

# AHCAL LDA

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Rouven Spreckels, Stefan Tapprogge, Rainer Wanke

CALICE electronics and DAQ Meeting  
DESY Hamburg, Dec. 10, 2012

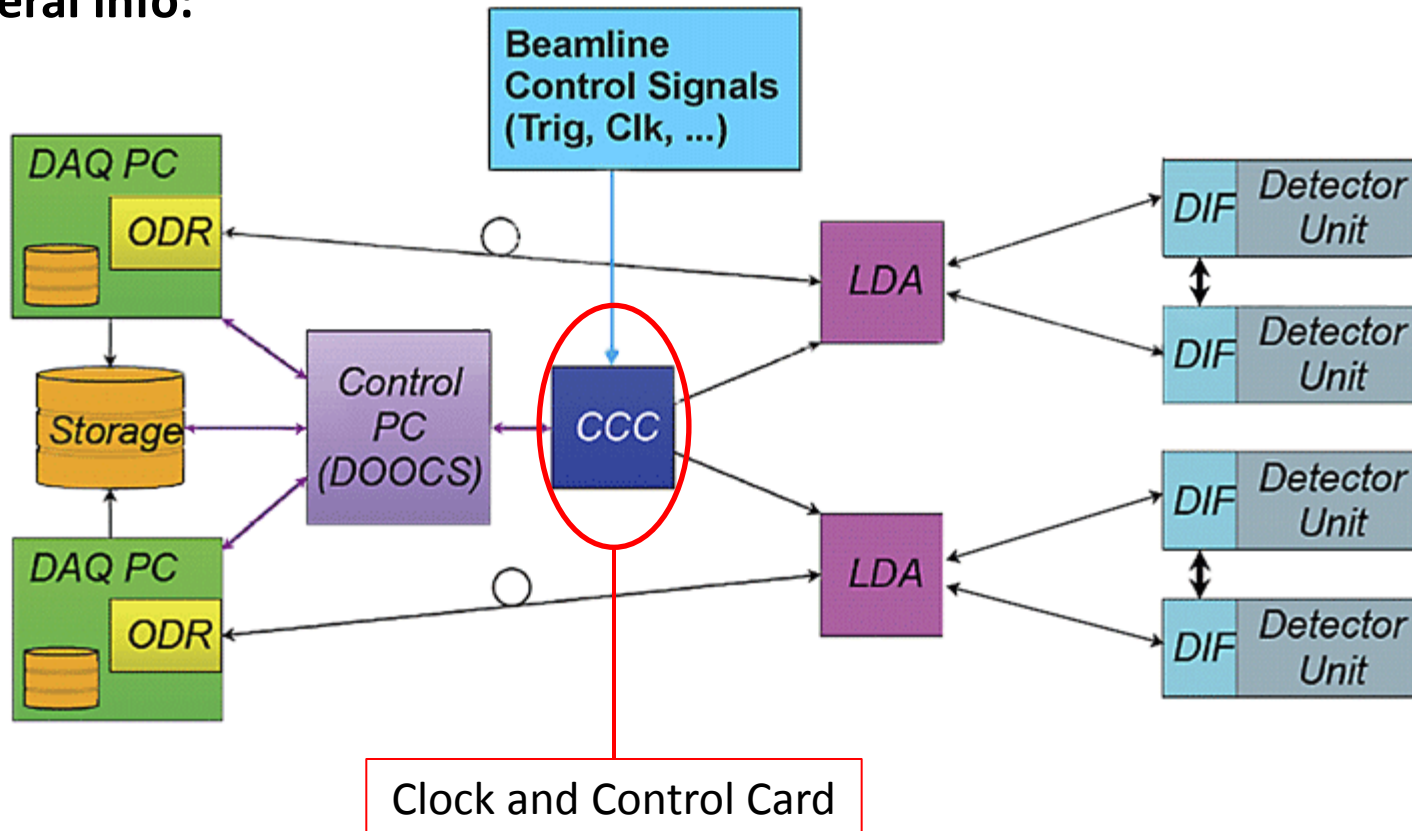


JOHANNES GUTENBERG  
UNIVERSITÄT MAINZ



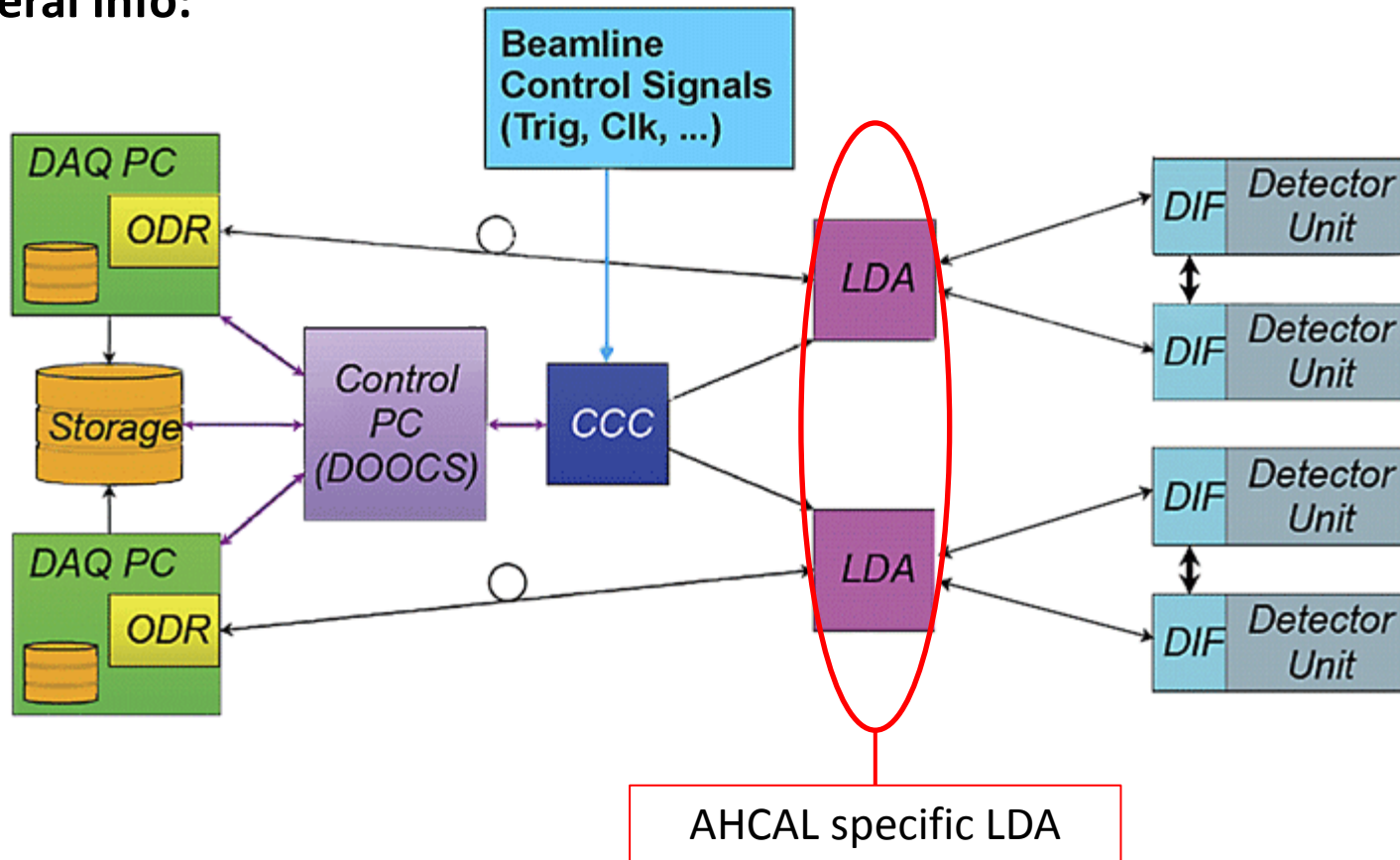
# Readout chain

## General info:



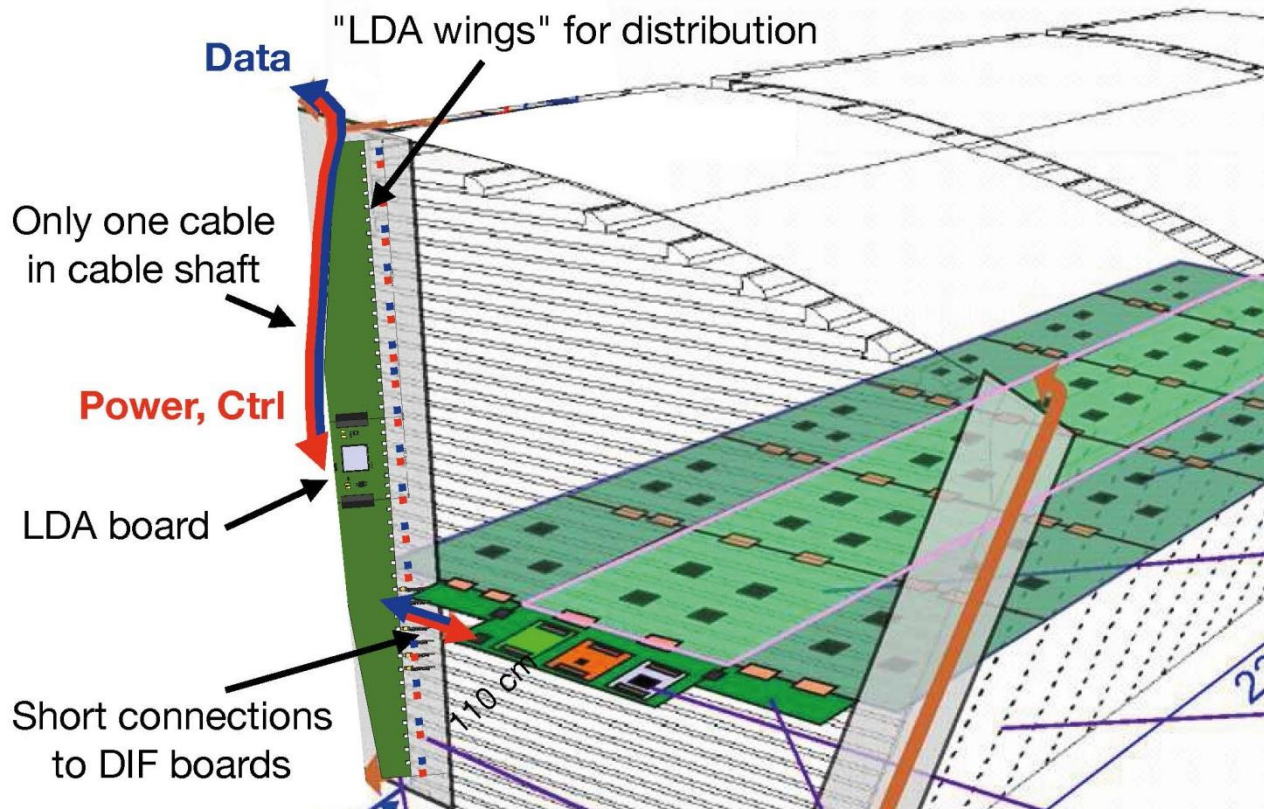
# Readout chain

## General info:



# Cambridge Meeting September 2012

Put LDA board inside cable shaft:



# Cambridge Meeting September 2012

**Consists of four separated parts:**

**1. Three passive PCBs:**

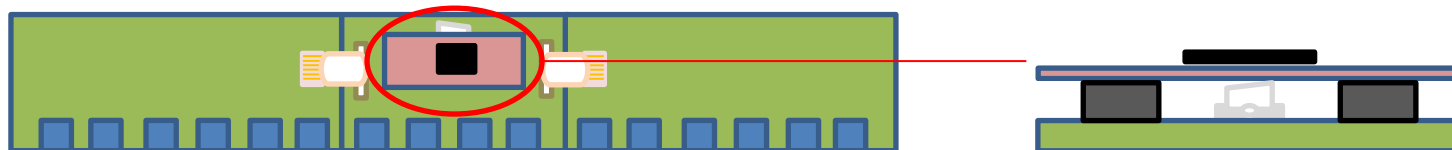
the 48 HDMI-connectors are on this three PCBs.

**2. One active PCB:**

on this mezzanine we can change our FPGA/processor without problems.

**Solution:**

**LDA with flex ribbon cable:**



# Cambridge Meeting September 2012

**Consists of four separated parts:**

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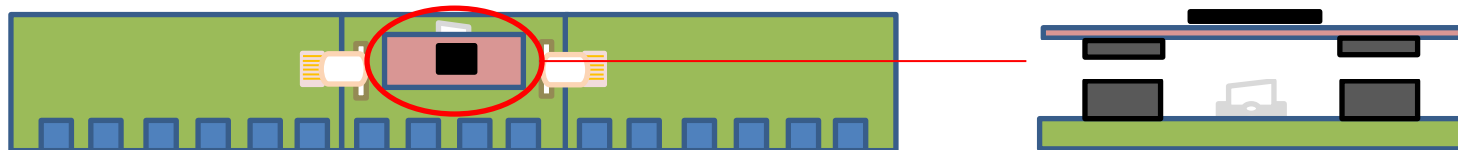
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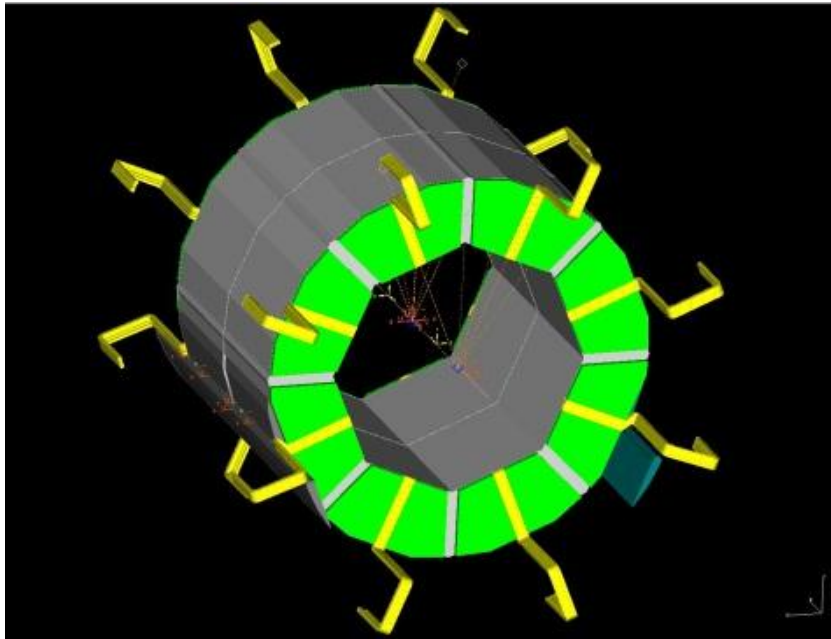
**Solution:**

**LDA with flex ribbon cable:**



# ILD and the LDA

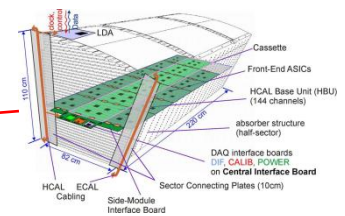
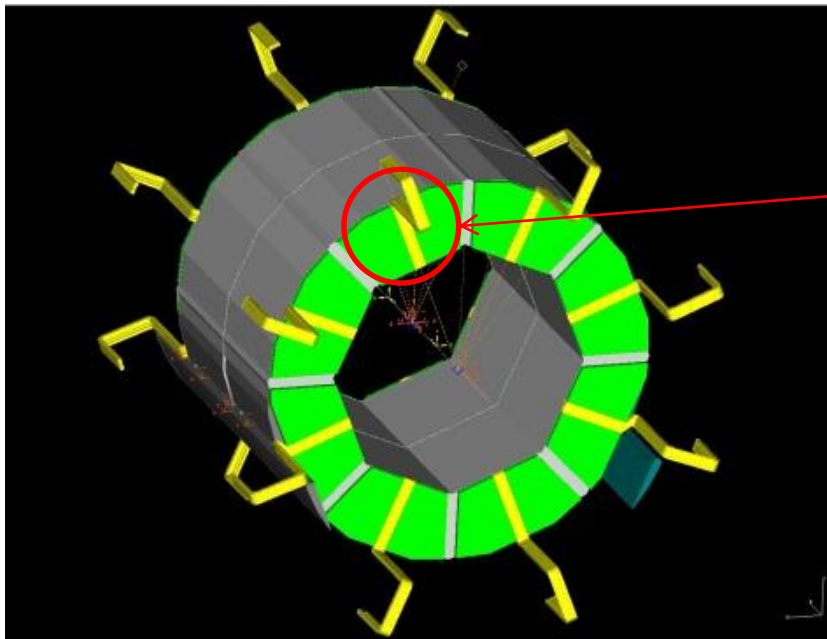
**ILD barrel :**





# ILD and the LDA

ILD barrel :



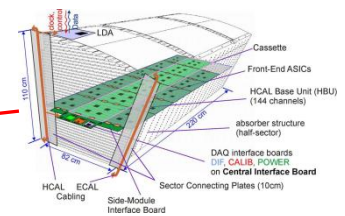
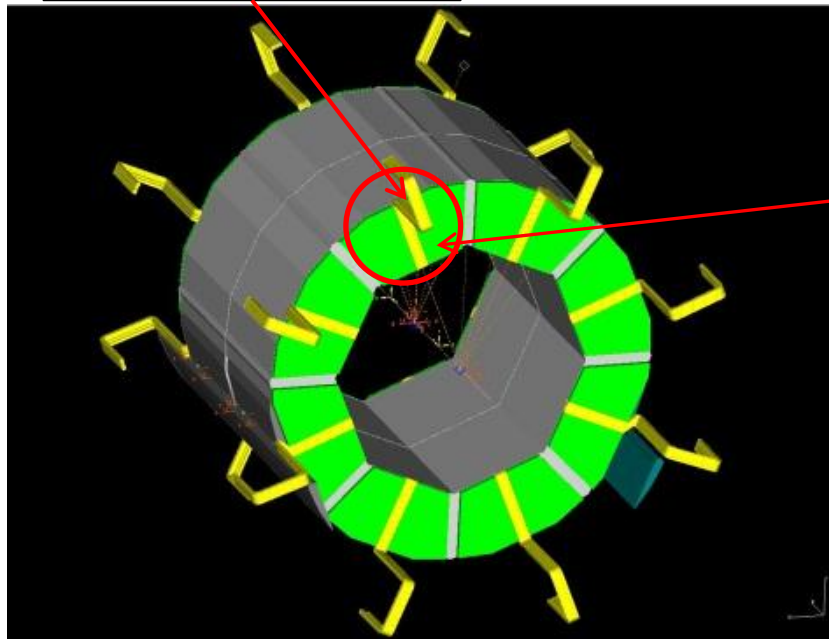
- readout 2 HCAL segments



# ILD and the LDA

ILD barrel :

HCAL shaft with cooling pipes and TPC cables



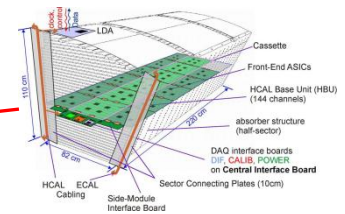
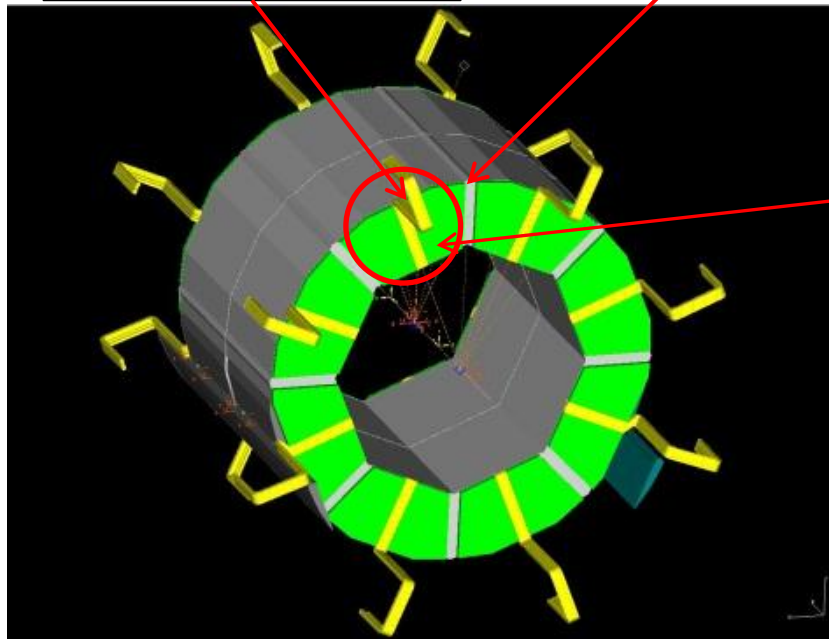
- readout 2 HCAL segments

# ILD and the LDA

ILD barrel :

HCAL shaft with cooling pipes and TPC cables

ECAL shaft



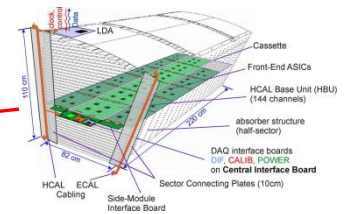
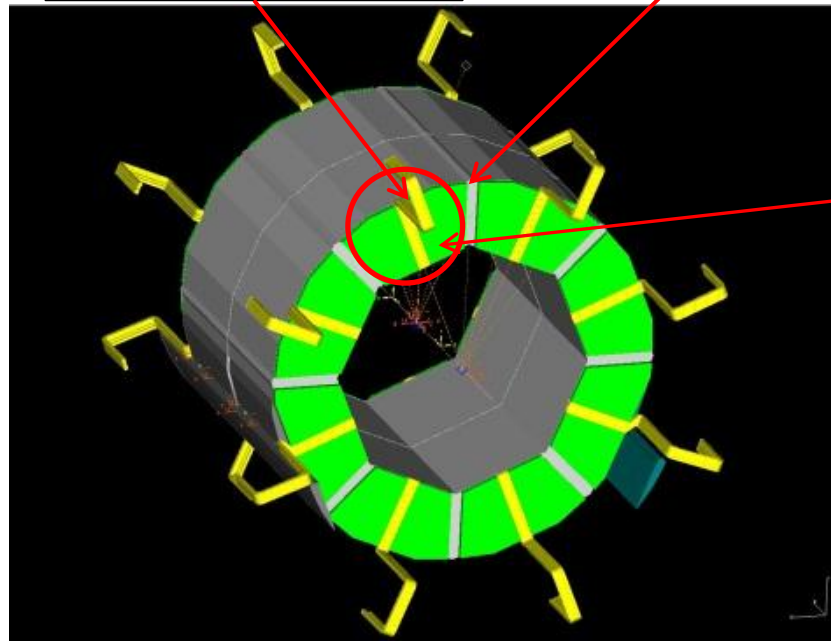
- readout 2 HCAL segments

# ILD and the LDA

ILD barrel :

HCAL shaft with cooling pipes and TPC cables

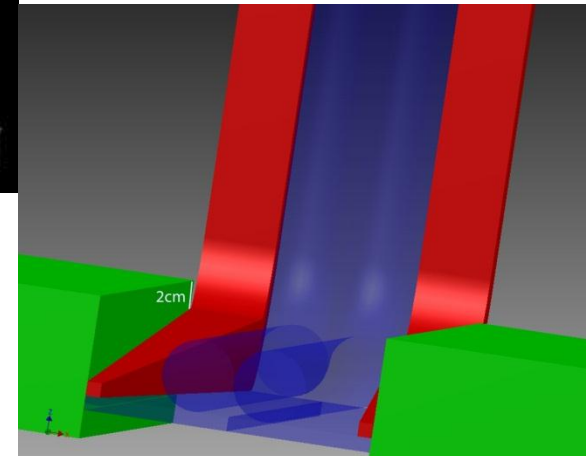
ECAL shaft



- readout 2 HCAL segments

More than anticipated:

~~48~~ 96 HDMI-connectors on the PCBs.



# Specific AHCAL LDA

**Consists of four separated parts:**

**1. Three passive PCBs:**

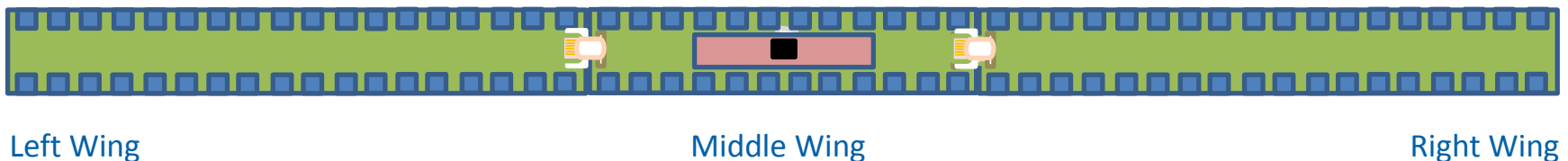
the ~~48~~ 96 HDMI-connectors are on this three PCBs.

**2. One active PCB:**

on this mezzanine we can change our FPGA/processor without problems.

**Solution:**

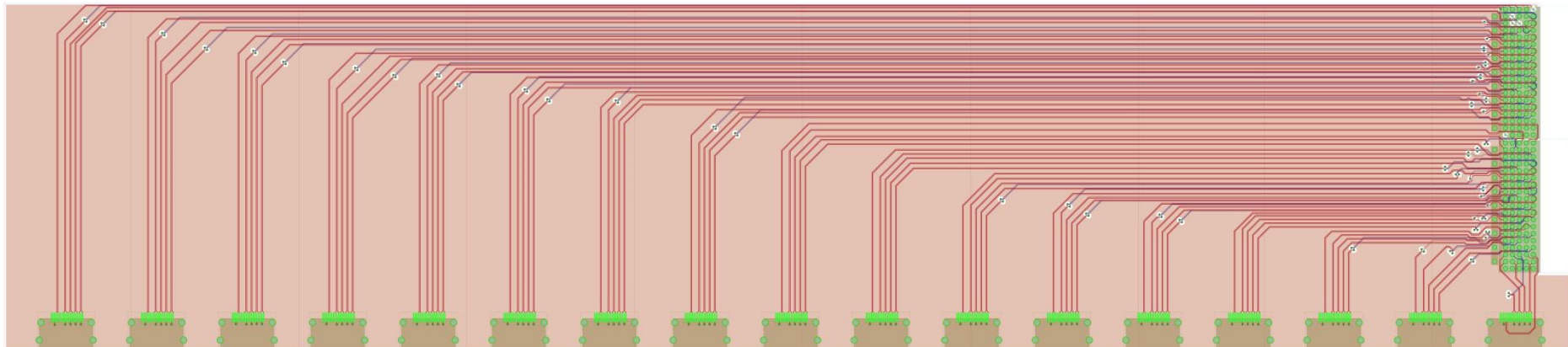
**LDA with flex ribbon cable:**



# Wing-LDA

## The three PCBs:

1. Wing with 18 HDMI-connectors routed (without flex ribbon cable):

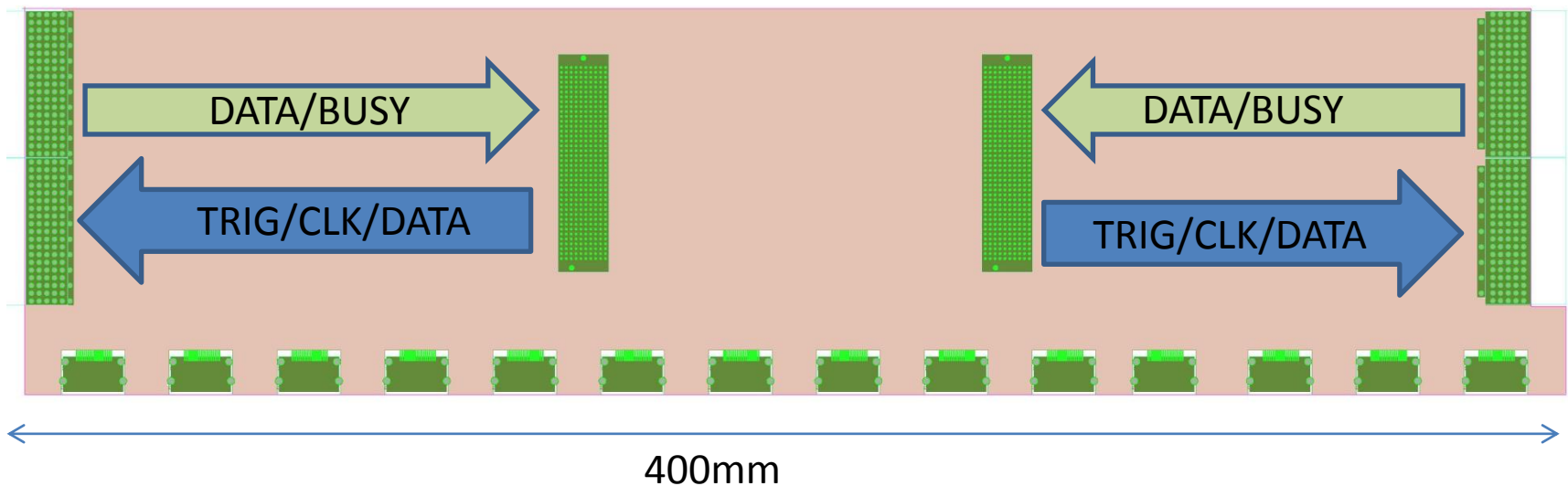


450mm

# Wing-LDA

## The three PCBs:

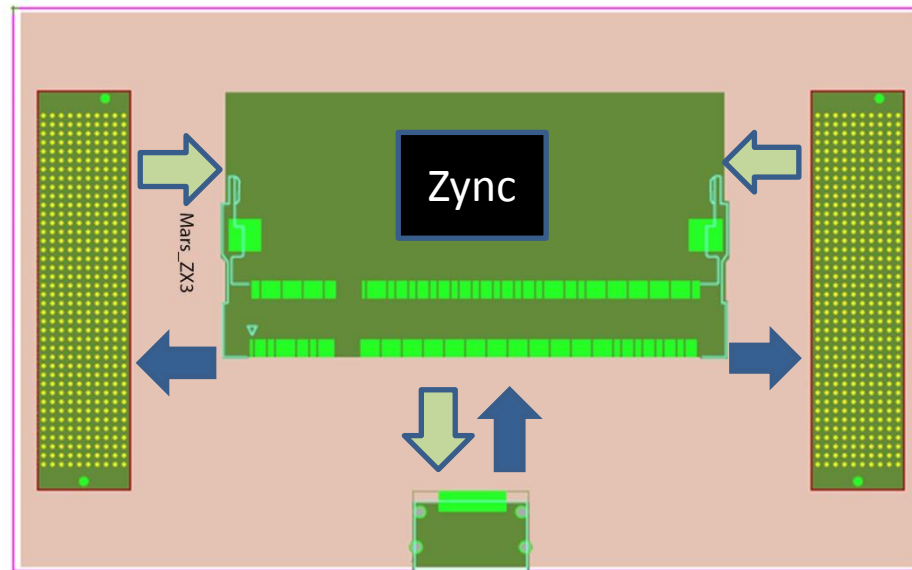
### 2. Middle PCB with 12 HDMI-connectors (without flex ribbon cable):



# Wing-LDA

## The three PCBs:

### 3. FPGA mezzanine:



#### 1. First test with Mars-ZX3 PCB:

- New Xilinx FPGA/processor (108 I/Os), needed 490

#### 2. Later with a FPGA/processor who can handle more I/Os:



# Amount of data

## Data:

1. 1 SPIROC max. 18696bits (8bits ID, 256bits time stamp, 9216bits TDC, 9216bits Data)

# Amount of data

## Data:

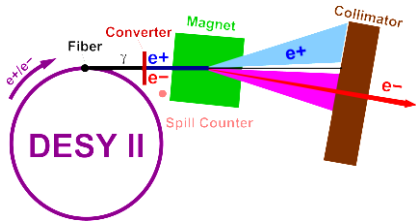
1. 1 SPIROC max. 18696bits (8bits ID, 256bits time stamp, 9216bits TDC, 9216bits Data)
2. Per Slab max. 24 SPIROCs

# Amount of data

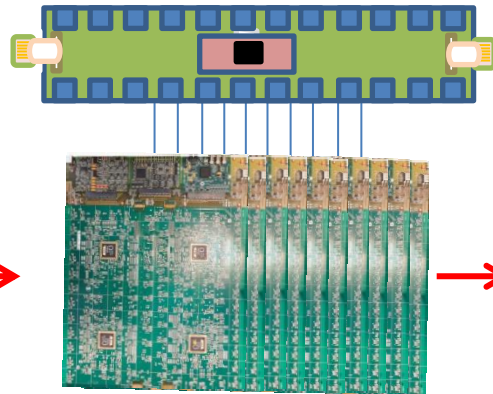
## Data:

1. 1 SPIROC max. 18696bits (8bits ID, 256bits time stamp, 9216bits TDC, 9216bits Data)
2. Per Slab max. 24 SPIROCs
3. Max. 3 Slabs → 72 SPIROCs per DIF → 1346112 bits (per 200ms)
  - 829,9kB/s
  - 96 x 829,9 kB/s max. 100MB/s with 1GBit Ethernet
  - 77,03MB/s maximum amount of data

# HBU 2013 TB (DESY)



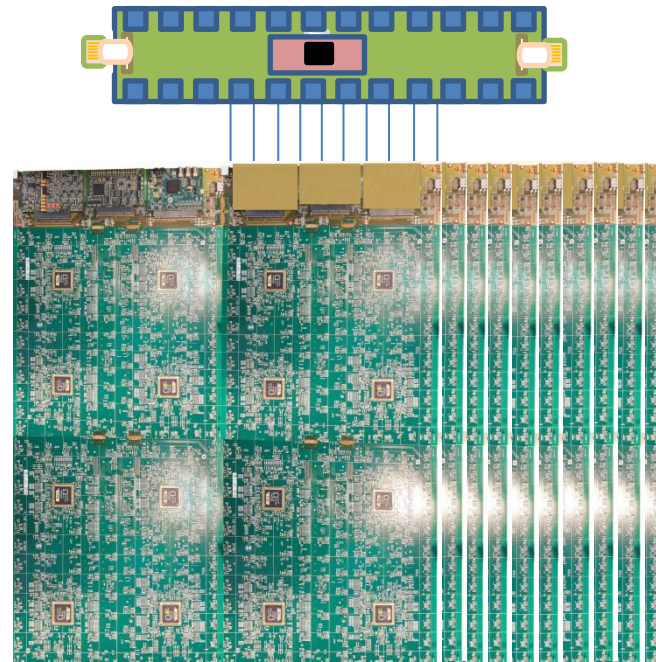
DAQ ECAL (Ethernet)



Beam



DAQ HCAL (Ethernet)



# Next steps



## **Timeline:**

- 1. Finalizing layout for a full-sized functional demonstrator.**
- 2. Working on the software/firmware for the LDA.**
- 3. Requiring more details on the new DIF firmware.**
- 4. Start tests at the Mainz PRISMA detector lab.**

**So that we are ready for the next TB.**

# Next steps

**Are there some questions?**

**Thank you for your attention!**