SiD Calorimetry – "Plan"

- ECal -- R. Frey
- HCal – J. Repond

The R&D to date mostly addresses the "forefront" issues:

- barrel (and endcap) technologies
- PFAs

and (mostly) leaves out:

- forward calorimetry (→ BNL)
- barrel-endcap transition and other detector specific issues

The capabilities of the forward and endcap regions are crucial, e.g. the endcap at 1 TeV; SUSY capability in forward. As we start to get a grip on the 1st category, we need to figure out how to address the 2nd.

Underlying question:

Detector R&D defines the detector?

Or the concepts define the R&D?

⬇ SiD role

Some SiD calorimeter issues...

- For the ECal, we seem to be on a viable (but not cheap) trajectory for the R&D.
  - What is optimal segmentation? What is optimal longitudinal structure?
  - Endcaps?

- What is the best HCal detector technology (within budget) ?
- What is its segmentation?
  - Has 1 cm^2 been shown to outperform 3 cm^2 ?
  - How many bits ?
- What is the radiator, longitudinal sampling, and depth ?

Our PFAs are now very close (1-2 months?) to providing some answers to the above, and perhaps 6 months (??) from addressing global detector parameters (B, R, Z). This is a major development!

$\Rightarrow$ Crucial to validate the simulation codes (G4) with beam tests.

SiD needs to ensure that (1) the detector configurations tested in beam are applicable to SiD; and (2) that the appropriate technologies are tested.

Now for the ECal...

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Stanford Linear Accelerator Center

- KPiX readout chip
- downstream readout
- detector, cable development
- mechanical design and integration

J. Brau, R. Frey, D. Strom, M. Robinson

U. Oregon

- detector development
- readout electronics

V. Radeka

Brookhaven National Lab

- readout electronics

B. Holbrook, R. Lander, M. Tripathi

UC Davis

- cable development
- bump bonding

S. Adloff, F. Cadoux, J. Jacquemier, Y. Karyotakis

LAPP Annecy

- mechanical design and integration

ECal R&D Plan (Outline)

1st round prototype detector development and testing	2004-6	Oregon, funding: LCRD
KPiX 1st prototype chip delivery and bench testing	"today"- 3/06	SLAC
Develop and fab kapton readout cable	2006	UC Davis
Mount KPiX-p1 to detectors – test in lab (and in electron beam ?)	Late 2006	SLAC, Oregon, UC Davis
Design and order 2nd round detectors (40) for full-depth ECal module	2006	Oregon, funding: DoE supp?
Develop and order KPiX-p2, concentrator boards	2006	SLAC
Develop and design mechanics for full-depth ECal module and FEA for SiD ECal	2006	Annecy
Mechanical and magnetic field tests	2006-7	All
Order full 1024 channel KPiX	2007 ?	SLAC
Fab. ECal module; test in electron beam: determine EM response and resolution	2007	All
ECal module + HCal module in hadron beam (presume FNAL) – G4 validation	2008 ?	All