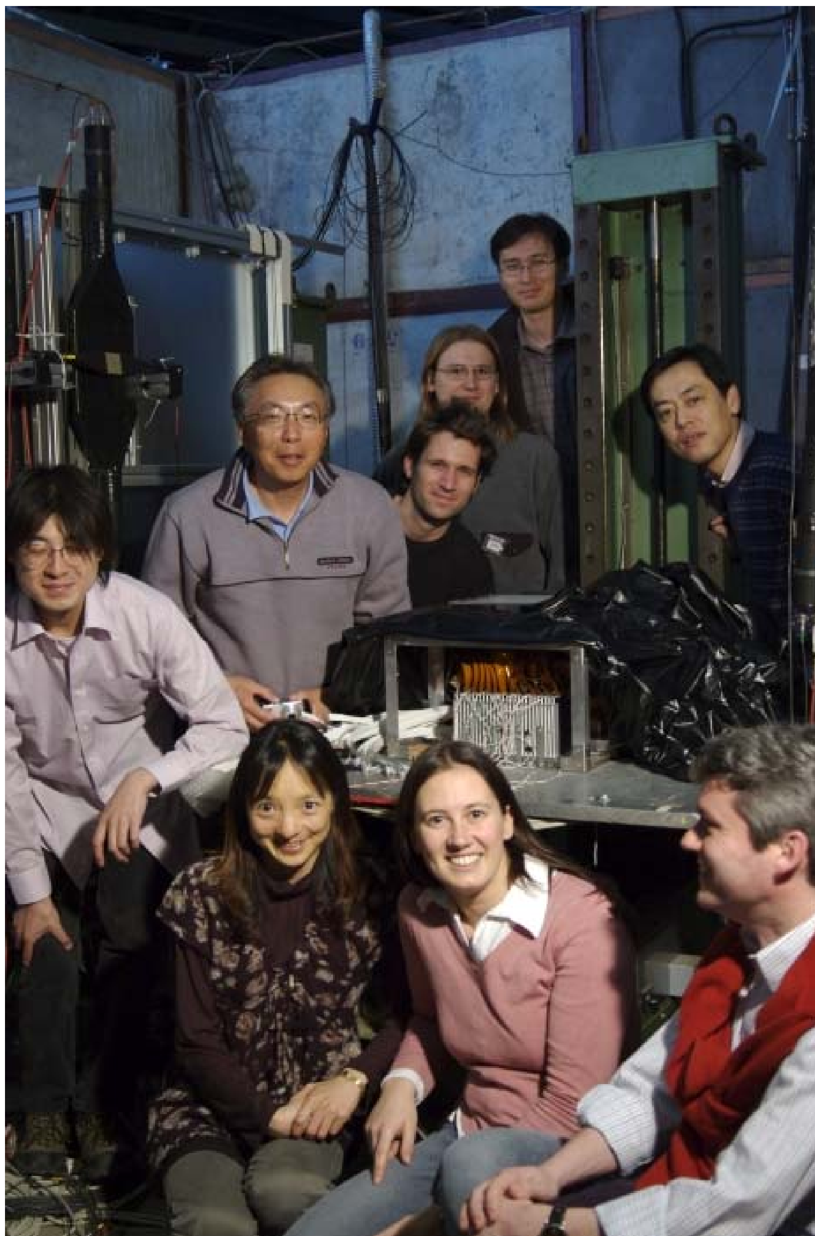
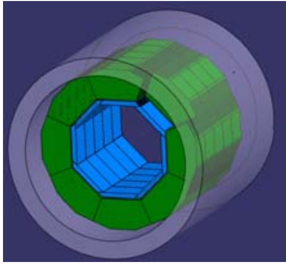


Scintillator HCAL programme

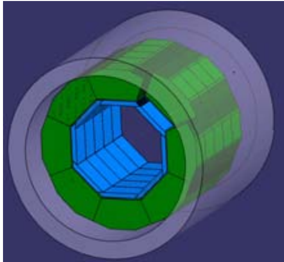
Felix Sefkow

CALICE Technical Board Review
April 19, 2007



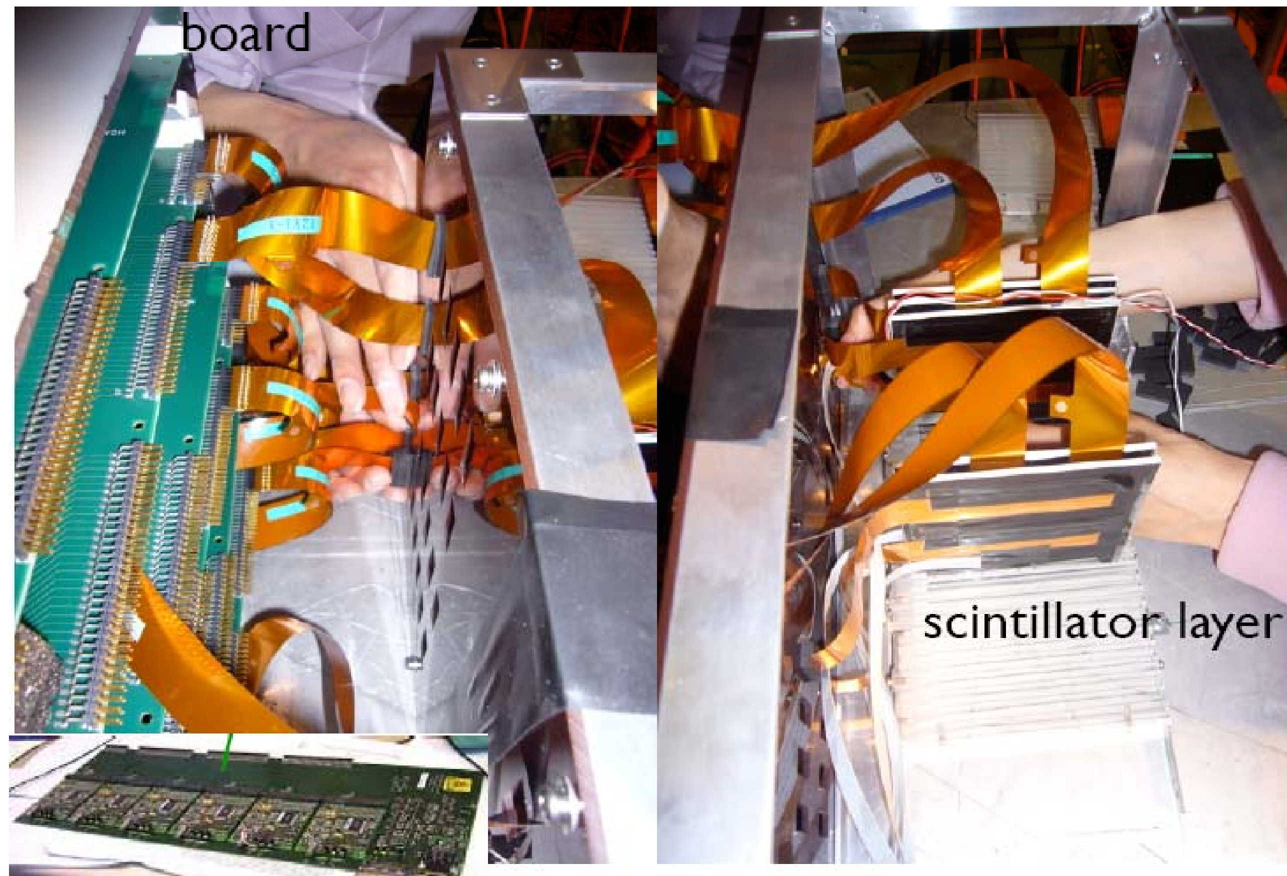
Collaborative projects

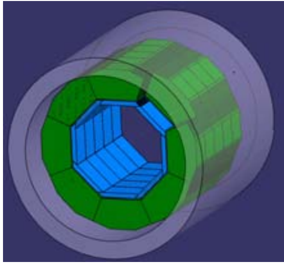
- AHCAL electronics for Scintillator ECAL
- Future AHCAL beam tests
- Next generation prototype



Scintillator ECAL

- 500 channel prototype test at DESY March 2007



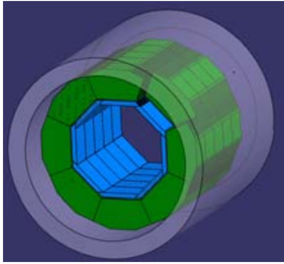


Scint ECAL upgrade

- Plan to upgrade to 2000 channels
- Cannot run anymore simultaneously with AHCAL
  - Enough CRCs, but too few front end boards

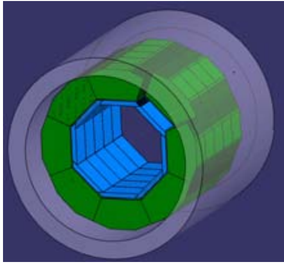
- Plan to produce additional 20 baseboards / 120 piggy backs at DESY
  - There are still 200 - 300 ILC_SiPM ASICs from LAL left
  - Does not interfere with next generation R&D
  - Cost sharing being discussed

- Aim at combined scintillator ECAL + HCAL run at FNAL
  - In 2008, following SiW ECAL + ScintHCAL run



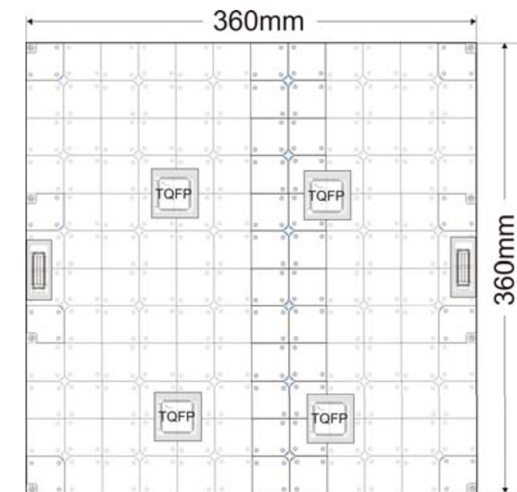
Further beam tests

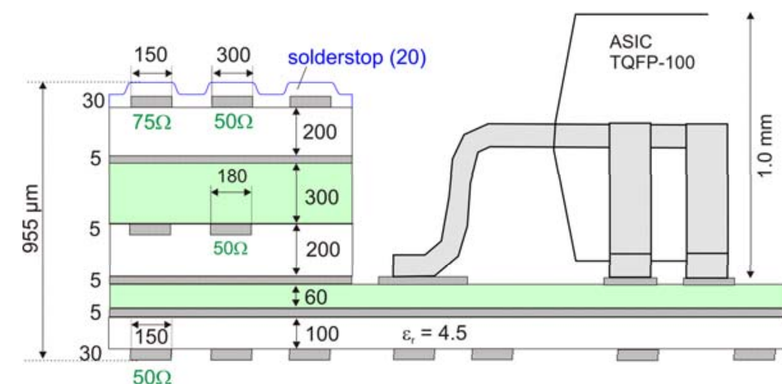
- There is more physics for the physics prototype:
  - Neutron hit timing for energy and space reconstruction
    - Use new SPIROC ASIC and (most likely) new DAQ
    - Build new front end boards for existing tile HCAL modules
    - Should become possible ~ 2009
  - GLD HCAL Lead Scintillator option
    - Replace steel absorber on movable stage
    - total stack weight limited to 7t
    - Thickness ratio 4:1 not (quite) possible with 5mm scintillator
  - Strip HCAL
    - PFLOW pattern recognition performance to be demonstrated in MC first
    - ***If*** promising: must be tested with beam (short-range correlations)
    - Physics prototype stack or EUDET structure: to be decided later

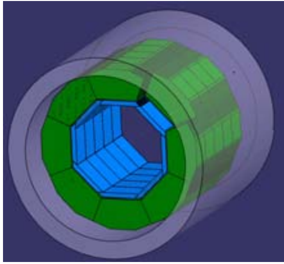


2nd generation prototype

- Conceptual design for integrated readout board for the EUDET module started
- Ambition to minimize gap thickness (~1.5 mm + scintillator)
  - Not ambitious enough for ECAL
- Different approaches to scintillator technology and photo-sensor packaging
  - Individual tiles or mega-tiles/strips
  - Different mechanical interfaces
  - Still many common issues
- Aim at a design which can be adapted to both options



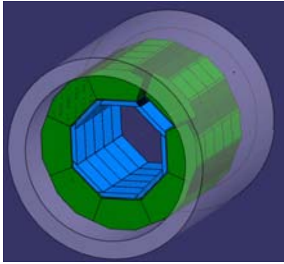




Scint – SiPM – PCB integration

- Two possibilities:
  1. Photo-sensor scintillator unit + PCB with VFE
  2. Scintillator + PCB with photo-sensor and VFE

- We follow option 1, based on the good experience with TB prototype
  - Stable optical connection
  - Early and easy single channel quality control
  - independent of final electronics (schedule)
- Option 2 is followed by NIU and FNAL
  - Advantage: automated SMD technology for photo-sensor mounting
- Integration into overall CALICE HCAL programme to be further clarified – before LCWS
  - Mechanical interfaces (stack)
  - VFE, FE and DAQ



Summary

- A coherent R&D programme is emerging
  - Common use of infrastructure
  - Minimizing duplication
  - Maximizing fun (the CALICE way)
- Integration of US effort somewhat unclear, due to uncertain funding prospects
- Personal remark: I hope the integrated approach to HCAL and TC/MT readout will be followed also for the next generation
  - Independent engineering challenge