

# Future Plans for SiD & Opportunities for collaboration

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Last months have been sobering

Funding situation in UK & US  
especially towards ILC

SiD keeps making progress

The case for a Linear Collider remains strong.  
Science has not changed.

Goals:

- Create a LOI ( or whatever it will be called) and submit to Research Director (RD)
- Interact with RD and communicate clear intention to submit LOI
- Become a "validated" LOI

Hard to see beyond this, because it is not clear.  
Even "validation" meaning is not quite clear

However:

It is necessary to be "validated", because it will be required for any future steps for SiD

<u>Date</u>	<u>Milestone</u>	<u>Activities</u>
4/09	Submit LOI	
3/09	Begin Final Edit of LOI; complete authorlist	
2/09	Complete LOI Draft Collaboration Review and Comment	
9/08	GEANT4 Description Ready Performance Studies Ready Benchmarking Studies Ready	
6/08	Freeze Detector Design SubSystems Fully Specified Subsystem Technologies/Alternates Selected Conceptual Designs Ready	
4/08	Freeze Global Parameters First Pass Detector Design	At UK meeting
3/08	First Pass Global Parameters  Optimization studies	Optimization studies
01/08	Subgroup Plans Defined Milestones and Deliverables Manpower Resources Needed	

Pre-conceptual thoughts

All the way to commissioning

Need to continue this in SiD

Can not produce anything  
believable without it

Example: Global parameters needed

Detector	Radius (m)		Axial (z) (m)	
	Min	Max	Min	Max
Vertex Detector	0.01	0.06	0.00	0.18
Central Tracking	0.21	1.25	0.00	1.61
Endcap Tracker	0.00	0.49	0.85	1.37
Barrel Ecal	1.27	1.41	0.00	1.79
Endcap Ecal	0.21	1.27	1.65	1.79
Barrel Hcal	1.42	2.37	0.00	2.74
Endcap Hcal	0.21	1.41	1.79	2.74
Coil	2.46	3.27	0.00	2.74
Barrel Iron	3.28	5.92	0.00	2.75
Endcap Iron	0.21	5.92	2.75	5.39

## Workshops & Meetings

Recent  
meetings:

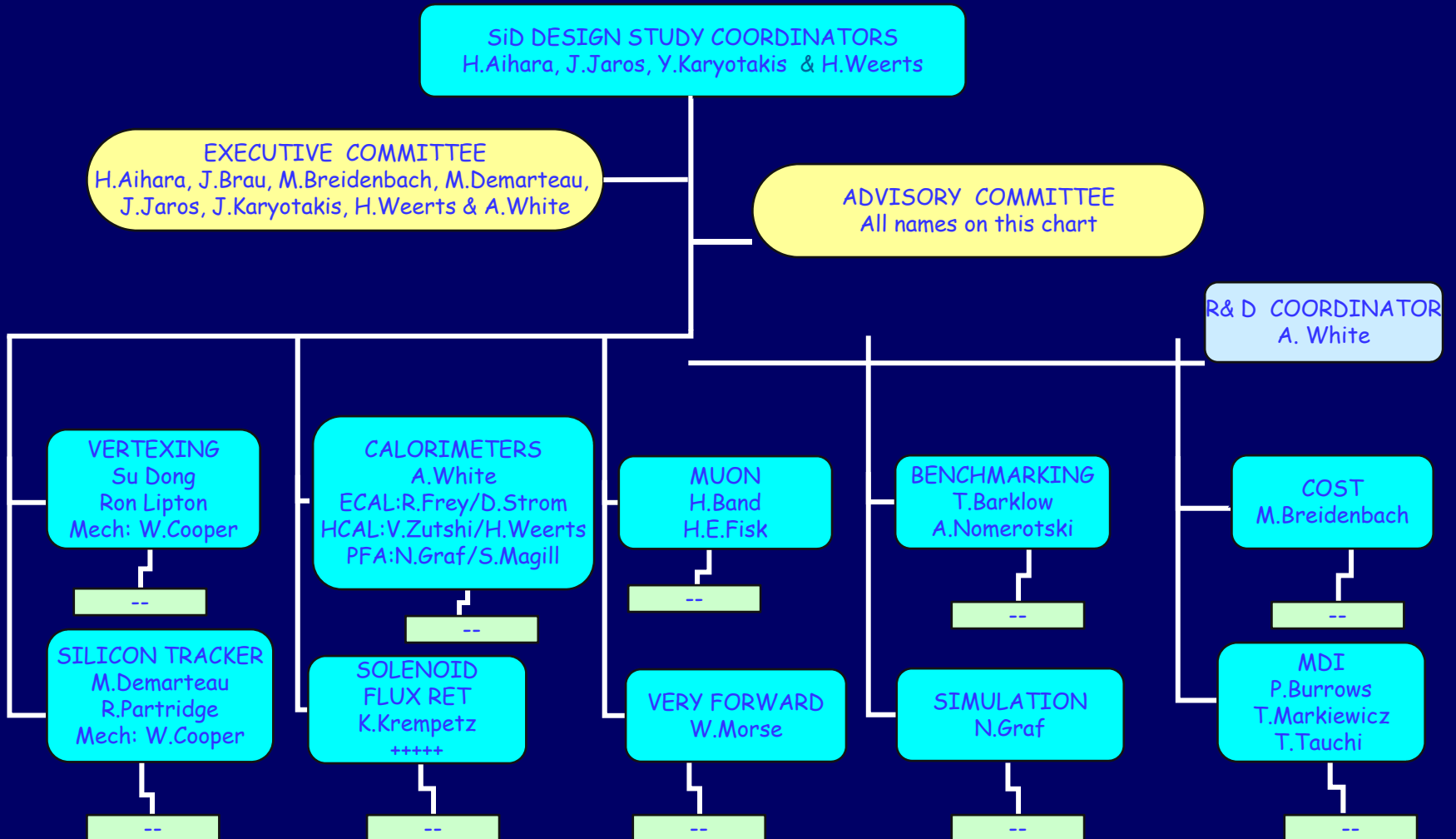
Oct 2007 At Fermilab (ALCPG)  
Jan 28-29, 2008 SiD meeting @ SLAC

Next  
meetings:

March 3-6 Sendai meeting ( ACFA)  
April 14-15 SiD meeting @ RAL  
.....  
Plan more for LOI preparation

## Areas for contributions to SiD

## SiD organization and subgroups



Version 0.3 July 2007

Engineering: M.Breidenbach, K.Krempetz

## Opportunities (incomplete list)

### ■ Tracking

- VTD technology →
- Optimize Si tracking ( layers, ++)
- Forward System

### ■ Calorimetry

- Choice of HCAL technology requires study, PFA evaluation.

Overall Optimization:

- *Inner Radius*
- *Depth and Length?*
- *B field?*

- Forward systems challenging →

### ■ Muon

- Technology?
- # Layers? (Boost HCAL )

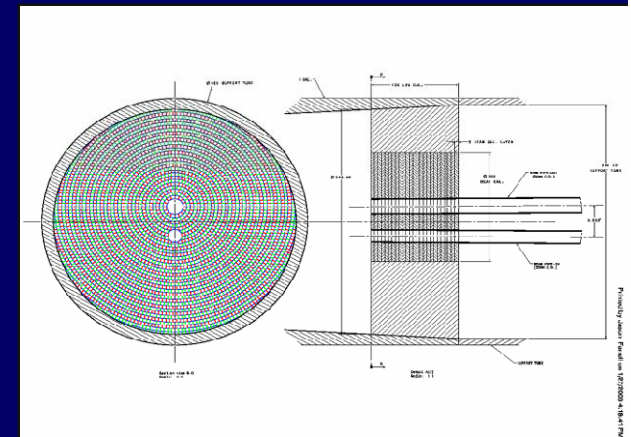
### ■ Solenoid challenging

### ■ Simulation & algorithmic tools

- Tremendous effort and many tools are in place) →
  - *Detector studies and MC benchmarking should be pursued!*
  - *Overall integration studies needed*

#### Concepts under Development for International Linear Collider

- Charge-Coupled Devices (CCDs)
  - ↳ demonstrated in large system at SLD, but slow
- Monolithic Active Pixels – CMOS (MAPs)
- DEpleted P-channel Field Effect Transistor (DEPFET)
- Silicon on Insulator (SoI)
- Image Sensor with In-Situ Storage (ISIS)
- HAPS (Hybrid Pixel Sensors)
- Macro/Micro Pixel Arrays





## Vertex Detector Projects

- Pixel sensor development and testing
- Mechanical design and testing
- Power delivery and signal transmission
- Vertex and flavor tagging algorithms
- Test beam program

UK groups joined.

Vertex Contacts:

Su Dong

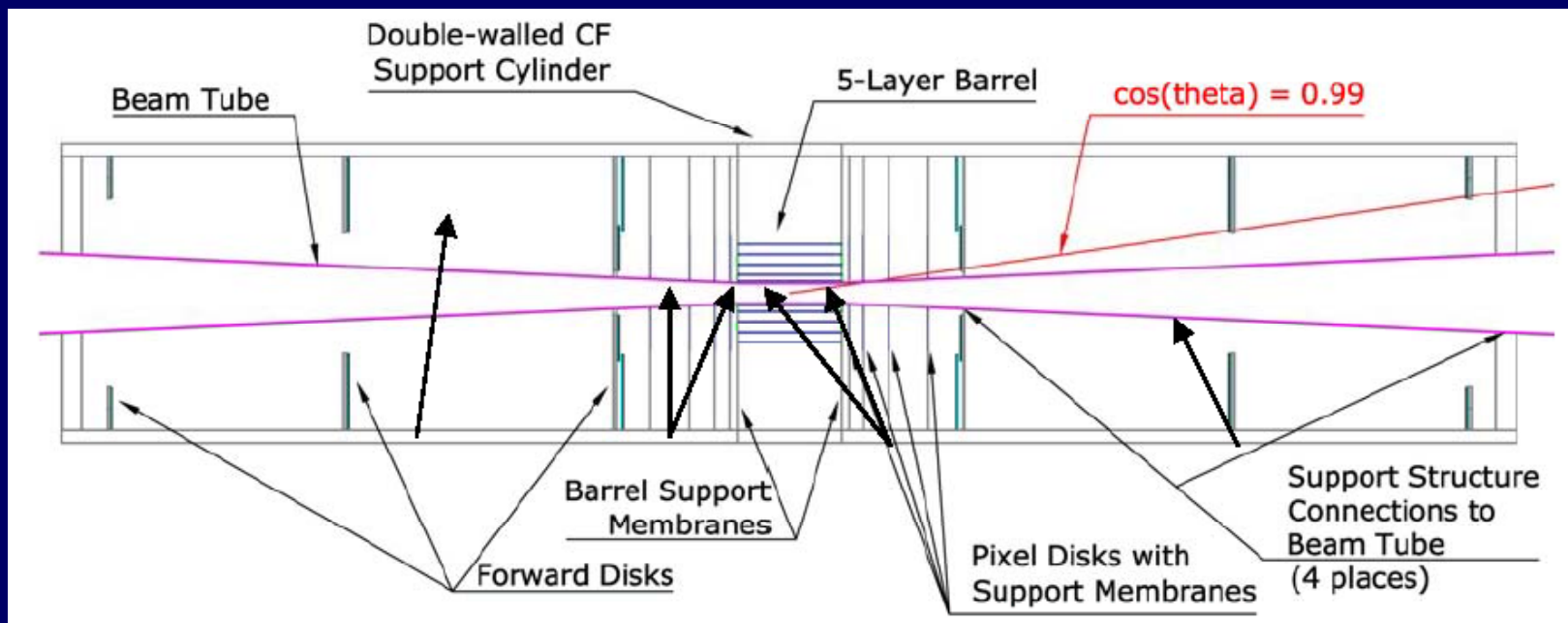
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## Tracker Projects

- Module design and testing
- Mechanical design and testing
- Alignment and vibration measurement
- Forward tracker design
- Tracking algorithms and optimization
- Test beam program

Tracker Contacts:

Marcel Demarteau

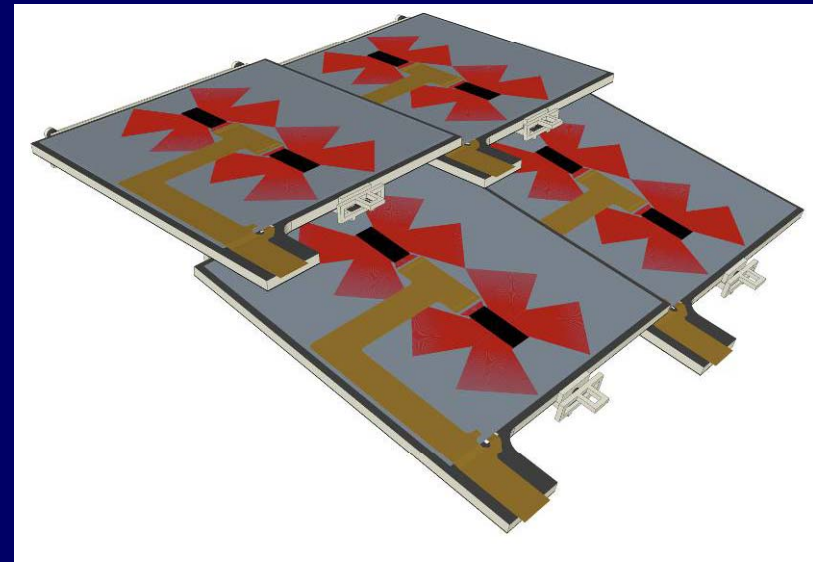
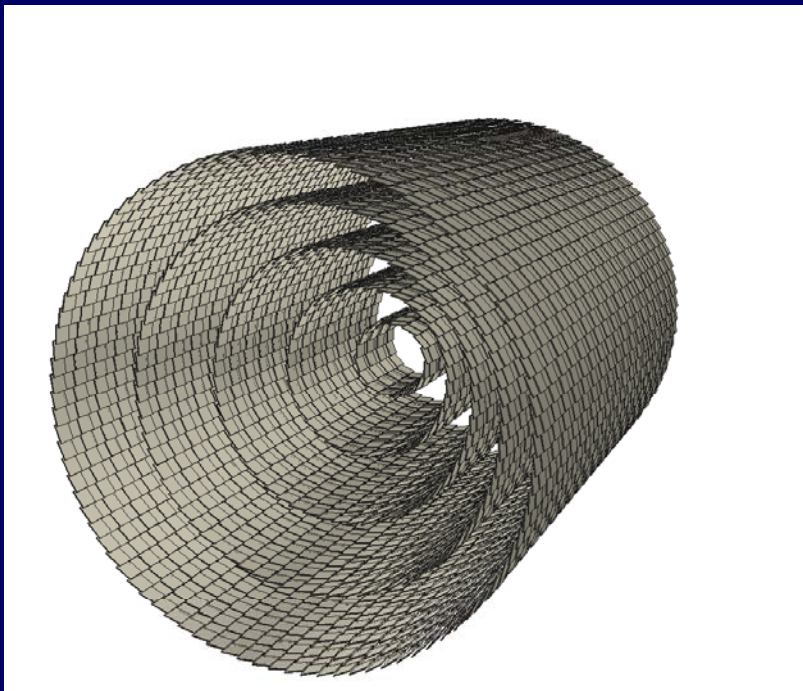
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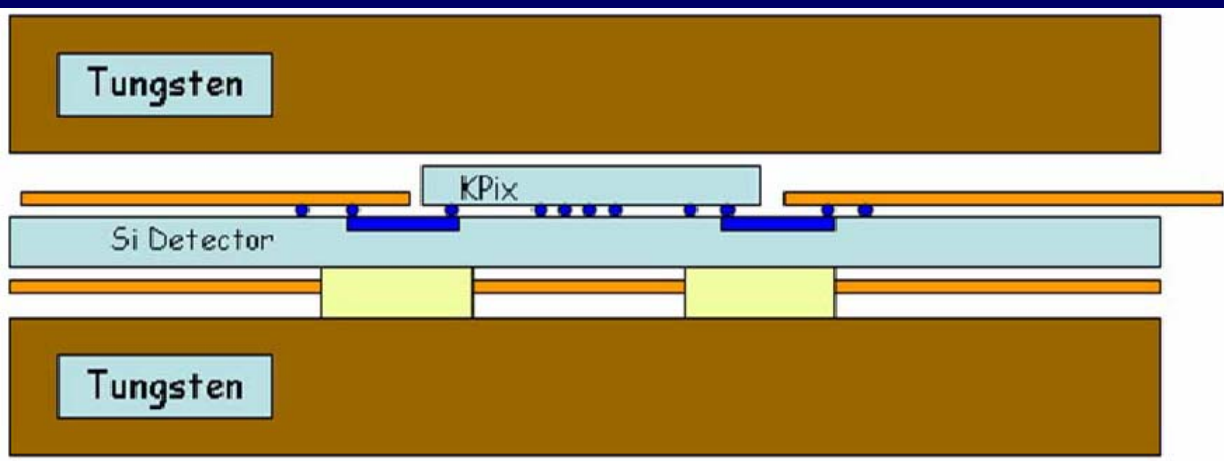
Bill Cooper (mechanics)

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## Calorimeter Projects

- ECal design, testing & simulation
- HCal design and testing
- Mechanical Design
- PFA development and studies
- Other Simulation studies:  $\tau$ ,  $\pi^0$ ,  $\#\lambda$ , etc.
- Test beam program



Calorimeter Contacts:

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## Muon and Solenoid Projects

- Muon system design
- Muon tracking algorithms and studies
- Punch-through, background studies
- Test beam program
- Solenoid design

Muon/Solenoid Contacts:

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Gene Fisk (muon)

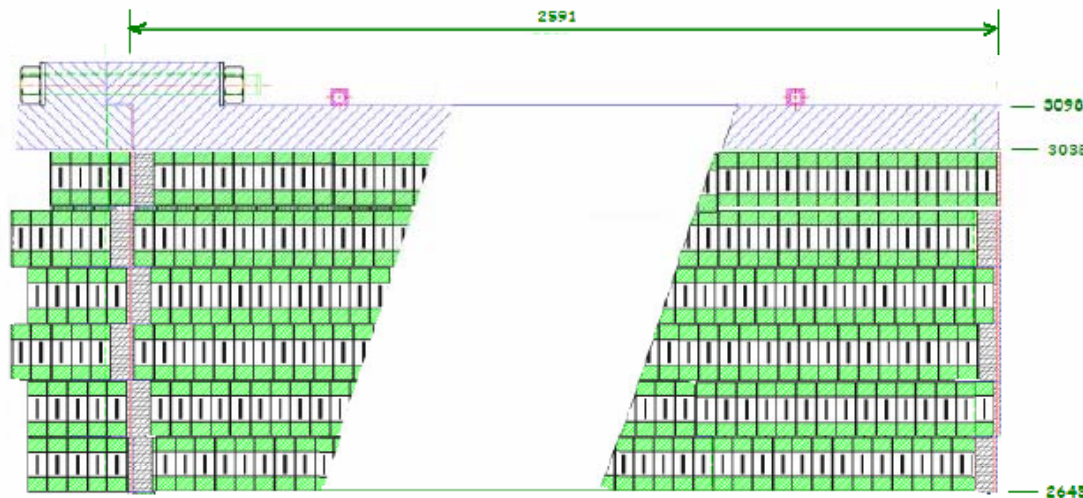
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Kurt Krempetz (solenoid)

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## Forward Detector and MDI Projects

- LumCal, BeamCal, GamCal design
- MDI design  $\leftrightarrow$  machine connection
- Energy, polarimeter design
- Beam pipe design

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Phil Burrows (MDI)

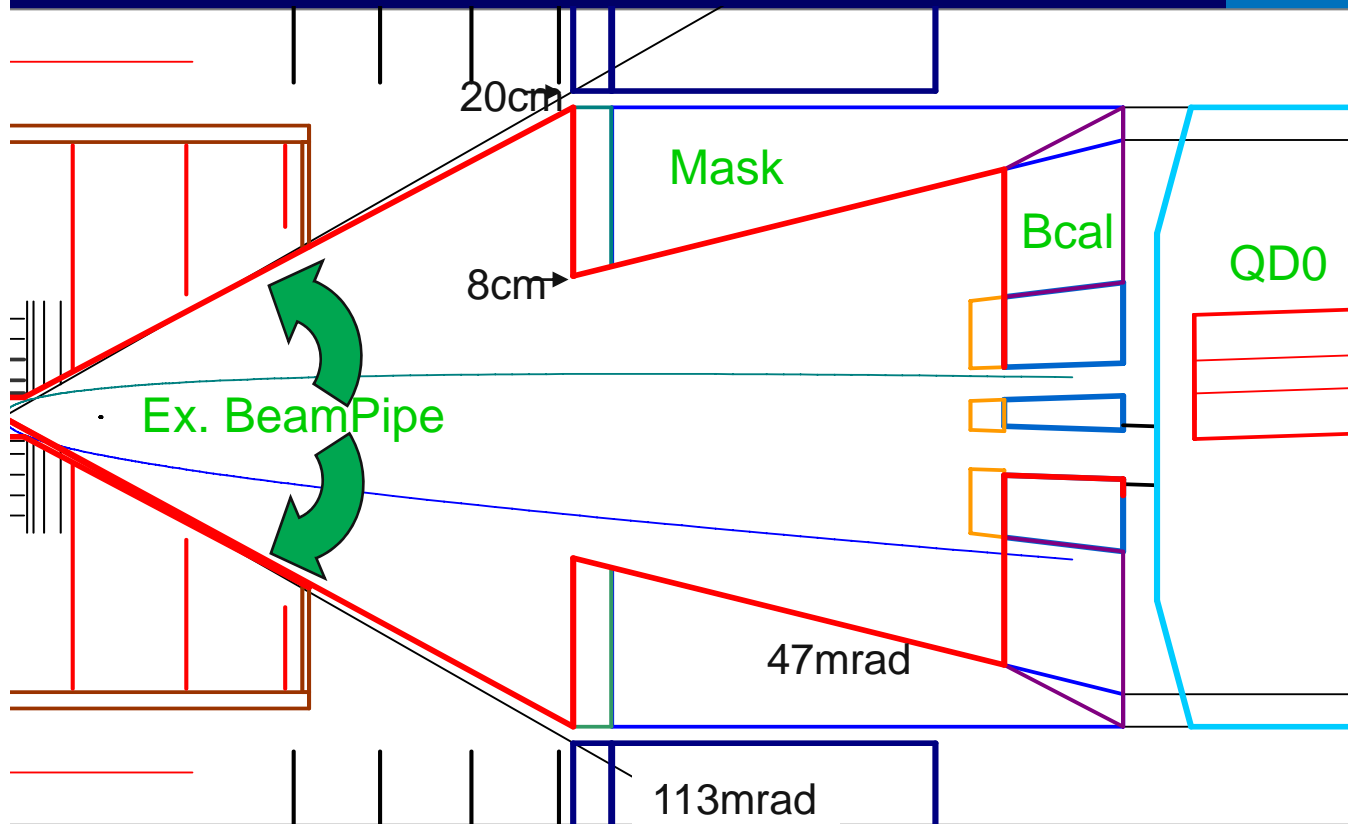
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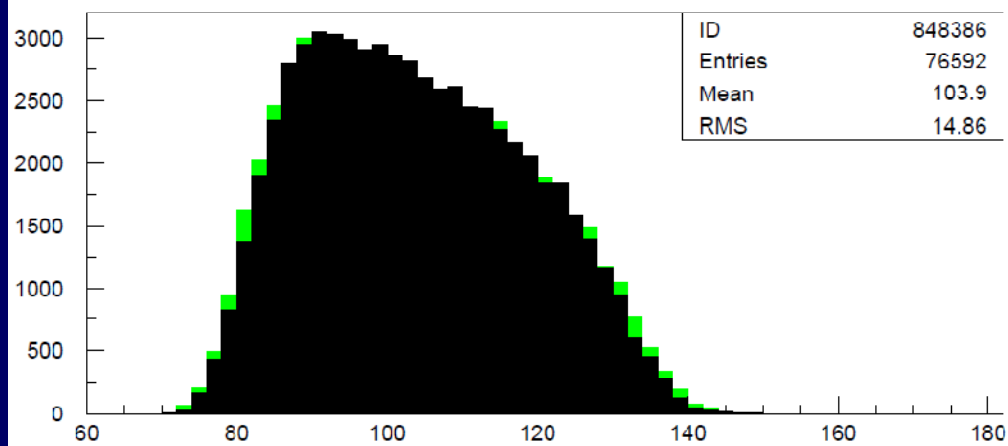
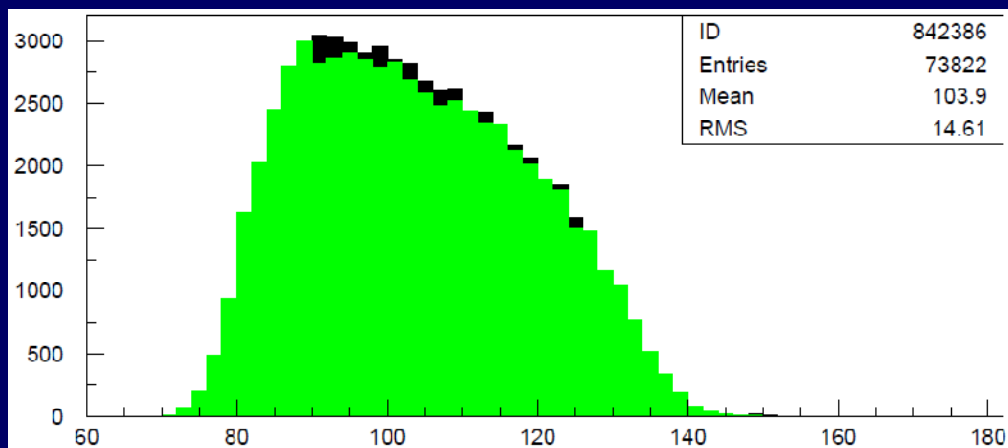
[toshiaki.tauchi@kek.jp](mailto:toshiaki.tauchi@kek.jp)



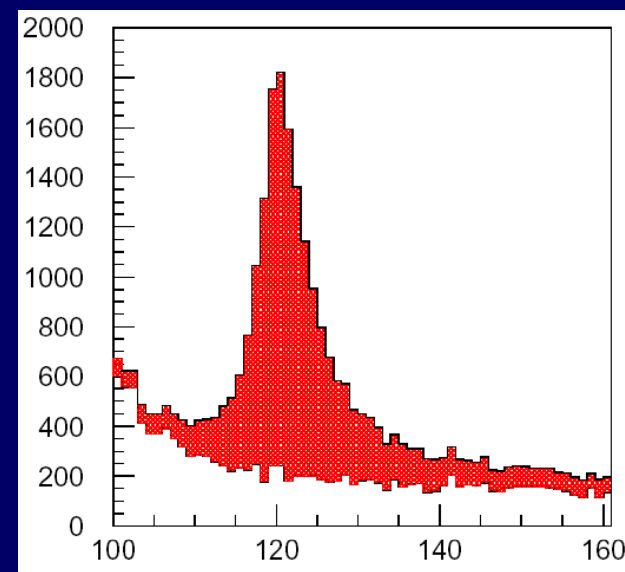
# Benchmarking Projects

## ■ Physics performance studies

$$e^+e^- \rightarrow \tilde{\chi}_1^+ \tilde{\chi}_1^- \rightarrow \tilde{\chi}_1^0 \tilde{\chi}_1^0 W^+ W^- \rightarrow \tilde{\chi}_1^0 \tilde{\chi}_1^0 qqqq$$



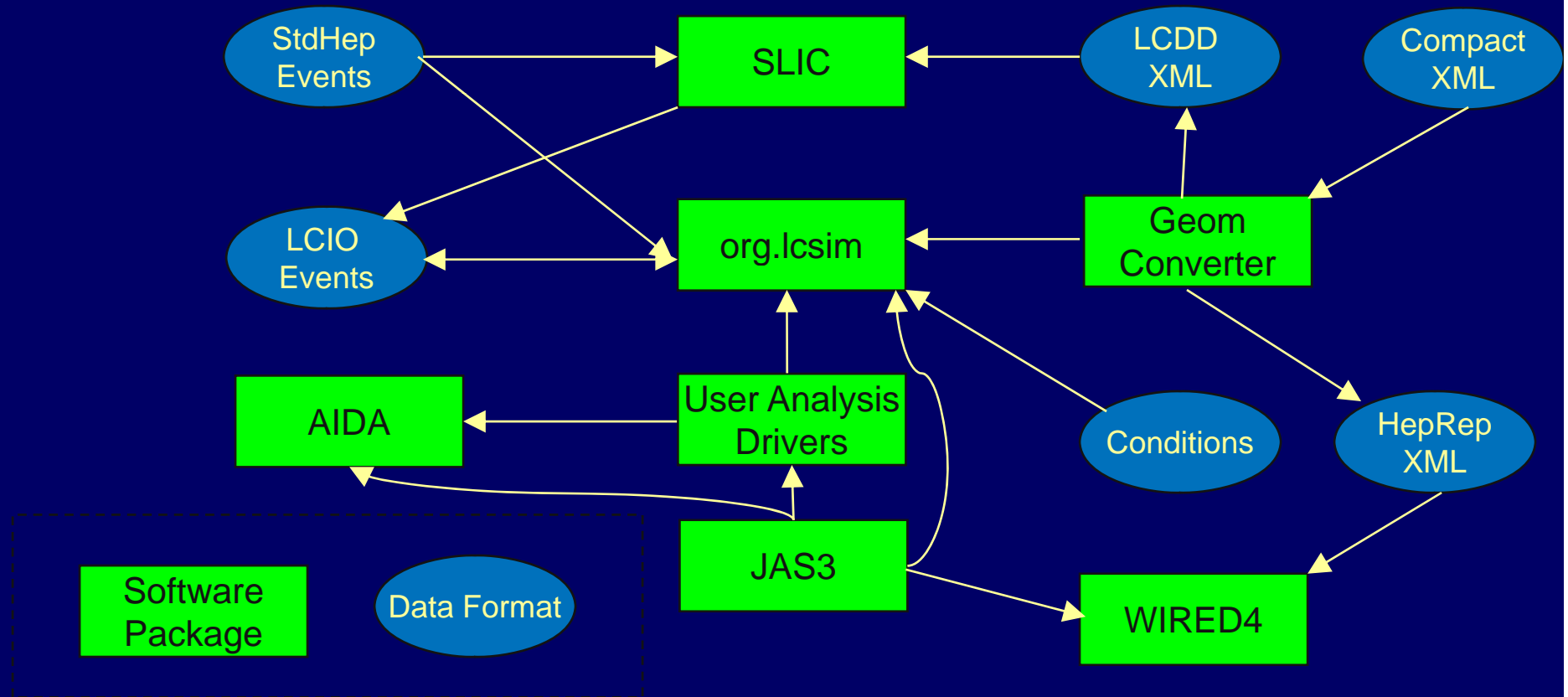
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## Simulation Projects

- Detailed detector simulation
- Algorithm development and detector optimization through simulation

Simulation Contact:  
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## Summary

- It is an excellent time to get involved in SiD
- Many interesting projects that can use contributions
- Challenging to work on new detector
- More information can be found in the SiD talks at conferences & workshops
- Getting started is easy:
  1. Identify an area in SiD where you would like to contribute
  2. Talk with SiD leadership about your interests and SiD needs
  3. Start attending meetings and begin contributing to SiD

See the SiD web page for links to further information:

<http://silicondetector.org>



THE END