

# AHCAL software status for CALICE/ILD

Shaojun Lu

[shaojun.lu@desy.de](mailto:shaojun.lu@desy.de)

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# Outline

- CALICE offline software for the AHCAL test beam
- Centrally supported packages for basic reconstruction and simulation/digitization:  
`calice_userlib`, `calice_reco`, `calice_sim` and script generator package `calice_run`
- Centrally supported packages for special tasks:  
`calice_cddata`, `calice_db_tools`, `calice_calib`
- Analysis code provided by users (using fully reconstructed data):  
`calice_analysis`

# AHCAL reconstruction

- Centrally supported packages for basic reconstruction and simulation/digitization: `calice_userlib`, `calice_reco`, `calice_sim` and script generator package `calice_run`
- Intensive usage and feedback from all analyzers.
- The logical treatment of the data has been improved continuously.
- Newly requested features have been (will be) implemented.

# AHCAL experts software

- Centrally supported packages for special tasks:
  - [calice\\_cddata](#), [calice\\_db\\_tools](#), [calice\\_calib](#)
  - Some processors also relevant for analysis  
(e.g. muon track identification)
- The support are also provided for these packages, and fully maintained on [AFS](#) and [NAF](#) system at DESY, which can be accessed for the groups who involves in the AHCAL R&D currently.

# CALICE higher level software

- Analysis codes provided by users (using fully reconstructed data):

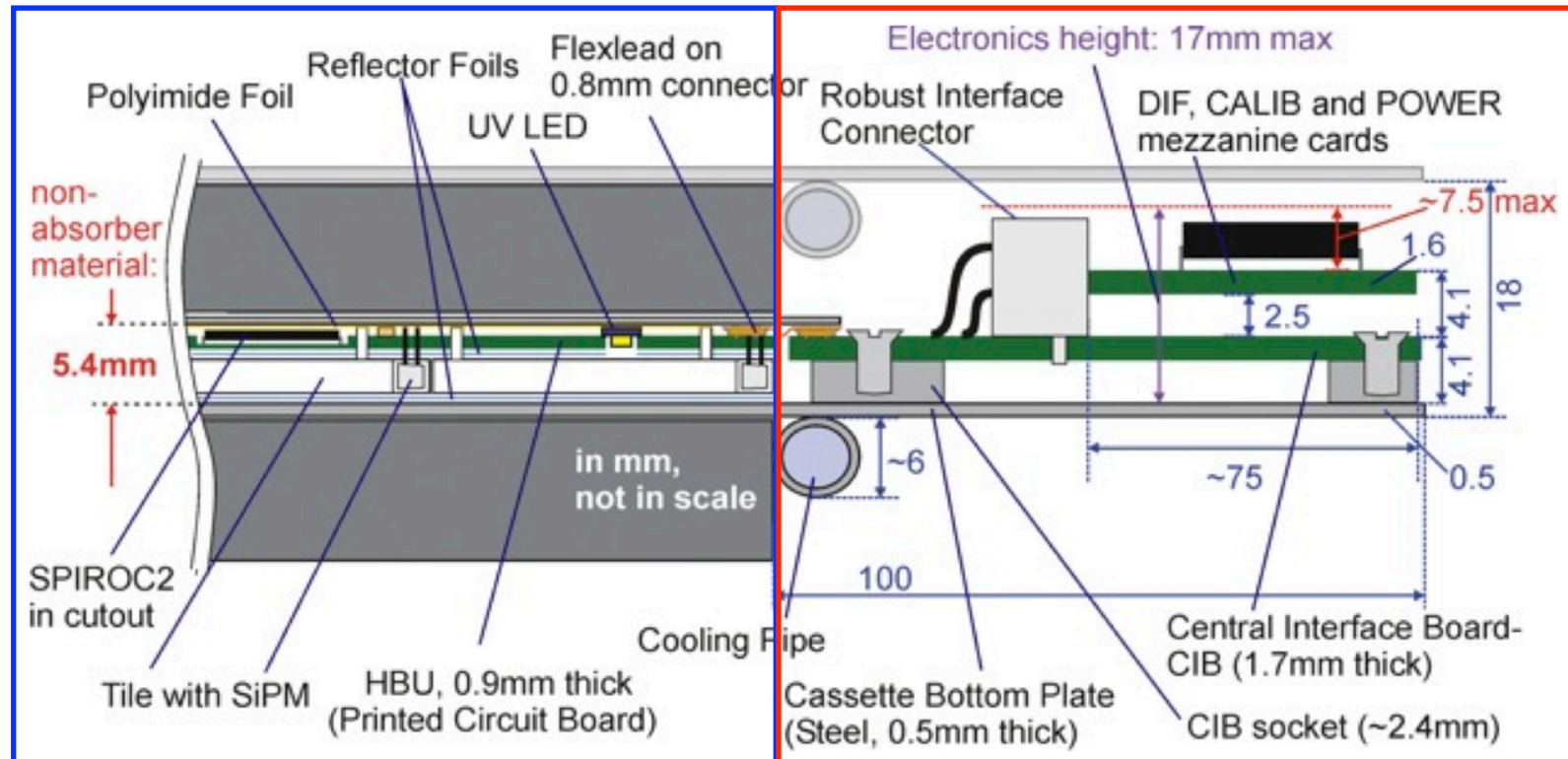
`calice_analysis`

- [A new repository](#) has been created, and to be used for sharing the higher level CALICE analysis processors.
- Package provides examples steering files to
  - [help new users to generate first physics plots](#)
  - [allow for reproducing results from CALICE analysis notes or final publications.](#)

# Outline

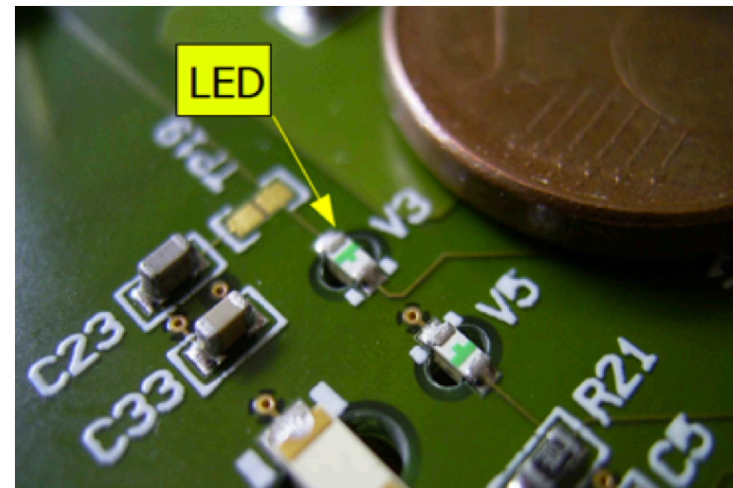
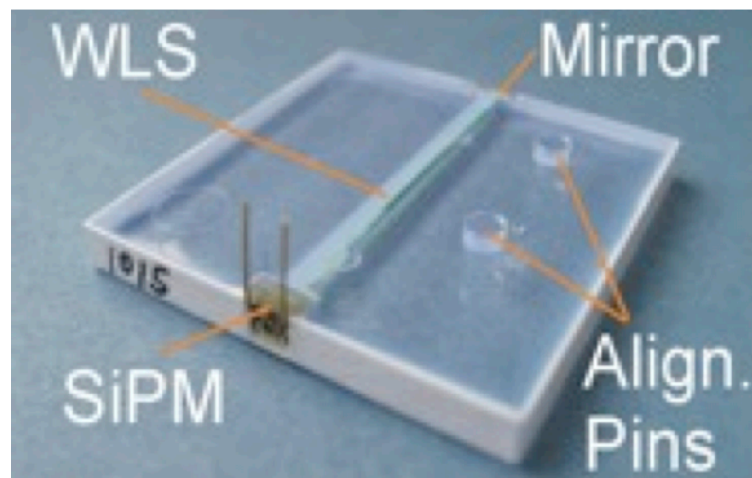
- Mokka drivers: ILD-AHCAL
  - New videau geometry for ILD-AHCAL Barrel
  - New mechanical endcap geometry design of ILD-AHCAL
  - Sensitive detector digitization

# 2nd Generation Prototype: Layer

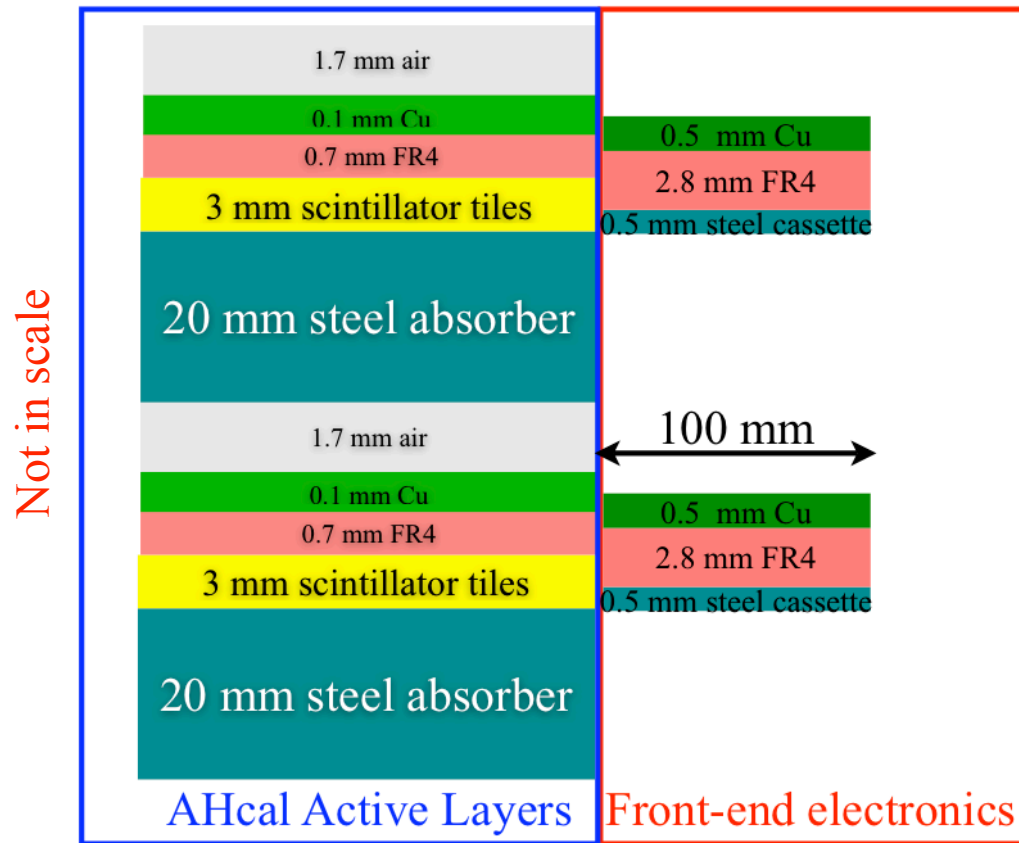


Hcal Barrel Layers

Front-end electronics



# Current Implementation of Simulation Geometry



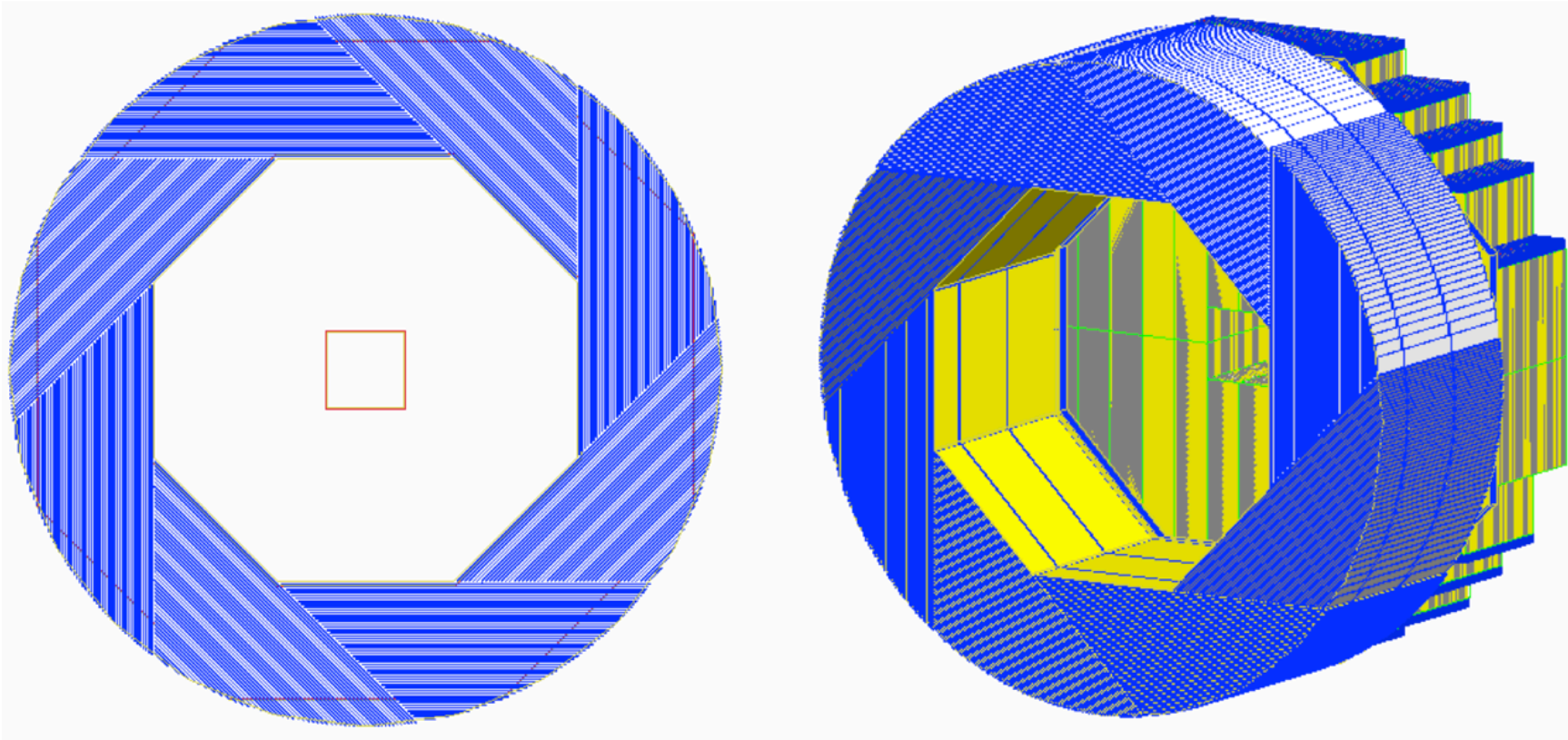
- The current mechanical active layers design
  - Implemented for Barrel and Endcap of ILD Hcal calorimeter.
  - The up-to-date AHcal endcap Mokka driver include front-end electronic too. (more realistic)

- Current implementation of detector layers:
  - 20 mm thick steel absorber: include 19 mm absorber and 2\*0.5 steel cassettes
  - 3 mm thick scintillator tiles
  - readout board with integrated ASICS simulated by 0.7 mm FR4 and 0.1 mm Cu
  - 1.7 mm air gap for connectors, solder pins ...
- Front-end electronics at module ends were implemented
  - 0.5 mm steel, 2.8 mm FR4 and 0.4 mmCu



# Mokka drivers: ILD-AHCAL

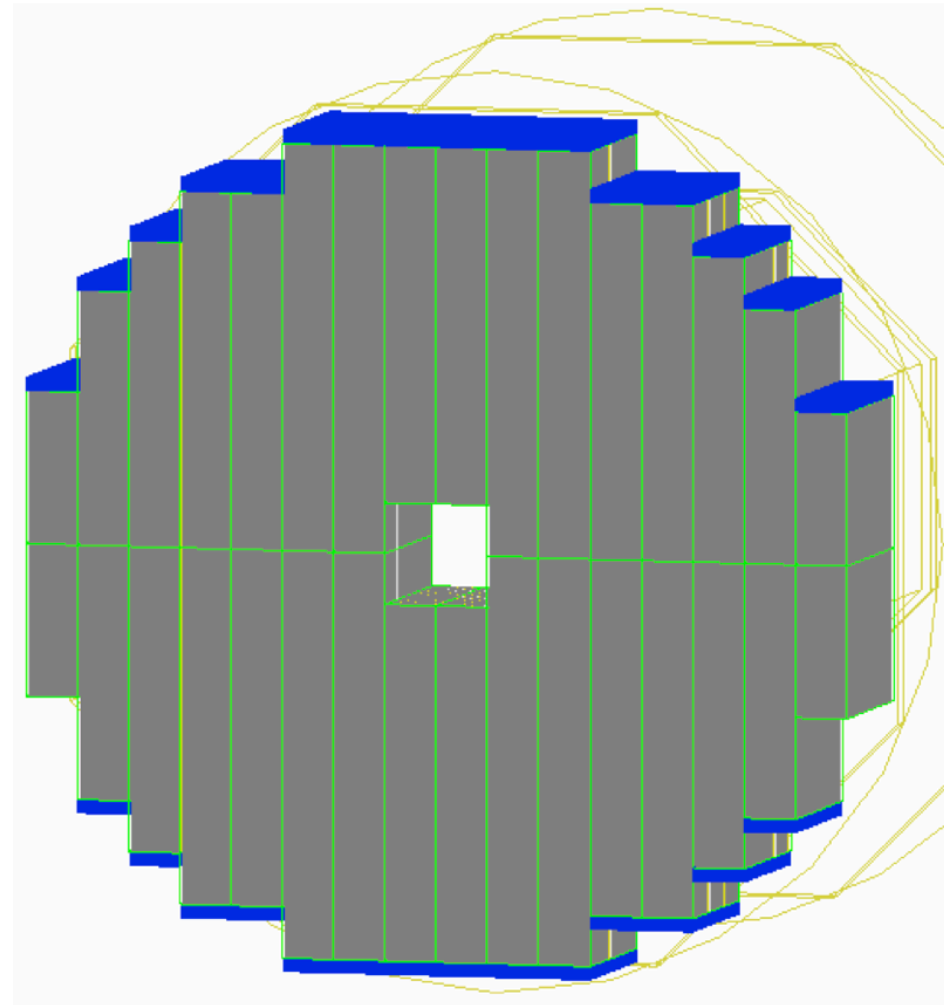
- New videau geometry for ILD-AHCAL Barrel



Geant4 visualization for videau geometry implementation

# Mokka drivers: ILD-AHCAL

- New mechanical endcap design for ILD-AHCAL
- Geant4 visualization for updated endcap geometry implementation
- grey: endcap modules
- blue: front end electronics



# Status of simulation

- Current update of Mokka driver in the barrel has been reported in detail here. Both Tesla and videau geometry are available.
- Endcap has been updated follow engineering design, service has been implemented too.
- Current status of simulation
  - overall dimensions were already OK
  - service for both barrel and endcap are already in
  - updated details of active layer structure
  - updated cracks, to follow engineering design

# Summary and outlook

- AHCAL CALICE software:
  - Fully implemented for the reconstruction and calibration.
  - Debugged during the explore of the intensive usage by users.
  - This strategy provide us a better software today than yesterday.
  - More higher level applications to be supported.
  - Go through the calibrations and hardware connection setup for the last test beam with hardware exports.
- AHCAL ILD Mokka drivers for ILC DBD:
  - The Mokka drivers for the barrel and endcap have been updated and implemented. The intensive test will be followed up.
- AHCAL test beam Mokka drivers:
  - Few bugs has been fixed for the previous test beam, And a new driver has been implemented for the W-AHCAL test beam with the hardware parameters.
  - A more flexible Mokka driver for the next generation AHCAL has been implemented, and under testing. And a Mokka module has been created too in the Mokka database.