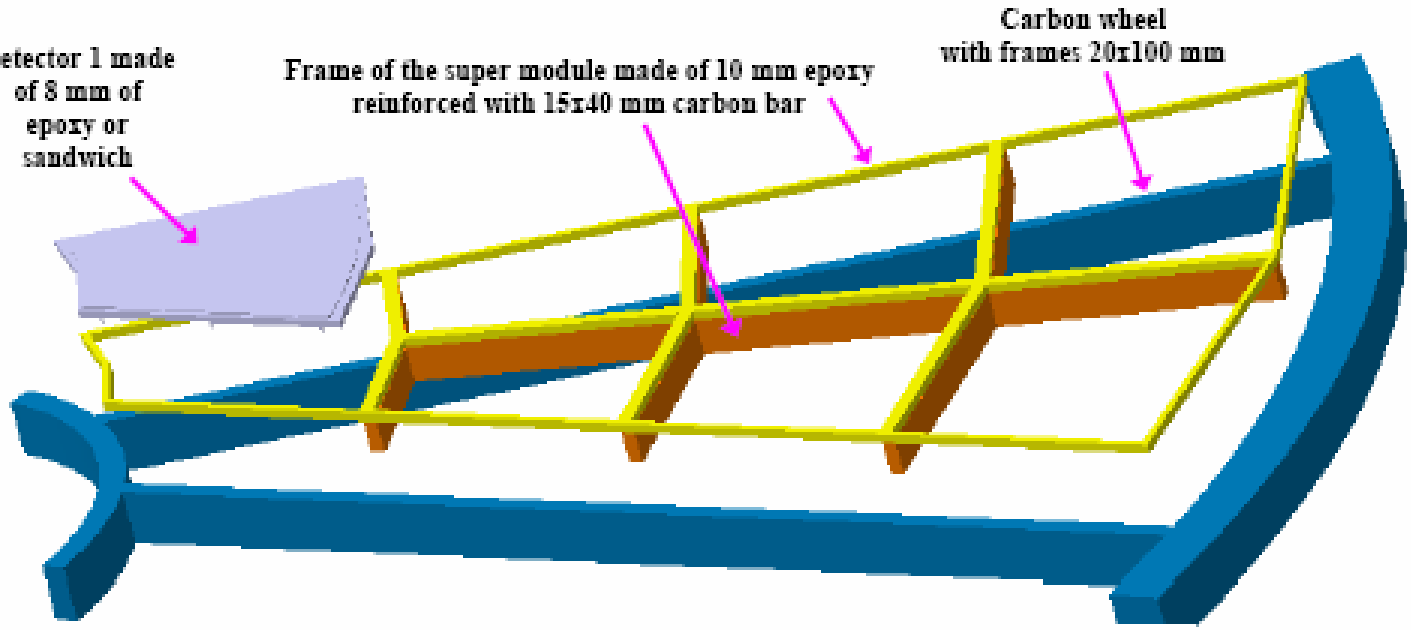


By rotation of 15° around the axe,
these frames are the same

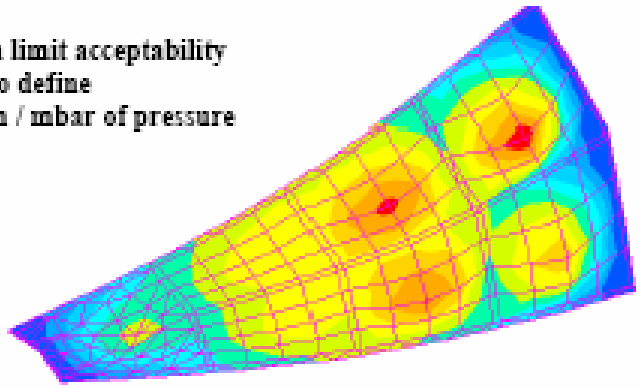
These arrangement seems to be the best as only 4
different PADS are necessary

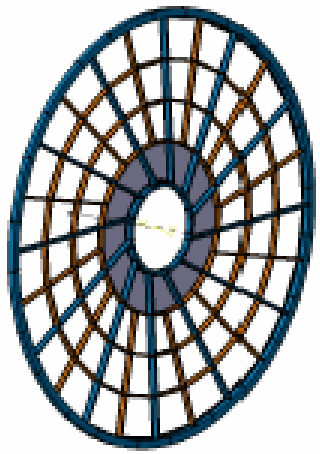
Page 2
ROSIER Ph. 26-11-03

Principle for a Super Module equipped with detector 1



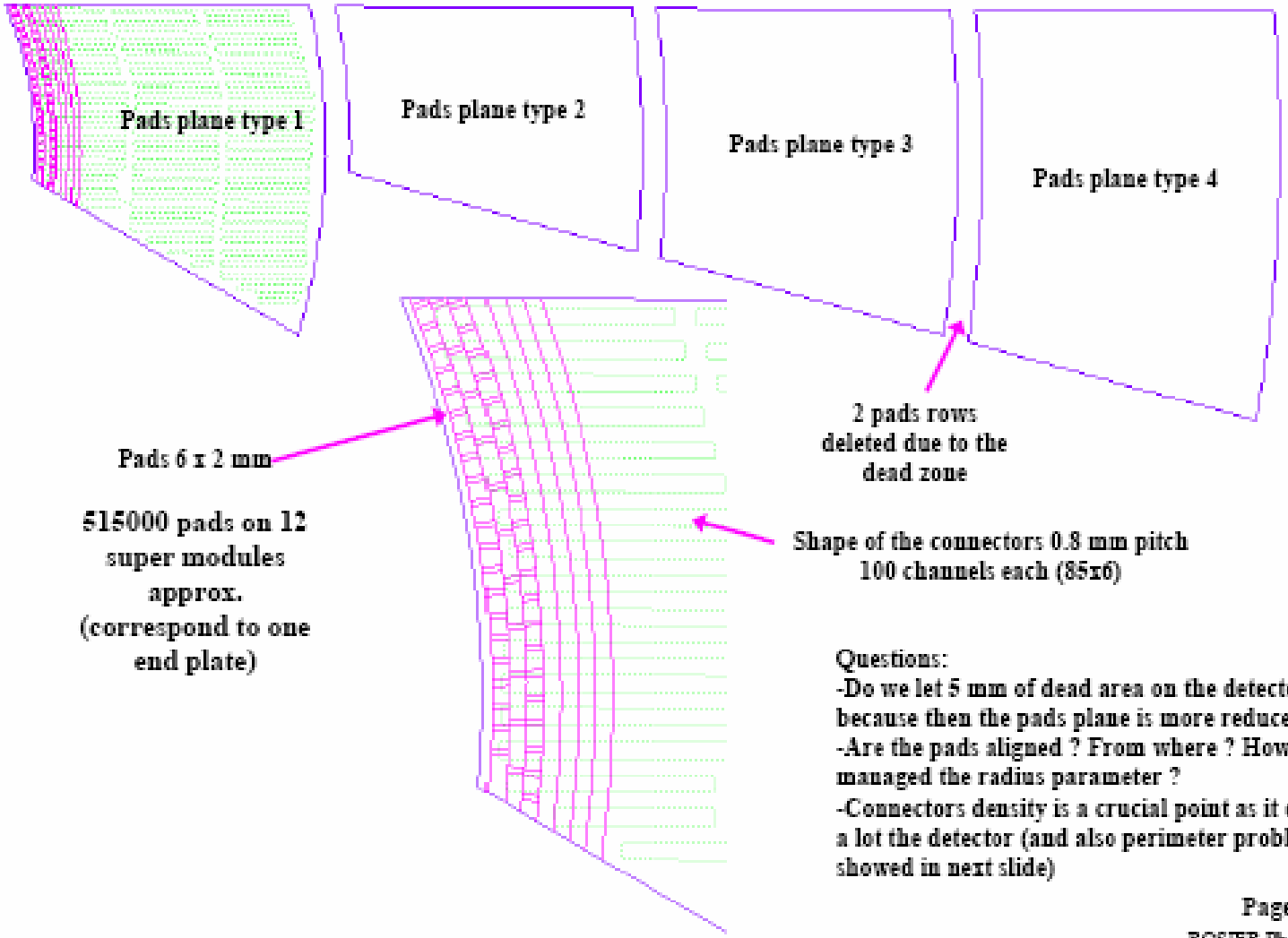
Deformation limit acceptability to define
Here is 20 µm / mbar of pressure





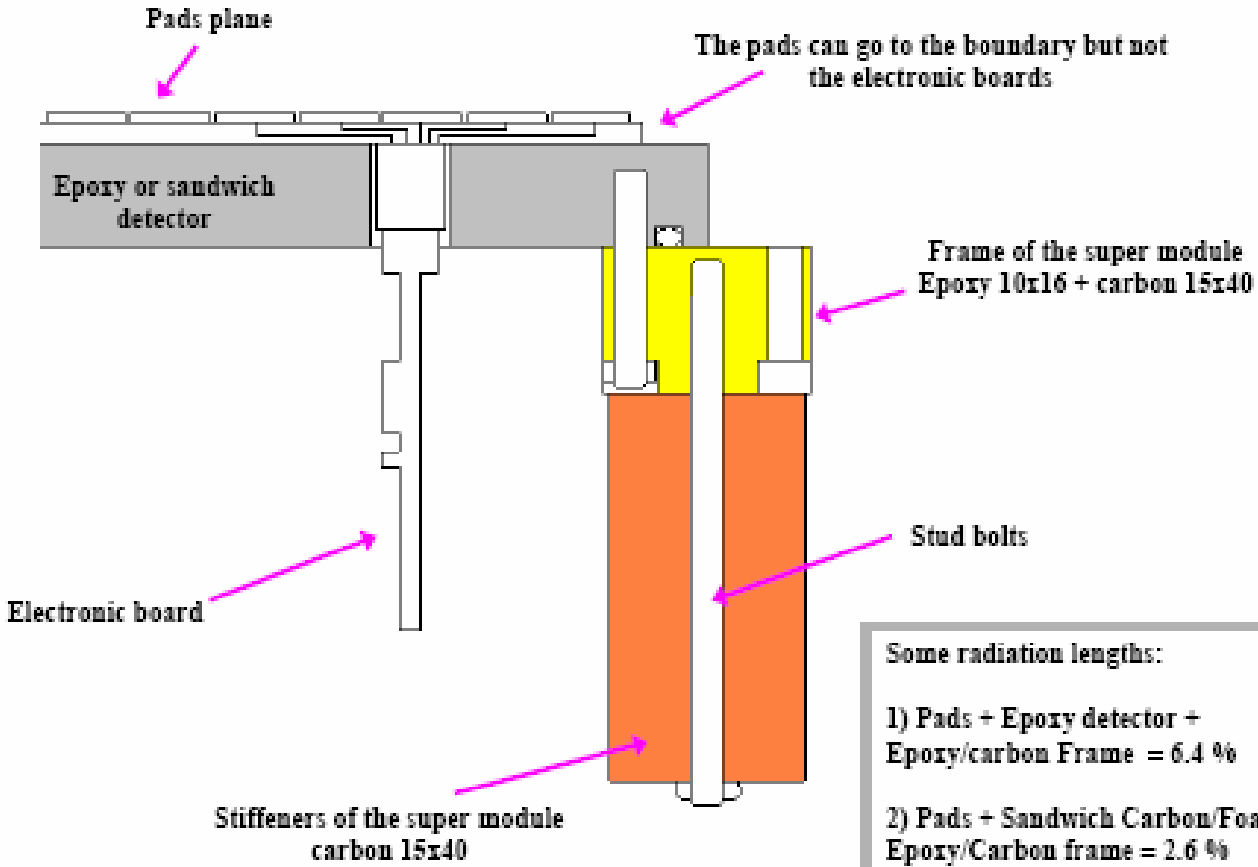
Complete wheel with 12 super modules

Principle for the 4 types of Pads plane



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)

Principle of the boundaries (electronics on the pads plane)
Fixing and sealing of the detectors



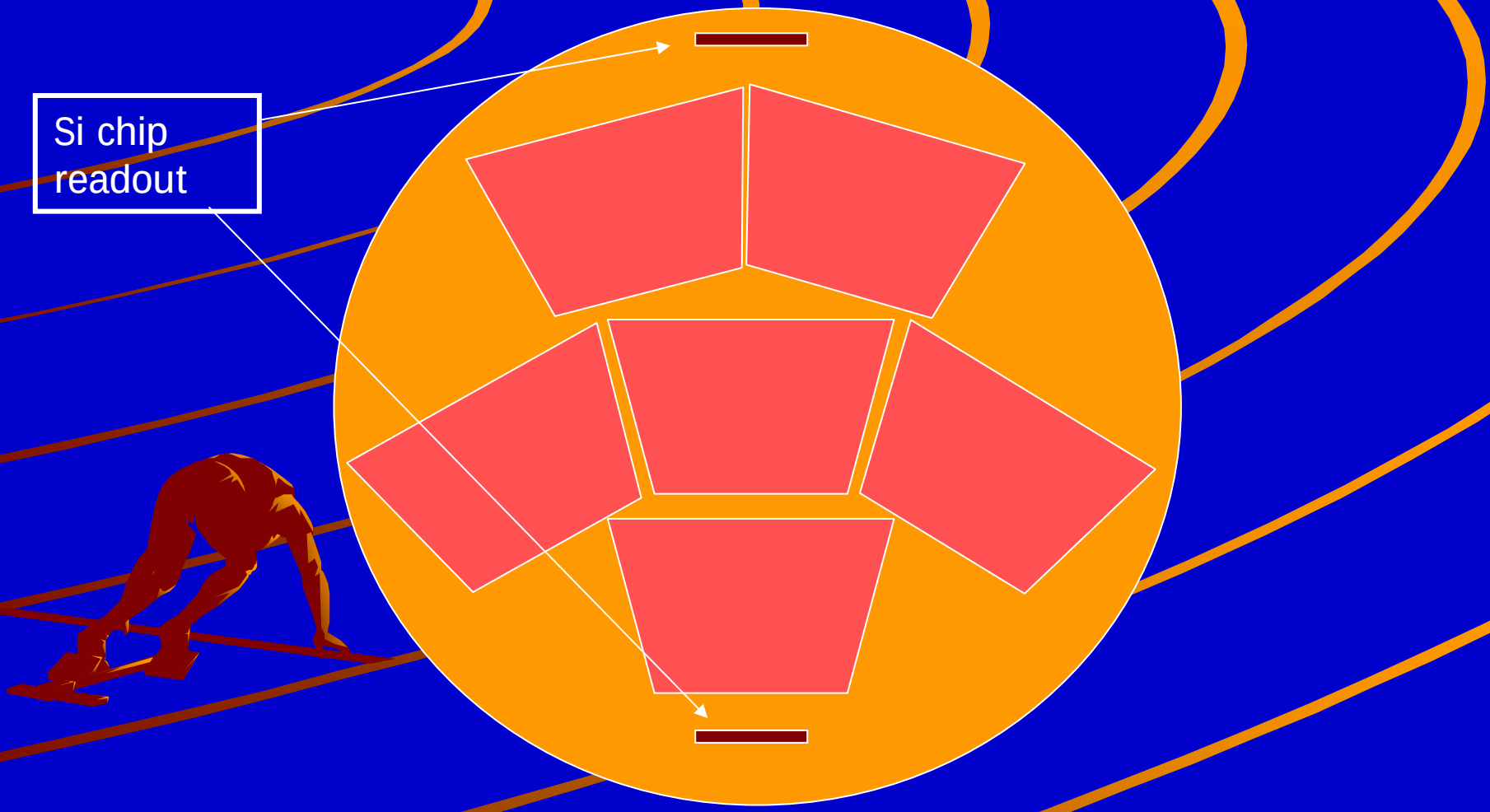
Some radiation lengths:

1) Pads + Epoxy detector + Epoxy/carbon Frame = 6.4 %

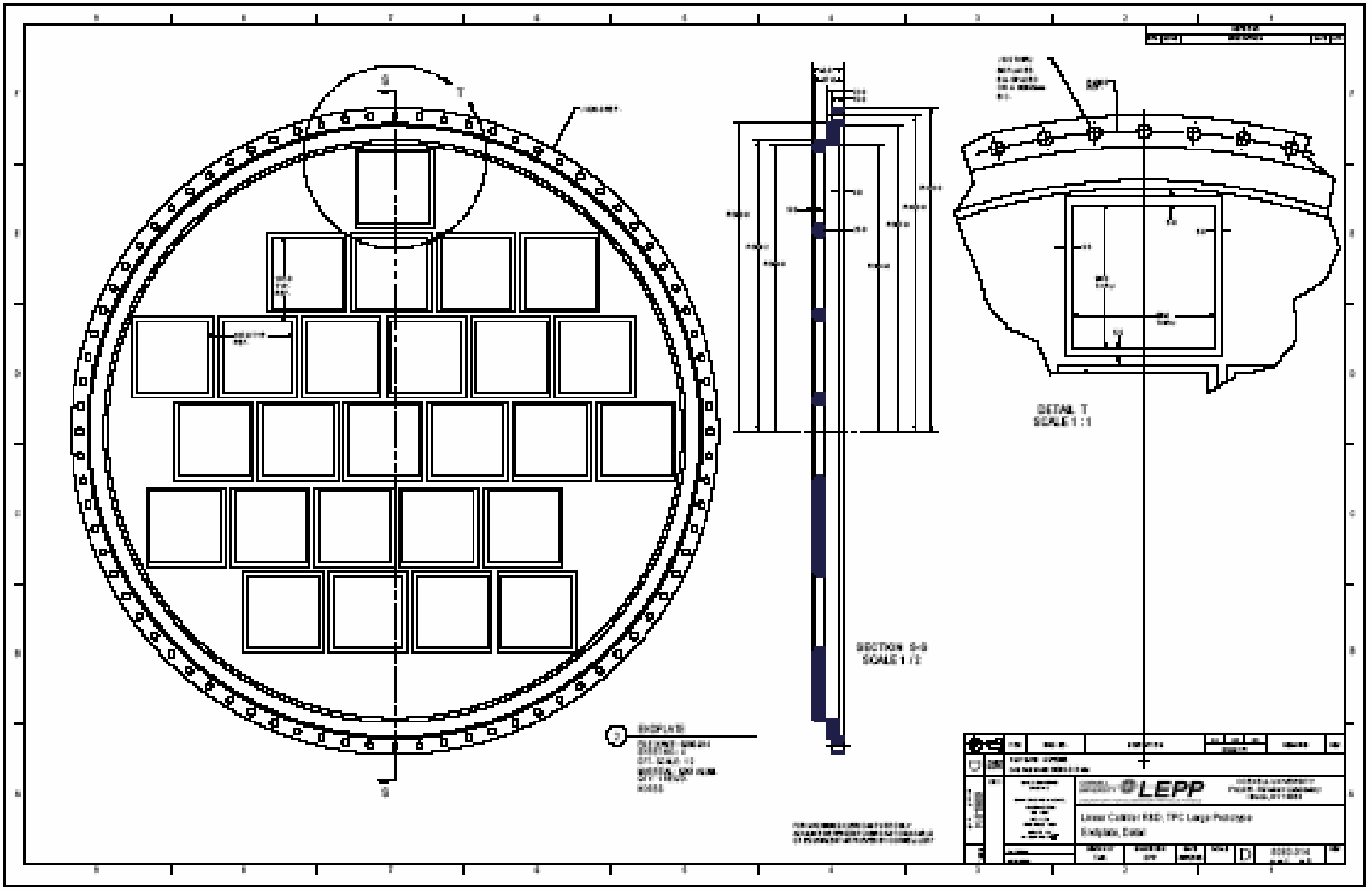
2) Pads + Sandwich Carbon/Foam 9 mm + Epoxy/Carbon frame = 2.6 %

(Without electronics)

Paul Colas - 9 May

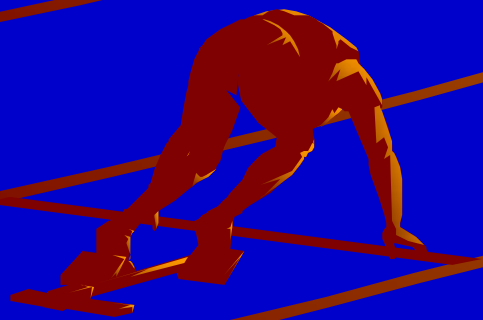


Dan Peterson - 9 May

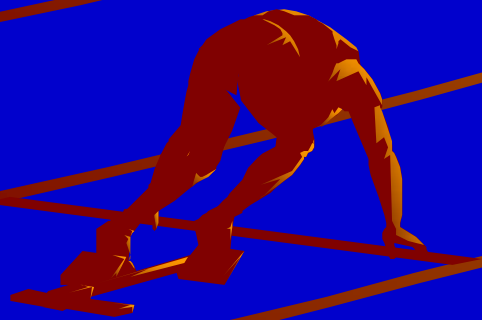


AGENDA

-7. AOB



Back up slides, for reference



TPC R&D Groups (7 June 06)

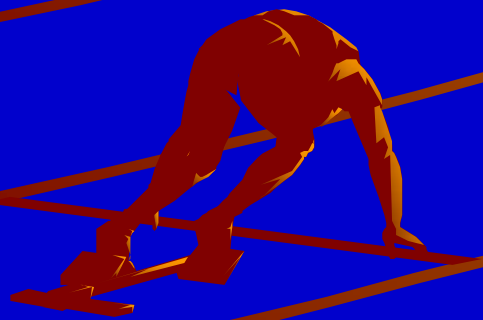
Europe	America	Asia	Other
RWTH Aachen	Carleton U	Tsinghua U	MIT (LCRD)
Bucharest	U Cornell	CDC:	Temple/Wayne State (UCLC)
CERN	Purdue U	Hiroshima U	
DESY	Indiana U	Minadamo SU-IIT	
U Hamburg	LBNL	Kinki U	
U Freiburg	MIT	U Osaka	
U Karlsruhe	U Montreal	Saga U	
UMM Krakow	U Victoria	Tokyo UAT	
Lund	Yale	U Tokyo	
MPI-Munich		Kogakuin U Tokyo	
NIKHEF		KEK Tsukuba	
BINP Novosibirsk		U Tsukuba	
LAL Orsay			
IPN Orsay			
U Rostock			
CEA Saclay			
PNPI StPetersburg			
U Siegen			

…Other groups interested?

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.

Phase 1 – continue (in parallel to LP) for next ~ 2 years



Phase 2

- Basic Idea: LP should be a prototype for the LC TPC design and test as many of the issues as possible as was done before, e.g., TPC90 @ Aleph
- The Eudet infrastructure gives us a starting basis for the LP work
- There other LC TPC R&D issues in addition to building LP which will be planned in conjunction with it