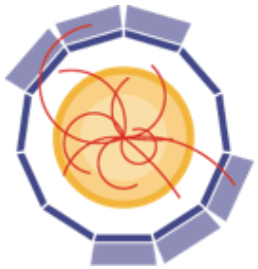
DESY and Heidelberg.

Contributions to WP 4 task 3

Micro-electronics for calorimeter read-out



AIDA2020

Felix Sefkow

AIDA-2020 kick-off meeting
CERN, June 3-5, 2015

HELMHOLTZ GEMEINSCHAFT

CALICE Calorimeter for ILC

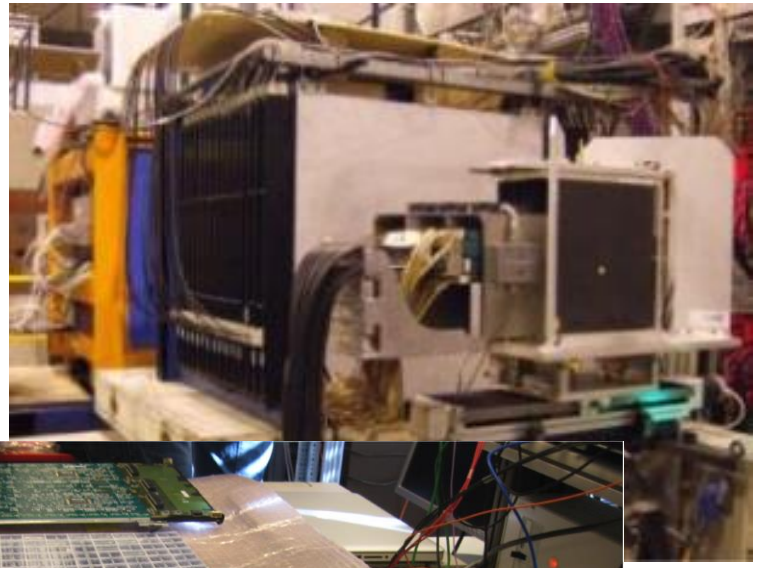
DESY

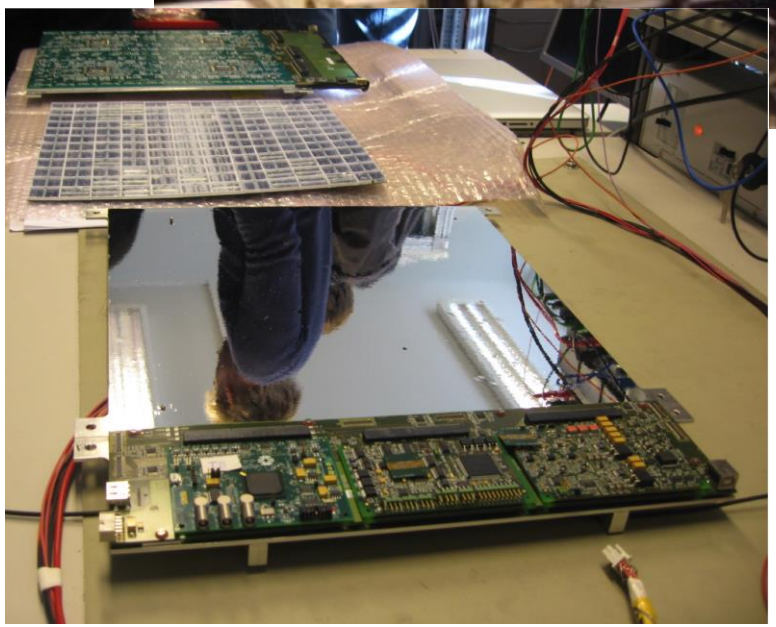
Outline

- DESY
  - ASIC characterisation
  - DAQ and system integration aspects
- Heidelberg
  - Design alternative and sharing of expertise
- Relations with other WPs

DESY: characterisation and integration

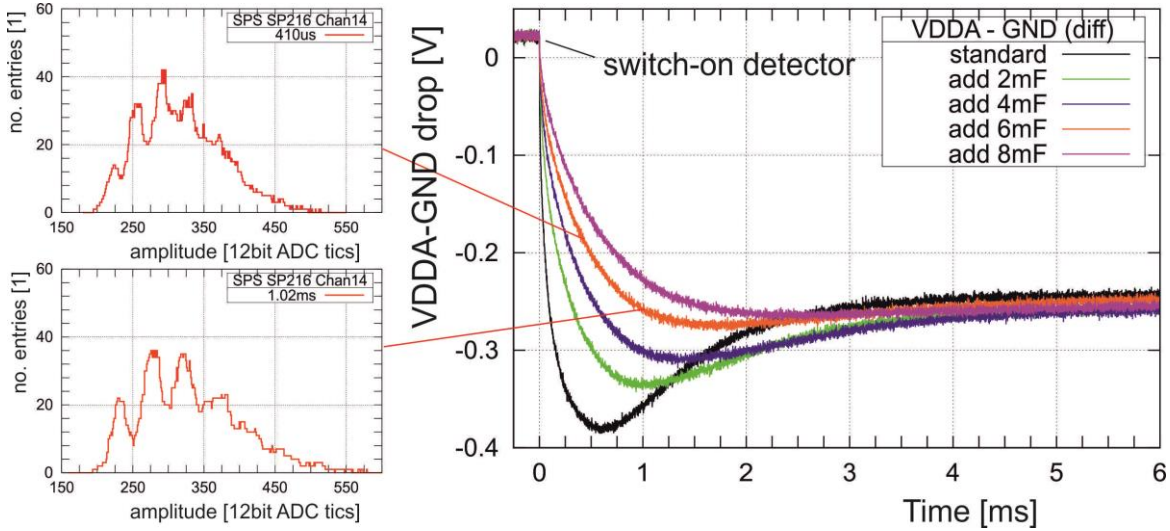
- DESY and OMEGA (formerly at LAL) cooperate since 2004 on development of calorimeter read-out electronics
  - OMEGA: design and first tests
  - DESY: multi-channel characterisation and system integration
- System-on-chip ASICs require experience and infrastructure (hardware, firmware and software) for characterisation
  - Typically 700 configuration parameters
  - Frequent meetings and exchange of personnel
- Continue and use expertise for new generation of AIDA-2020 ASICs





DESY: characterisation and integration

- Example studies
  - Coherent noise, cross-talk and load dependence studies
  - Interplay with real SiPM types and different pulse shapes
  - Power-up schemes**, power-pulsing behaviour**, power budget analysis
  - Integration into DAQ and slow control
  - Reliability and long-term stability



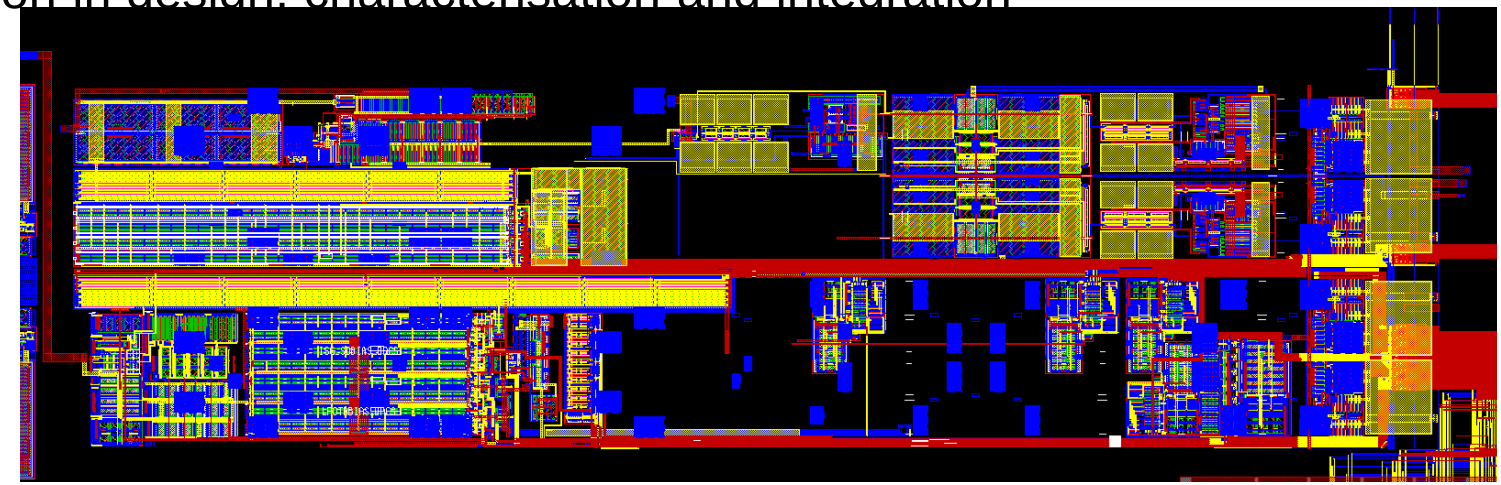
- Intermediate prototypes
  - SPIROC2B in use in present test beam prototypes

    Some more rare instabilities ironed out last (!) week
  - SPIROC2D with many bug fixes and feature improvements in production
  - Important step towards SPIROC3 in AIDA-2020

Heidelberg: alternative design and technology

- Heidelberg develops alternative ASIC for read-out of calorimeters with SiPM
- Main difference: extended application range for SiPMs with lower gain (e.g.: smaller pixels), but also less expensive CMOS technology (UMC 0.18)
- Also in CALICE framework
  - Regular exchange with OMEGA on design ideas
  - Back-end and footprint compatible
- Cooperation in design, characterisation and integration

KlauS



Relation with other WPs

- WP5: Common DAQ
  - Event building with channel-wise memory management
  - Slow control integration
- WP13: Tracking
  - Synergies with read-out chips for fast timing RPCs
- WP14: HG Calorimeters
  - Use of ASIC prototypes in test stands
  - New read-out interface
  - ASIC test stand
- People
  - DESY: Katja Krüger, Mathias Reinecke
  - Heidelberg: Hans-Christian Schultz-Coulon, Wei Shen