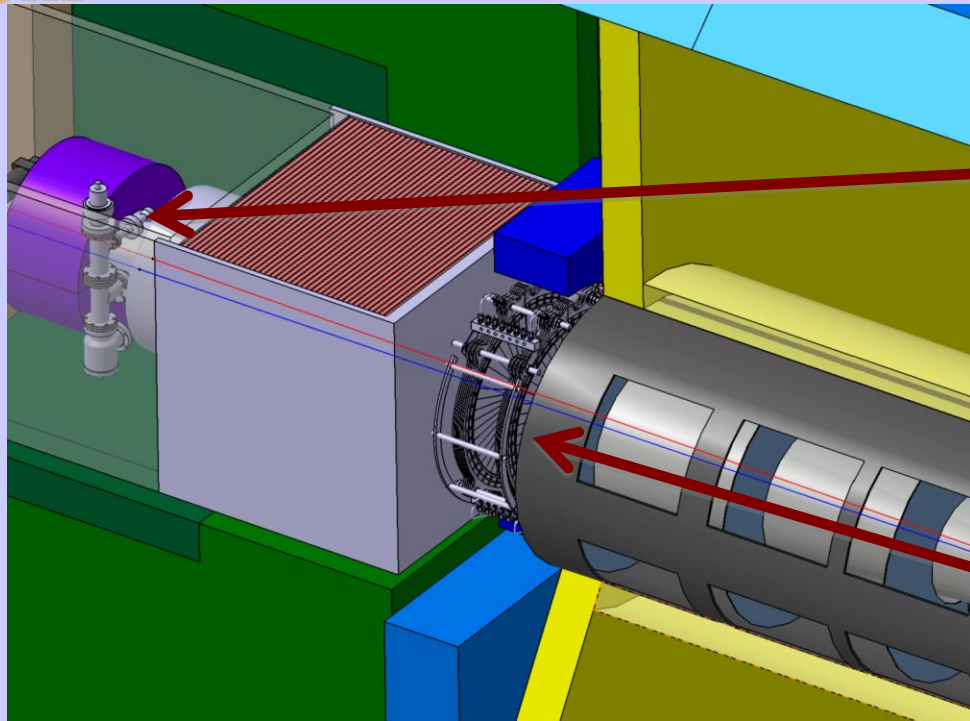


## Wolfgang Lohmann, BTU and DESY

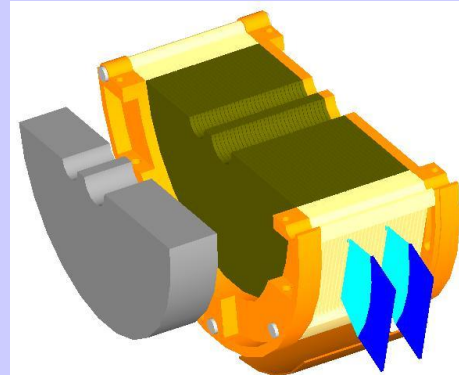
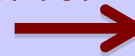
- FCAL is a R&D venture to develop novel detector technologies to instrument the very forward region of future collider
  - Main collider are ILC, CLIC (LHC ,sBELLE) .....
  - LHC is running, timeline for ILC, CLIC are 'gliding'
  - Our "glue" is a common physics interest
  - Estimates of performance benchmarks are based on the Standard Model
- Labs involved: Argonne, Vinca Inst, Belgrade, Bukharest IFIN, CERN, Univ. of Colorado, Cracow UST, Cracow INP, JINR Dubna, Royal Holloway, NCPHEP Minsk, Santa Cruz, Stanford University, SLAC, Tuhoku Univ., Tel Aviv , Univ., DESY (Z.)



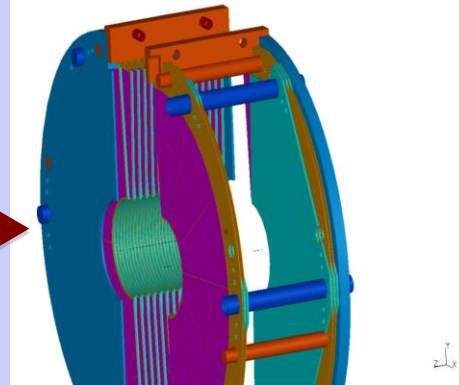
# Very Forward Instrumentation- Example ILD



BeamCal  
+ Pair  
Monitor



LumiCal



- Ongoing simulations to optimize detector design for
  - precise luminosity measurement,
  - hermeticity (electron detection at low polar angles),
  - assisting beam tuning (fast feedback of BeamCal data to machine)
- Challenges: radiation hardness (BeamCal), high precision (LumiCal) and fast readout (both)

Similar or harder challenges are expected at CLIC  
Our effort so far - Develop Technological Solutions to tackle the Challenges

- ILC detector DBD 2012 (2013)
  - refining design considerations (MC studies)
  - completing the measurements with the sensor prototypes
  
- CLIC CDR (2011)
  - completing design studies

- Completing of the sensor plane prototypes (~2012)

- adding ADCs, modify DAQ

UST	ADC chips, PCB	2011
DESY	Integration & Test	2011
TA	DAQ (@UST)	2011
together	beamtest	mid 2011-2012

- use of the SLAC chip

SLAC	completion of the chip	2011 ?
UC SC	connection to a sensor	2011 ?

DESY would be interested in beam-test

- 'second generation' sensor planes (AIDA) (~2014)
  - to be prepared for the calorimeter prototype
  - new connectivity scheme

Based on wire bonding:

- |                            |                 |           |      |
|----------------------------|-----------------|-----------|------|
| - design of a 'slim plane' | Cracow(LumiCal) | DESY (BC) | 2011 |
| - production of a plane    |                 |           | 2012 |
| - lab & beam tests         | + TA            |           | 2012 |
| - production, O(10 pieces) |                 |           | 2013 |

FE and ADC ASICS must be available 2013 (UST)

Based on second metalisation: to be followed as an option for silicon

- ASIC development for CLIC conditions (~2014)
  - specification      Cracow INP      2011
  - prototype      UST      2012
  - test      UST/Desy      2013

- Mechanical structure for the prototype calorimeter (AIDA)
  - CERN 2012
  
- Infrastructure for the prototype calorimeter (AIDA) (~2014)
  - Cooling, concept INP 2012
  - prototype, adopted to the setup 2014
  - laser position monitoring INP 2012/2014
  - DAQ TA/UST 2014 (see point 1)

FP7 Partners:

AGH-UST Cracow	(Marek Idzik)
CERN Geneva	(Konrad Elsener)
DESY Zeuthen	(W. Lohmann)
IFJPAN Cracow	(L. Zawiejski)
TAU Tel Aviv	(H. Abramowicz)

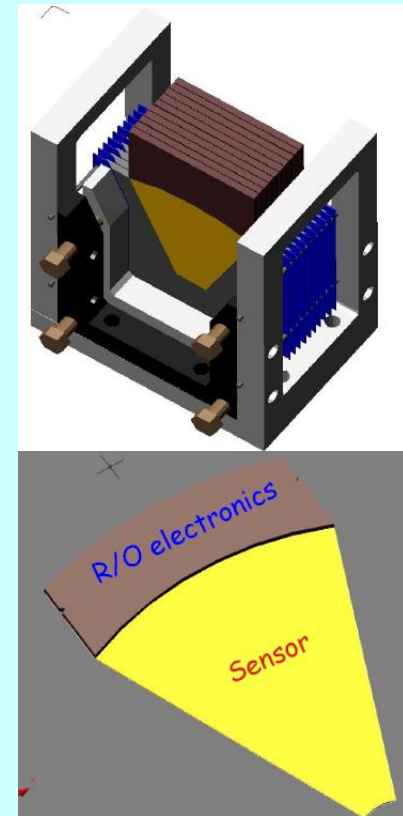
Infrastructure to tackle the scientific goal:

FCAL Specific infrastructure:

- Flexible, high precision tungsten structure
- Fast FE Readout
- Innovative connectivity scheme
- Module construction and test devices (jigs, mechanics and electronics test facilities)
- Position control devices

Infrastructure common with others:

- Power pulsing
- Data acquisition
- Tracking in front of the calorimeter





BeamCal: Electron Detection Capability

SB2009 beam parameter, no anti DID??

LumiCal: - Larger Background for SB2009, possibly no anti-DID, larger inner radius

- Completion of the physics background studies for CLIC

VINCA

2011

- bunch magnetic field effects

VINCA

2012

Both: - exercise of a calibration concept, using muons and Bhabhas