

Status Report of the LCC Detector R&D task force

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Charge

The detector R&D liaison ensures productive communication between the LCC Physics and Detectors Executive Board and detector R&D groups. The liaison is a member of the Executive Board and communicates relevant information from the Executive Board to detector R&D groups and vice versa.

The liaison is in contact with all detector R&D groups relevant to linear colliders to keep track of the overall detector R&D efforts conducted or planned for linear colliders and to periodically compile summaries of the efforts.

The ILC Detectors

Purpose:

- Precision measurements of Higgs properties
- Discovery potential for (and precision measurements of) new phenomena

Requirements:

- Precision instruments that are optimized for the ILC beam structure
- Choice of PFA paradigm requires an integrated concept. All parts play together to achieve the best performance.

Fields of detector R&D

In spite of tight budgets, Linear Collider R&D is still an active field.

Marcel Demarteau showed many beautiful results this morning.

The Plan

Get an overview over the linear collider detector R&D efforts.

Purpose:

- Publicise the technology. Make areas of overlap obvious without pointing them out.
- Provide a showcase for the technology, not individual institutes. Manpower and effort is explicitly not mentioned in the report.
- Provide an entry point for new groups.

Technical Details

Contributions come in many formats:

- LaTeX, Word, PDF, emailed text, ...
- With varying quality of references

Report is being written in LaTeX.

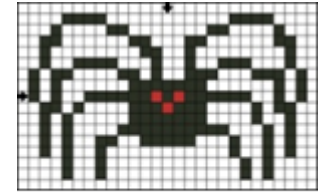
Currently 60+ pages + 7 pages references.

Goal was <70 pages. We might get there.

All references are verified and hyperlinked.

RPC DHCAL

Scintillator ECAL



Collaborations

FCAL

CLICPix

SPiDeR

DEPFET

LCTPC

ChronoPixel

SDHCAL

SOI

TPAC

GEM DHCAL



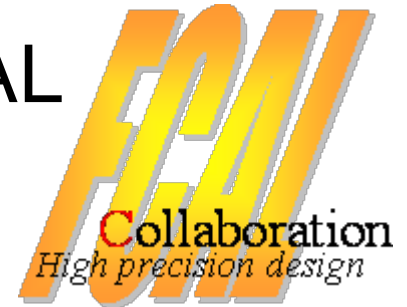
Calice

Silicon ECAL
(SiD)

VIP

Silicon ECAL
(ILD)

CMOS MAPS



KPIX

FPCCD

Scintillator
HCAL

RPC Muon

Dual Readout

Feedback

> 30 individuals contacted

→ overlap in technologies, ensure maximum coverage of all technologies

covering 20 Technologies

Responses ranged from

pointers to 100+ page documents, over inline text and bullet points to 18+ dedicated pages.

Five Questions

1. Introduction

Brief overview over the technology

2. Recent Milestones (Since DBD / CDR)

To avoid receiving historical data and get an idea of the activity of the group

3. Engineering challenges

for putting the technology into a real-world LC detector

4. Future Plans

5. Applications Outside of LC

Overview over the responses

List of responses was rather variable. From text inline with an email to 17 page document

Some chapters are not in good shape.

We need some additional help if we are to meet our goal of ~70 pages. If your chapter is not shown in green, please talk to us.



All is good. Response received within time and expected scope






More work needed. Supplemental material requested or additional editing needed.





Contribution has not been received within time or with the requested scope.





HCal Technologies

Technology	Comments	Response acceptable
SDHCal	needs update	yes, follow-up questions
Scintillator HCAL	OK	
RPC DHCAL	OK	
GEM DHCAL	Issues being addressed	
Dual Readout	OK	





ECAL Technologies

Technology	Response received	Response acceptable
Scintillator ECAL	Being improved	
Si-W ECAL (ILD)	OK	
Si-W ECAL (SiD)	Partly missing	
TPAC MAPS	From CALICE report	(no active contact)
FCAL	Needs editing	

Tracking Technologies

Technology	Comment	Status acceptable
TPC	Needs major editing	
KPIX	OK	
SCIPP	Editing needed	

Vertex Pixel Technologies

Technology	Comment	Status acceptable
DEPFET	Waiting for update	
CMOS MAPS	Partly missing	
FPCCD	OK	
SOI	OK	
VIP	OK	
CLICPix	Bullet points only	
ChronoPixel	OK	

Current Status

Contents

	1.6.1	Introduction	16	3.4.1	Test Beams in 2010	36
	1.6.2	Recent Milestones	16	3.4.2	Pixel efficiency results	37
	1.6.3	Engineering Challenges	17	3.4.3	Future plans	38
	1.6.4	Future Plans	18	3.5	Resistive Plate Chamber	38
	1.6.5	Applications outside of Linear Colliders	18	3.5.1	Description of the DHCAL	38
	1.7	CLICPix	19	3.5.2	Current R&D activities	39
	1.7.1	Introduction	19	3.5.3	Engineering challenges	40
	1.7.2	Recent Milestones	19	3.5.4	Plans for the coming years	40
	1.7.3	Engineering Challenges	19	3.5.5	Applications Outside of the ILC	40
	2	Tracking Detectors	20	3.6	Geant4	41
	2.1	SCIPP Tracking R&D	20	3.6.1	Introduction	41
	2.1.1	Introduction	20	3.6.2	Recent Milestones	42
	2.1.2	Recent Milestones	20	3.6.3	Engineering Challenges	42
	2.1.3	Engineering Challenges	20	3.6.4	Future Plans	42
	2.1.4	Future Plans	20	3.6.5	Applications Outside of Linear Colliders	42
	2.1.5	Applications outside of Linear Colliders	20	3.7	FCAL	42
	2.2	KPIX	21	3.7.1	Introduction	42
	2.2.1	Introduction	21	3.7.2	Mechanical Concept	43
	2.2.2	Recent Milestones	23	3.7.3	Recent Milestones	43
	2.2.3	Engineering Challenges	23	3.7.4	Engineering Challenges	43
	2.2.4	Future Plans	24	3.7.5	Future Plans	43
	2.2.5	Applications Outside of Linear Colliders	24	3.7.6	Test-beam Results	44
	2.3	Time Projection Chamber – Beam	24	3.7.7	Radiation Damage Studies	44
	2.3.1	Introduction	25	3.7.8	Technological Prototype	46
	2.3.2	Recent Milestones	25	3.7.9	Applications Outside of Linear Colliders	48
	2.3.3	Engineering Challenges	26	3.8	Analog HCAL	48
	2.3.4	Future Plans	26	3.8.1	Introduction	49
	2.3.5	Applications Outside of Linear Colliders	27	3.8.2	Recent Milestones	49
		Calorimeter R&D	28	3.8.3	Past and present R&D: technology	50
	3.1	Scintillator Strips	28	3.8.4	Summary	53
	3.1.1	Introduction	28	3.8.5	Engineering Challenges	54
	3.1.2	Recent Milestones	28	3.8.6	Future Plans	54
	3.1.3	Engineering Challenges	28	3.9	SDHCAL	54
	3.1.4	Future Plans	28	3.9.1	Introduction	55
	3.1.5	Applications Outside of Linear Colliders	29	3.9.2	Hadron calorimeter design	55
	3.2	Silicon-Tungsten ECAL in ILD	29	3.9.3	Recent Milestones	55
	3.2.1	Introduction	29	3.9.4	Engineering Challenges	58
	3.2.2	Recent Milestones	29	3.9.5	Detector R&D plans for the coming years	58
	3.2.3	Plans of the near future	31	3.9.6	Applications Outside of Linear Colliders	59
	3.2.4	Engineering Challenges	31	3.10	DualReadout	59
	3.2.5	Applications Outside of Linear Colliders	32	3.10.1	Introduction	59
	3.3	Silicon Tungsten SiD ECAL	32	3.10.2	Recent Milestones	59
	3.3.1	Introduction	32	3.10.3	Engineering Challenges	61
	3.4	DECAL	36	3.10.4	Future Plans	61
				3.10.5	Applications Outside of Linear Colliders	61
				3.10.6	References	61
1	Vertex Detector R&D	5				
1.1	ChronoPixel	5				
1.1.1	Introduction	5				
1.1.2	Recent Milestones	6				
1.1.3	Engineering Challenges	6				
1.1.4	Main directions of the R&D for the next 5 years	6				
1.1.5	Applications Outside of Linear Colliders	7				
1.2	CMOS	7				
1.2.1	Collaborating Institutions	7				
1.2.2	Introduction	7				
1.2.3	Recent Milestones	7				
1.2.4	Engineering Challenges	7				
1.2.5	Future Plans	7				
1.2.6	Applications Outside of Linear Colliders	7				
1.3	DEPFET Pixel Sensors	7				
1.3.1	The DEPFET Collaboration	7				
1.3.2	Introduction	7				
1.3.3	Recent Milestones	7				
1.3.4	Engineering Challenges	9				
1.3.5	Future Plans	10				
1.3.6	Applications Outside of Linear Colliders	10				
1.4	FPCCD	11				
1.4.1	Collaborating Institutions	11				
1.4.2	Introduction	11				
1.4.3	Recent Milestones	11				
1.4.4	Engineering Challenges	12				
1.4.5	Future Plans	13				
1.4.6	Applications Outside of Linear Colliders	13				
1.5	SOI	13				
1.5.1	Introduction	13				
1.5.2	Recent Milestones	13				
1.5.3	Engineering Challenges	15				
1.5.4	Future Plans	15				
1.6	3D Pixel Development	16				

Suggestion to the Community

The current layout makes it still difficult to get a quick overview.

We are working on a summary table listing collaborating institutions, mile stones, future plans. This will become the main part of an executive summary for each section (not each technology).

Should this be expanded with pointers to areas of possible contributions by newcomers (provided by the groups, not by us?)

Software

Suggestion at the SiD meeting to add software.

This can have a huge benefit:

Oftentimes managers don't know the status of the software world and are convinced by their engineers that they must start an effort from scratch.

Documenting the capabilities we have developed properly might increase adoption.
Your input is welcome.

Software examples

We have pioneered some very useful technology:

LCIO

SLIC

DD4HEP

LCFIPlus

PandoraPFA

...

Would be useful outside of the ILC world.

Summary

- Compiling an overview of the field of detector R&D is a lot of work and cannot happen without the help of the community.
- If your contribution was not shown in green, we would like to talk to you.
- The overview document has been mentioned several times in the ICHEP Detector R&D talk. This is an indication that it's seen as useful from outside the LC world.
- Thank you for your help with this effort so far. We will continue to work hard to provide a first draft around the time of LCWS.