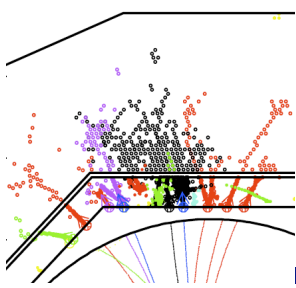


# Introduction and overview

**Felix Sefkow**



**CALICE Collaboration Meeting, University Hassan II,  
Casablanca, September 22-24, 2010**



# First of all: Merci!

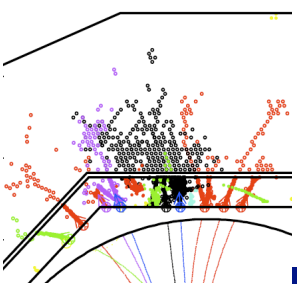


جامعة الحسن الثاني . عين الشق  
UNIVERSITE HASSAN II-AIN CHOCK



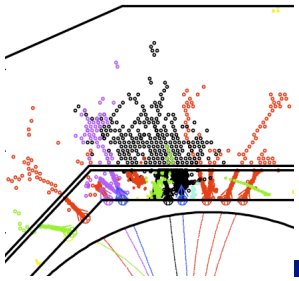
- To the university Hassan II for hosting and welcoming us:
  - vice president Prof. J. K. Naciri
  - vice dean O. Sadiqi
- To Driss Benchekroun and his co-workers for preparing it so nicely
- To the session convenors for the scientific organisation
- To all of you for coming

# Overview

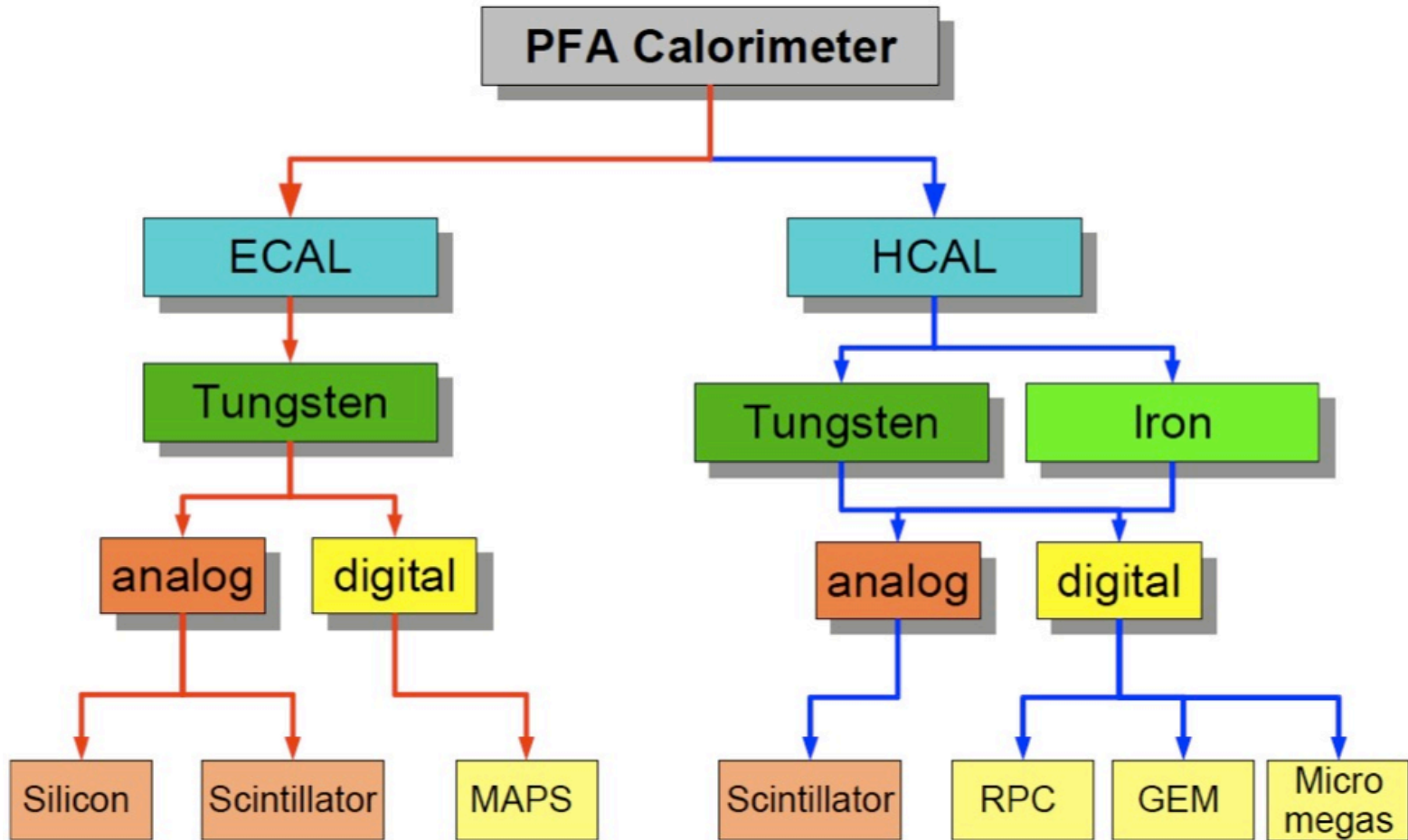


- Publications and Analyses
- Concepts and Reviews
- Test beams at CERN and FNAL

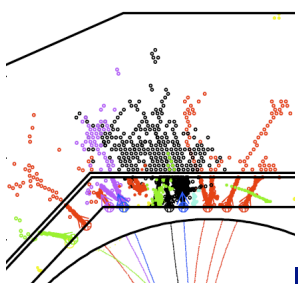




# Technology tree



# Overall status



- Major test beam campaigns at DESY, CERN and Fermilab
- 1st generation “physics” prototypes
- Mostly combined set-ups
  - ECAL-HCAL-TCMT
- Si W ECAL 2005-08
- Scint W ECAL 2007-09
- Scint Fe HCAL 2006-09
- W HCAL 2010+
- RPC Fe HCAL to start Oct 2010
- 2nd generation “technical” prototypes: construction and commissioning ongoing, single or few layers available
  - Scint, RPCs, GEMs, MicroMEGAS
- Complete detectors to start with RPC-Fe HCAL 2011
- ECAL, Scint Fe HCAL later



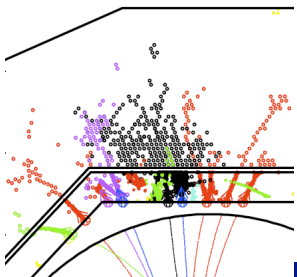
# Status of CALICE papers

- ❖ Details can be found on <https://twiki.cern.ch/twiki/bin/view/CALICE/CalicePapers>
- ❖ **SiW ECAL** – 2 published papers; 1 accepted by journal, 1 in internal review.
- ❖ **Analogue HCAL** – 3 published paper on test beam; 1 on tile-SiPM readout.
- ❖ **Digital (RPC) HCAL** – 6 published papers.
- ❖ **MicroMegas for HCAL** – 4 published papers.
- ❖ Many more analysis topics have preliminary results approved for conference presentation.



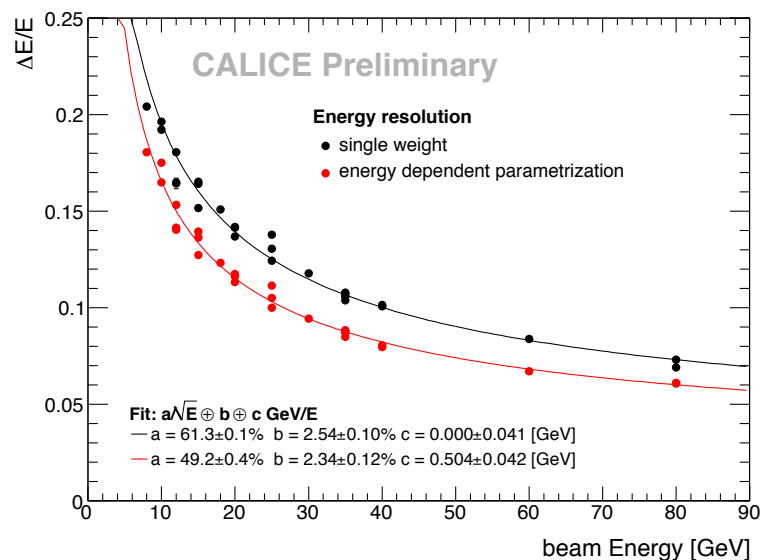
# CALICE Analysis notes

- ❖ The purpose of these is to document preliminary results for conferences, based on analysis of the main CALICE test beam data. Passed through rigorous internal Collaboration review.
- ❖ Currently have 20 approved notes (plus 5 addenda).  
<https://twiki.cern.ch/twiki/bin/view/CALICE/CaliceAnalysisNotes>
- ❖ Plus 6 currently in the internal review – mostly aimed at CALOR10 (May 10<sup>th</sup>).
- ❖ Two of these notes have already been converted to papers – the remainder should follow in due course. But of course some are inter-dependent. For example, understanding of muons and electrons should ideally precede hadron shower results.

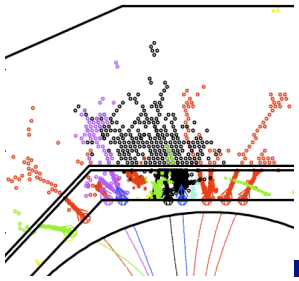


# Combined ECAL HCAL results

- Not many yet, require mature analysis framework
- Hadron energy resolution with software compensation
  - CAN-015, March 2009
- Two-particle separation with PandoraPFA and overlaid test beam events
  - CAN-024, internal review

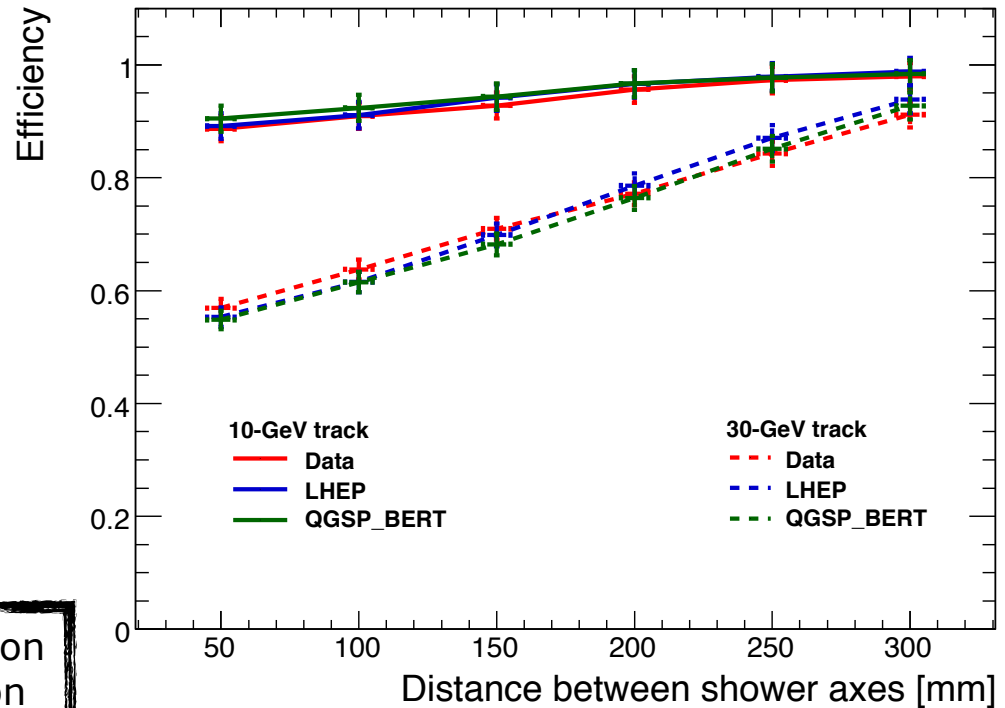
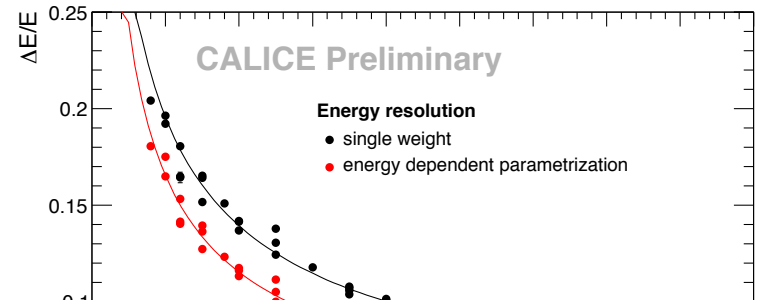




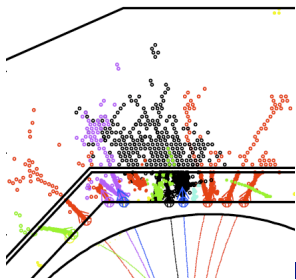


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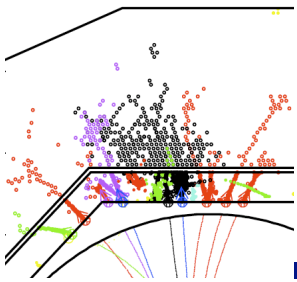


10 GeV neutral hadron next to charged pion



# Summary (PRC)

- Minimal results (scintillator and RPC HCAL) **published**
- Detector papers for ECAL and AHCAL physics prototypes **published**
- ECAL performance with electrons and pions **published**
- 25-30 CALICE analysis notes with preliminary results, many in **publication-ready** quality
- some are **interdependent**
  - validate detector understanding before concluding on shower physics
- expect further increase in publication speed
- DHCAL physics not yet started - stay tuned



# Recommendation + Next Review

- The PRC congratulates the CALICE collaboration on a strong record of research productivity and publications, and, while recognizing the issues involved in understanding and interpreting results from new techniques/prototypes, urges CALICE to keep publishing results in a timely manner.
- CALICE has asked to make its **next major presentation to the PRC in Spring 2011**. This was agreed.



# Status of papers

- ❖ Since Arlington:
  - ❖ SiW ECAL pion paper [2010\\_JINST\\_5\\_P05007](#) Ward/Goto
- ❖ In the pipeline
  - ❖ SiW ASIC exposure paper (in editorial board) Pöschl
  - ❖ AHCAL electron analysis (in editorial board) Garutti
- ❖ Also a new MICOmega paper based in their beam test and one on direct SiPM tile readout from MPI. See <https://twiki.cern.ch/twiki/bin/view/CALICE/CalicePapers> and please add anything that's missing.

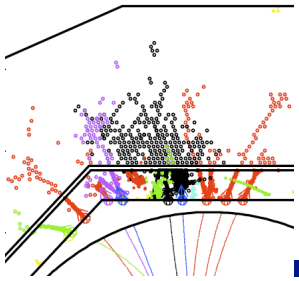
# CALICE Analysis Notes

- ❖ Approved since Arlington
  - ❖ **CAN-021** AHCAL energy resolution (Seidel)
  - ❖ **CAN-016** ScECAL FNAL results (Uozumi)
  - ❖ **CAN-022** Track segments in AHCAL (Weuste)
  - ❖ **CAN-023** ECAL tracking using Hough Transform (Fehr)
  - ❖ **CAN-024** PandoraPFA tests using overlaid charged pion test beam data (Markin)
- ❖ In editorial board (all aiming for IWLC 2010)
  - ❖ **CAN-025** Hadronic showers in the SiW ECAL (Doublet)
  - ❖ **CAN-026** Hadronic showers in the AHCAL (Kaplan)
  - ❖ **CAN-028** HCAL Software Compensation (Chadeyeva)
  - ❖ **CAN-024a** PandoraPFA tests using overlaid charged pion test beam data *Addendum* (Markin)

# Conferences

- ❖ [LCWS2010](#) (Beijing, March 26-30 2010)
  - ❖ 22 talks given
- ❖ [CALOR10](#) (IHEP Beijing, 10-14 May 2010)
  - ❖ 16 talks given
- ❖ [ICHEP2010](#) (Paris, 21-28 July 2010)
  - ❖ Only awarded 1 talk
- ❖ [ECFA Workshop](#) International Workshop on Linear Colliders 2010 (CERN/Genève, 18-22 October 2010)
  - ❖ Just assembling list of proposed talks. Currently we have ~12, which seems a bit low
- ❖ [IEEE Nuclear Science Symposium](#) (Knoxville, 30 Oct-6 Nov 2010)
  - ❖ At least 9 abstracts were submitted, most accepted.
- ❖ After this, seems to be a gap till Oregon in March 2011. Let's turn some CANs into papers 😊





# Towards the DBD

- example  
ILD

## Technology driven timeline

|             | 10 |  |  |  | 11 |  |  |  | 12 |  |  |   |
|-------------|----|--|--|--|----|--|--|--|----|--|--|---|
| Fix options |    |  |  |  |    |  |  |  |    |  |  | x |
| R&D         |    |  |  |  |    |  |  |  |    |  |  |   |
| Simulation  |    |  |  |  |    |  |  |  |    |  |  |   |
| testbeams   |    |  |  |  |    |  |  |  |    |  |  |   |

R&D collaborations present their proposed baseline, discussion and decision  
In ILD starts



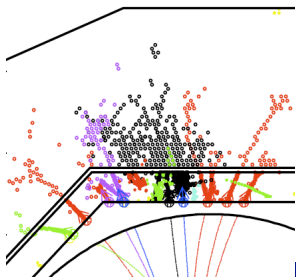
Goal: try to use as much as possible results from ongoing R&D before deciding on a technology baseline.

R&D does not stop with the DBD

Open for discussion

Include Alternatives

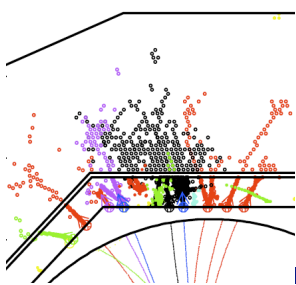




# Technology baselines

- In spring 2012 CALICE is expected to present **proposals** for technology baselines to concepts
- Establish technological feasibility and performance
  - validated design solutions for internal integration
  - operational stability and calibration procedures
  - test beam validated performance
  - input to realistic simulations and detector integration
  - open issues
- Next steps: define readiness criteria
- 2011: report status, discuss criteria with concepts and present R&D plans





# Test beams 2010

ILC NewsLine - 9 September 2010 - Feature 1 - Textbook tests with tungsten

22/9/10 00:59

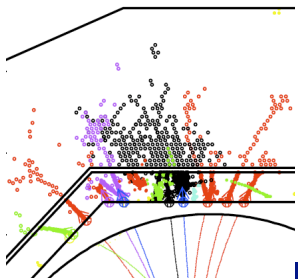


- CALICE is on the road again
- Large scale (s)DHCAL tests with GRPC and micromegas at CERN
- First steps into power pulsing
- Start-up of beam tests for W based high energy options
- Next week (!): installation of full-scale DHCAL at FTBF

## Textbook tests with tungsten

*CERN's linear collider detector group joins forces with CALICE in building the world's first tungsten hadronic calorimeter.*





# Test beams 2011

- Fermilab: RPC steel DHCAL
  - solution found to extend stay of our movable stage and stack
  - discussing tail catcher options
  - and combined running with SiW ECAL
  - GEMs
- CERN:
  - full-size sDHCAL Fe prototype
  - full-size W HCAL prototype
  - alternative technologies
  - combined ECAL/HCAL runs?
  - and no beam 2012
- Aim at a joint installation



Enjoy the meeting!

