Forward Calorimetry

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Institutions: AGH-UST, DESY, IFJPAN, TAU

Physics Goal:

- Excellent EM shower position reconstruction for the Luminosity measurement
- Highly efficient electron tagging with rad. hard sensors
- Verification of shower simulations for electrons and hadrons

Technology:

Finely segmented and extremely compact calorimeters

The following infrastructure development will allow to prove the Results obtained from Monte Carlo simulations for the current optimised calorimeter design.

Tracker in front of a calorimeter prototype

Responsible: Silicon people

A flexible tungsten absorber structure, depth >=10 X_0, precise mechanics
Responsible: DESY and Tel Aviv
Cost:
Material : 50 kE
Design : 6 MM designer work
Manufactoring: 50 kE

FE and ADC ASICs to allow the test of 10 consecutive sensor layers, (30^0) in the beam:

Responsible: AGH-UST Cracow

Cost estimate (ASISc for all partners)

	Direct	Total(*1.6)	Request EU (40%)
ASICs	125kE	200kE	80kE
Design&test	54 MM	86.4 MM	34.5 MM
Material (PCB, etc.)	10kE	16 kE	6.4 kE

Tools to assembly sensor sectors:

Cern offers support to develop bump-bonding connectivity,
DESY and Cracow will focus on jigs etc. to produce assembled sensor plane Prototypes.

Responsible: DESY, CERN and Cracow AGH-UST/IFJPAN

Cost estimate

Material	50 kE
Cooling studies	6 MM

Design : 6 MM designer work

Manufactoring: 10 MM workshop

Detector alignment and position monitoring:

Responsible: IFJPAN

Cost estimate

Mechanical support (EU request=Direct*1.6*0.4) 8 kE

Alignment system(EU request=Direct*1.6*0.4)30kE

Manpower (EU request=Direct*1.6*0.4) 11.5 MM

DAQ (common contribution to the infrastructure of all components):

Contributions from TAU and IFJPAN

materials 50 kE

manpower (IFJPAN) 6 MM

Tau 12 MM

Reconstruction and simulation software

Contributions from TAU and IFJPAN

manpower 24 MM

Power pulsing (common with other infrastructure):

Cern may contribute with the source infrastructure for pulsed power, AGH-UST and DESY will focus on preparing the infrastructure to operate the system with pulsed power

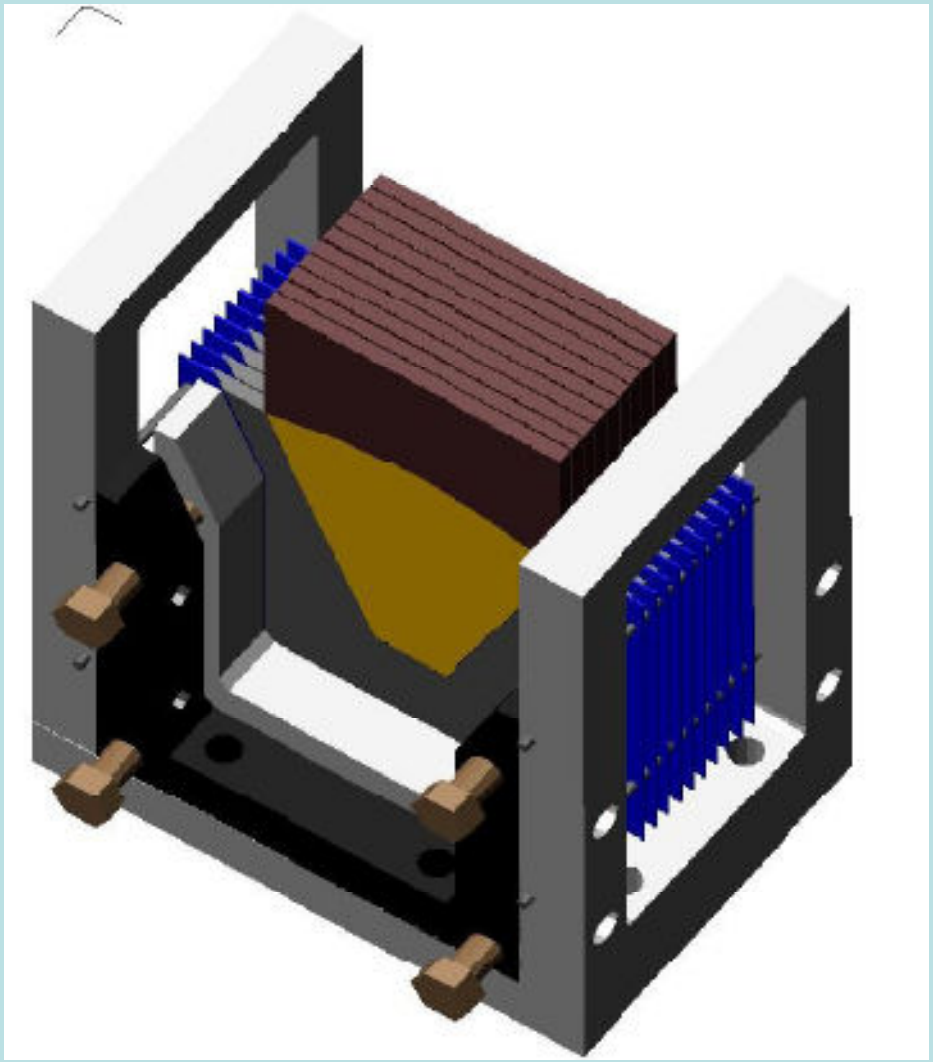
Contributions from AGH-UST	3 MM,
DESY	3 MM
CERN	6 MM
Equipment	40 kE

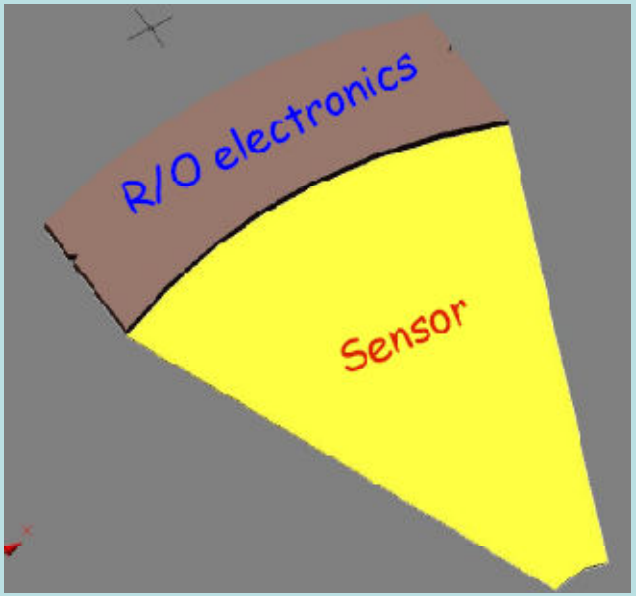
CLIC front-end with time stamping:

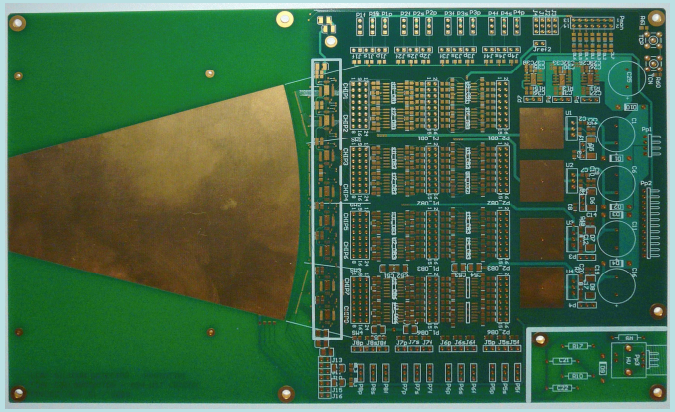
This is aimed to adopt the readout infrastructure to CLIC conditions. Cracow will work on the design and prototyping, DESY and CERN on test and integration in future test-beam studies.

Contributions from AGH-UST, DESY	
ASICS	40 kE
Design	12 MM
Test and integration	6 MM

Example Ideas







Where we are

Si Sensors (LumiCal) are produced, just tested

GaAs Sensor prototypes are avaiable for BeamCal
Not yet tested.

Prototypes of FE ASICS are available (8 channels per chip)
System test needed

ADC ASICS are available as one-channel version,
Development needs to be completed

No assembly done so far.