

# Calorimeter Test Beam

- Goals
  1. Test of hardware technologies
    - Feasibilities, properties and performances of various detector technologies; aging, linearity, responses, resolutions, etc
    - Feasibilities of digital hadron calorimetry
  2. Data for simulation validation and improvements
    - Data for shower libraries for realistic simulation of jets
    - Magnetic field effect
    - Single particle track-cluster match
- Dates: Starting early 2005 (CALICE ECAL) – early 2006
- Proposed rough detector sizes
  - 30 cm x 30cm x 20cm for ECAL ( $\sim 20\lambda_0$ )
  - 1m x 1m x 1m HCAL – 1.3mx1.3mx1m ( $5\sim 6\lambda_0$ )

- Initial facility requirements
  - Beam with wide kinematic ranges at an adequate rates
    - Particle types:  $p$ ,  $K$ ,  $\pi$ ,  $\mu$ ,  $e$
    - Momenta of particles: 1 ~ 150 GeV w/ 1% momentum bite
    - Rate: no more than 100Hz
  - Beam instrumentation
    - 1% beam momentum and position measurements
    - PID, such as Cerenkov counters, and selection
    - Neutral tagging (TOF)
  - Sufficient Mechanical Infrastructure
    - Rotational support table
    - Crane up to 5 tons
  - Floor space ~ 10x10m<sup>2</sup>
- Length of stay: few years
- Length in beam: 2-4 months each

# Comparisons of TB Facilities

Facilities	Particles	p-ranges	Availability	Contact
FNAL MTF	$p, K, \pi, \mu, e$	5-120 GeV/c	From early 2003	E. Ramberg
SLAC-ESA	$\gamma, e^+, \text{had}$	<45GeV e <13GeV had	Available now	
IHEP-Protvino	had, e, $\mu$	<45GeV e 33-45GeV h	From 2004	
BNL-AGSB2	e, p, K, $\pi, \mu$	<10GeV	Dependent on AGS Status	
JLab			N/A 2007-8 due to upgrade	
CERN			Pretty bad after 2004	
DESY	$e^+, e^-$	1-3(??)GeV	Not clear	
Frascati	Not clear	Up to 50GeV	Available now	
KEK			N/A 2004-5	

# How do we organize?

- When do we want to do this and for how long?
  - Late 2005 early 2006? Why? For a few years...
- Where do we do this?
  - Based on the necessary particle types, momentum range, availability, Fermilab seems to be the best place to do this.
- Who are the participants?

# Groups Showed Interest in TB

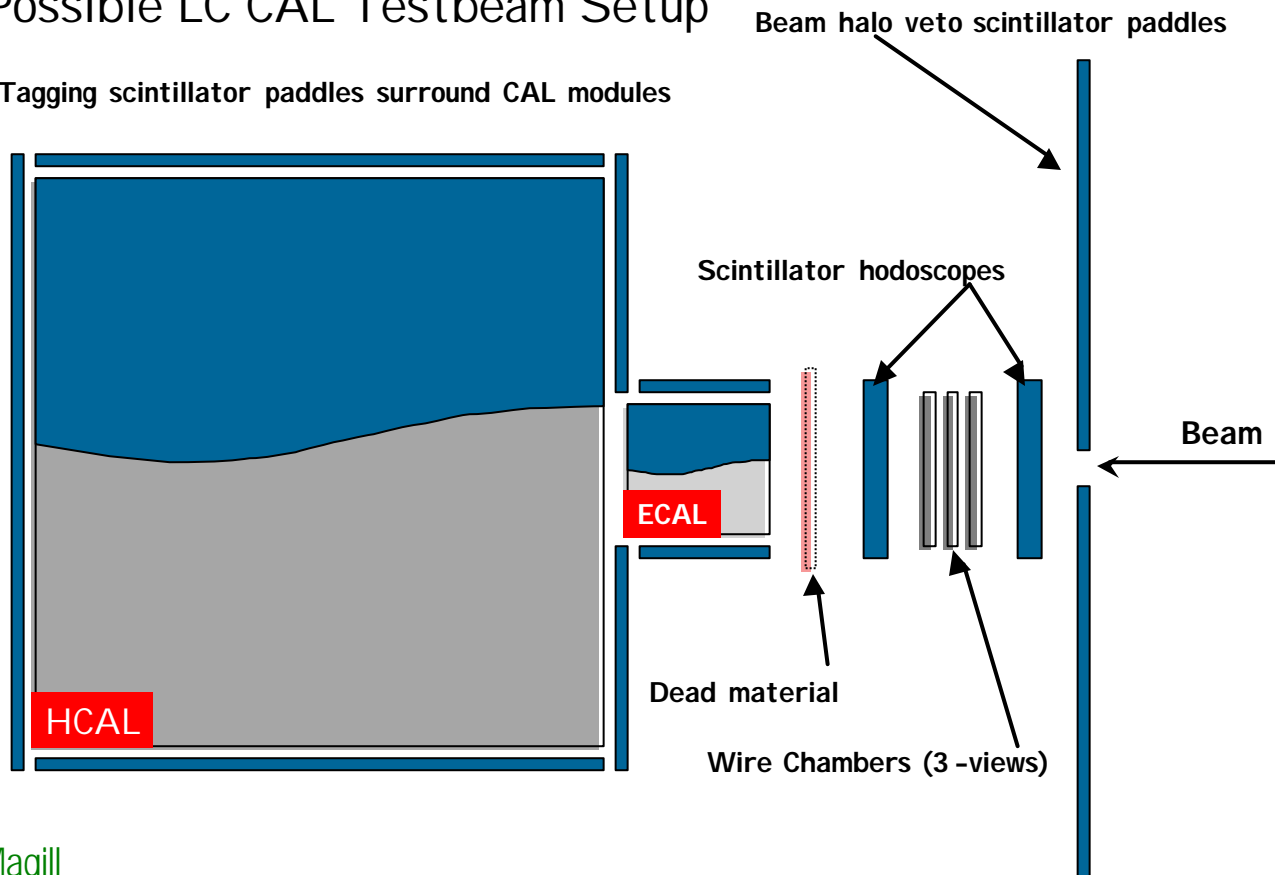
- ECAL
  - Si/W (Oregon, R. Frey)
  - Crystal detector (U. Mallik)
- HCAL
  - Scintillator tile (NIU, D. Chakraborty)
  - RPC (ANL, J. Repond)
  - GEM (UTA, A. White & J. Yu)
- Calorimeter-based luminosity monitoring
  - Cerenkov Compensated Calorimetry (Y. Oneil)

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- What is the setup for testbeam?

# A Possible LC CAL Testbeam Setup

Tagging scintillator paddles surround CAL modules



S. Magill

Mar. 31, 2003

CAL Testbeam Discussion  
J. Yu

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- What is the setup for testbeam?
- Who builds which part of the setup?
  - Each sensitive gap technology construct their own sensitive gap detectors?
  - What about DAQ?
    - Front-end? Backend? Data recording?
  - How about absorber plates for sampling calorimeters?



- What is the readout granularity we want?
- How do we organize TB software development?
- In what time table do we work?
- Where do we obtain financial support for coordinated effort? DOE? NSF? Each group figure out by themselves?
- What are the other detector groups' efforts?
  - We need to work together with them to approach facilities as a concerted group effort.