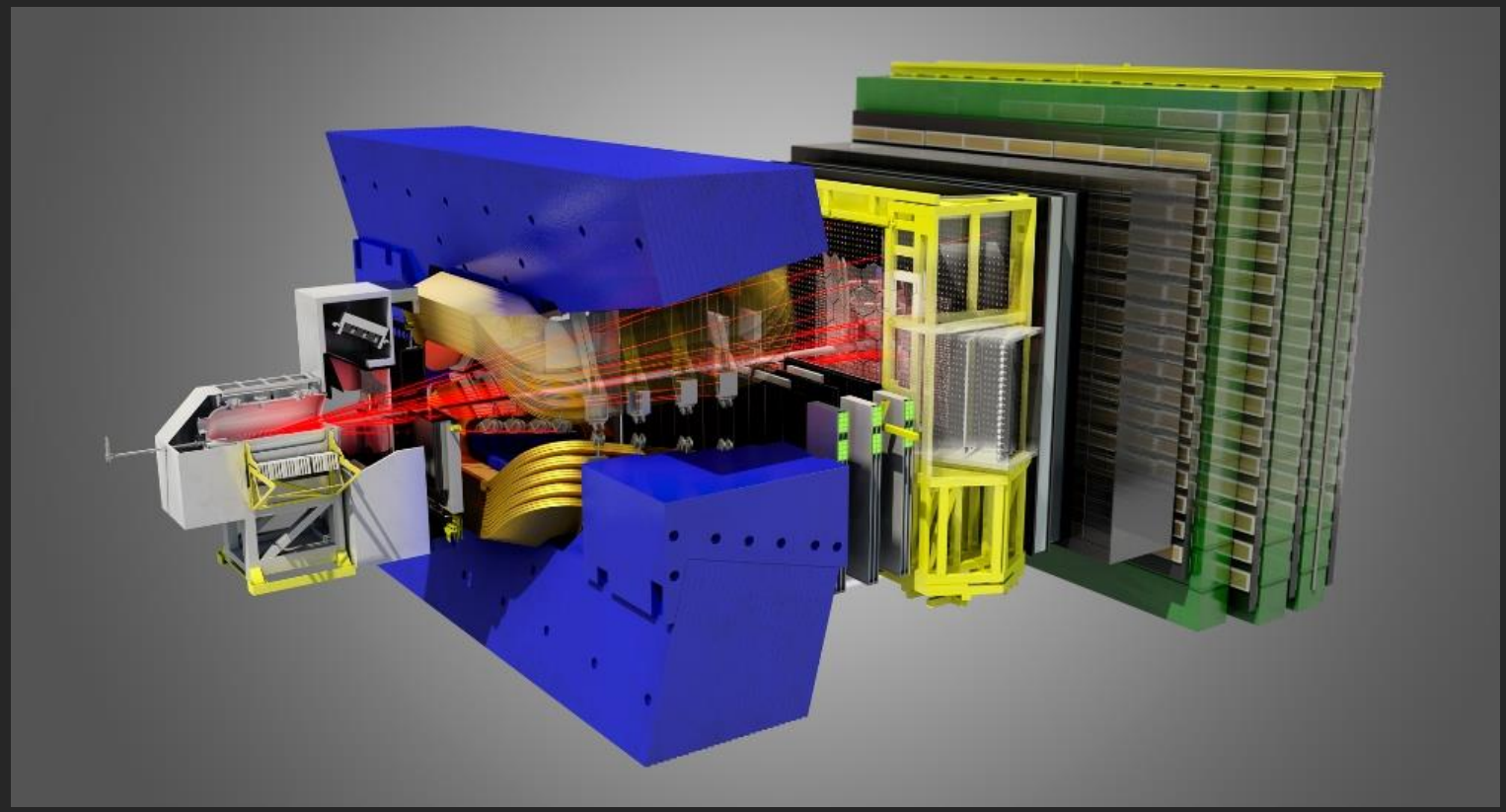
RICH 2 Projekt



Aida Baradari

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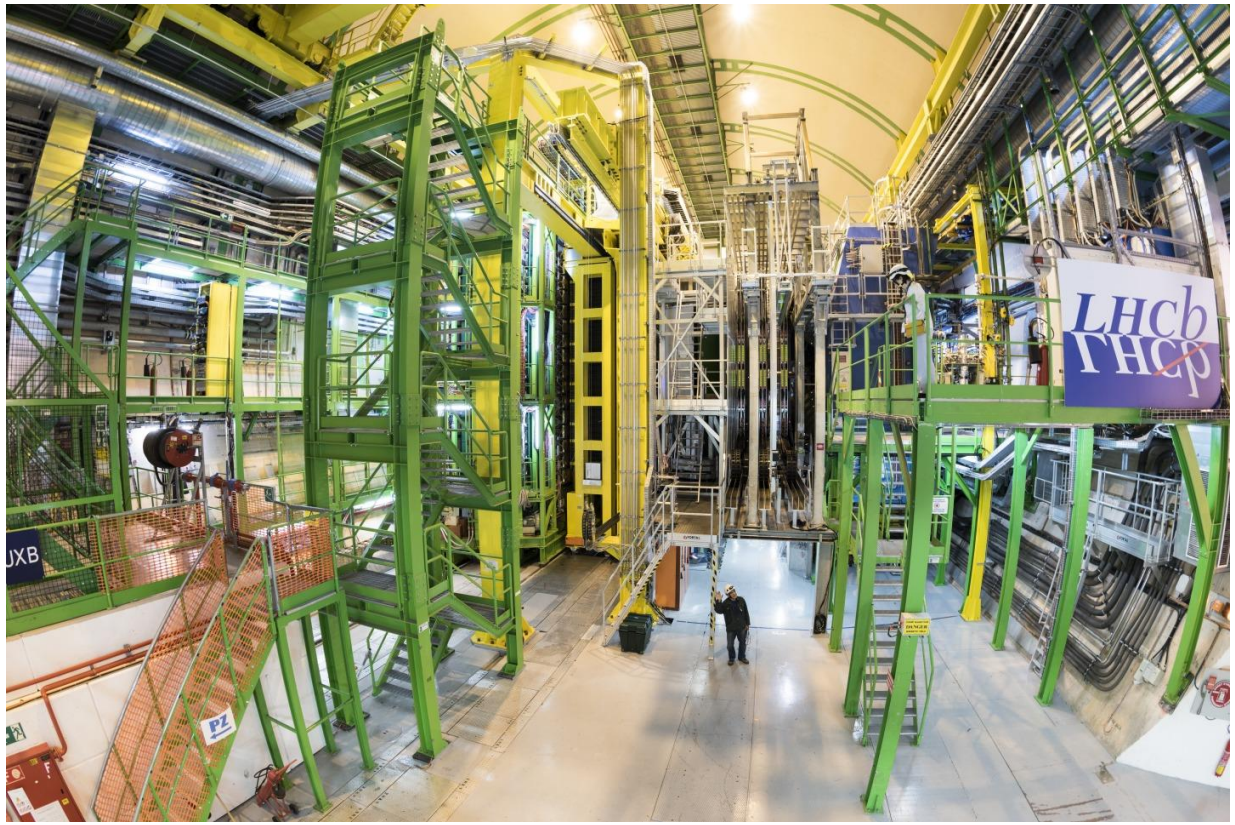
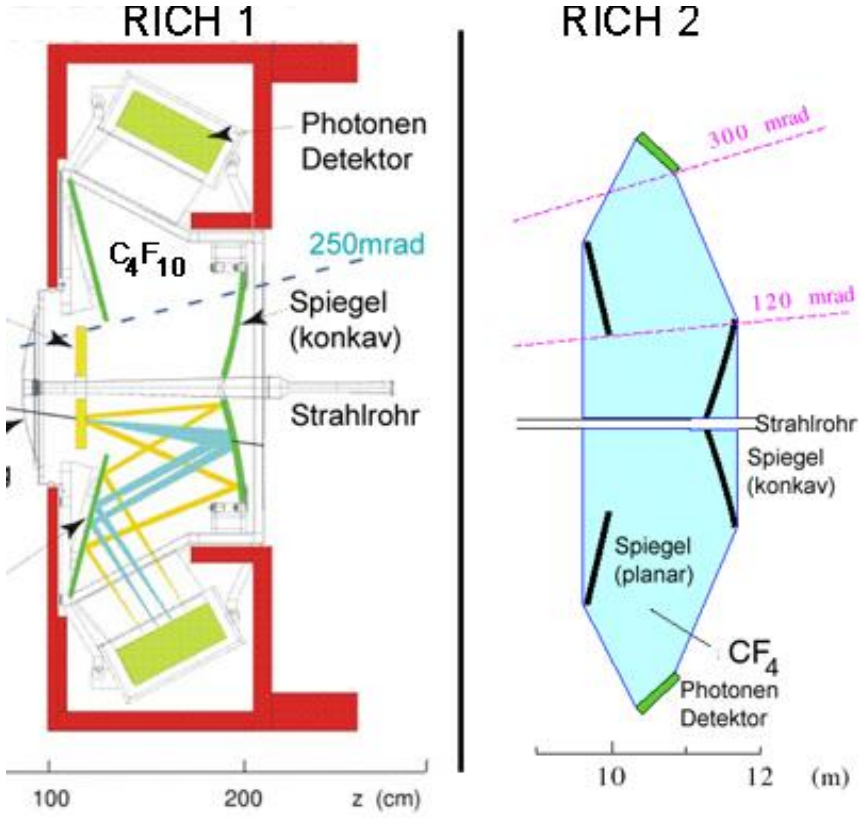


LHCb – RICH Detektoren

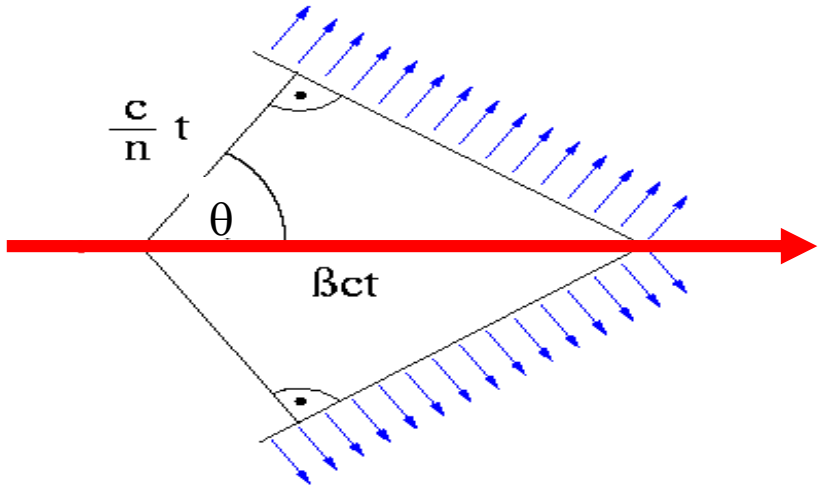


Idee der RICH Detektoren

- Partikel Identifikation → Cherenkov-Licht

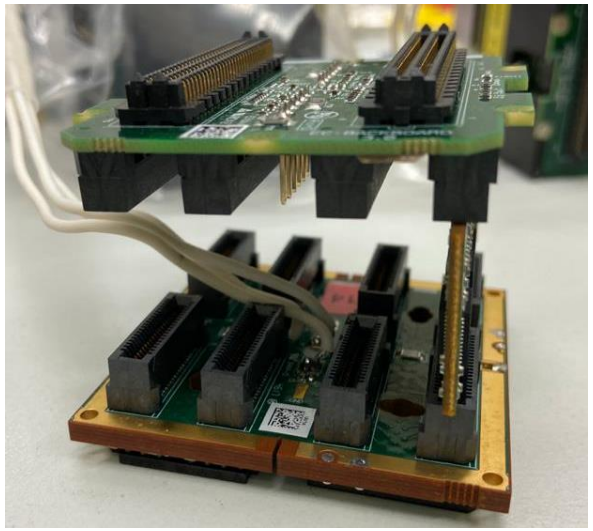
1. Tracking der Flugbahn und des Impulses durch Tracker.
2. Die zu erwartenden Cherenkov-Winkel (unterschiedlich bei RICH Detektoren) bestimmen.
3. Zu erwartenden Werte mit den experimentellen Daten vergleichen. Daraus dann die Masse & Ladung des Teilchens → Bestimmung der „Partikel ID“

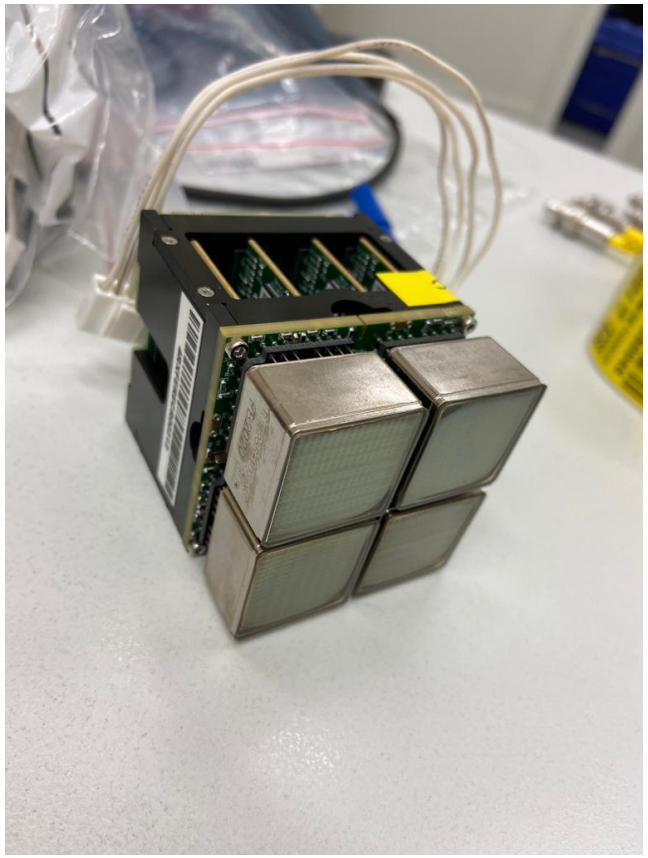
→Messen der Cherenkov-Radiation



Photomultiplier Tubes (PMTs)

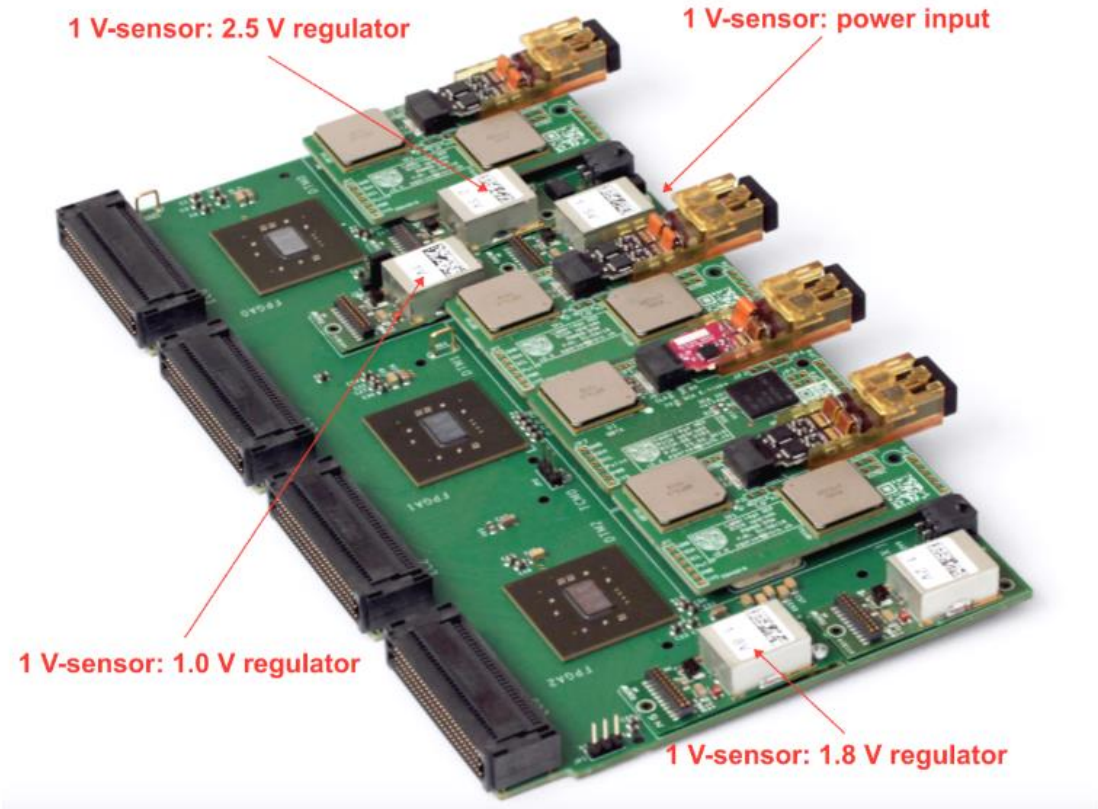
- MaPMTs werden verwendet (Multi-Anode Photomultiplier Tubes)
- 40MHz
- 2 verschiedene Größen
- „verbunden“ mit Front-End-Boards (FEBs)





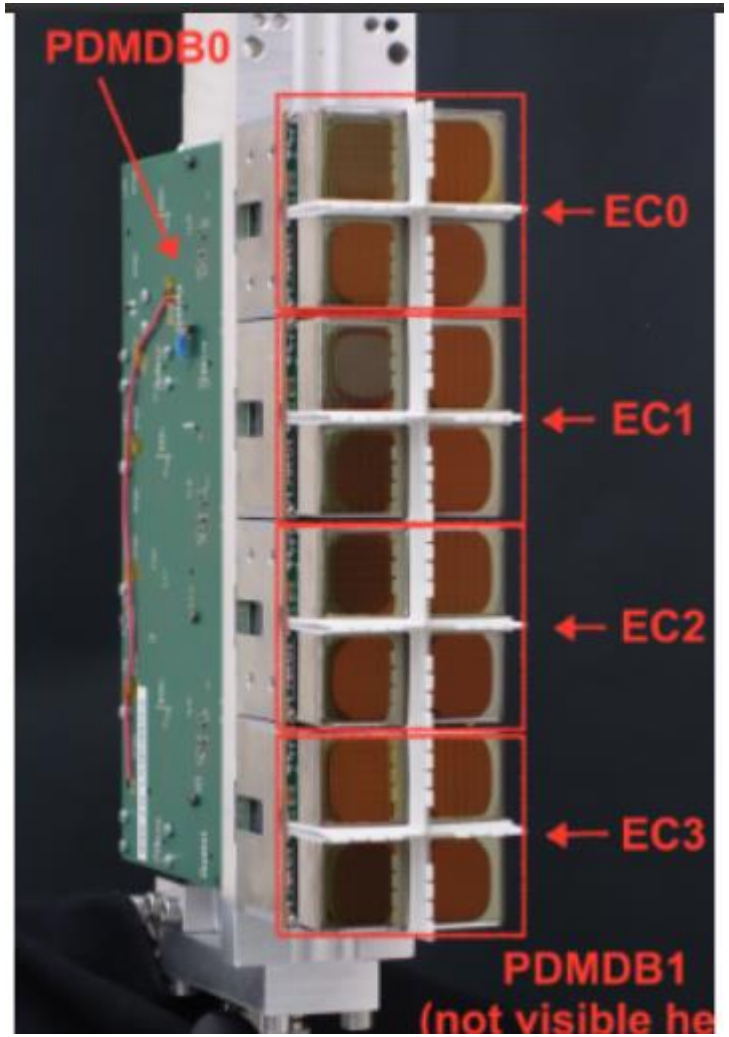
Photon Detector Module Digital Board (PMDBs)

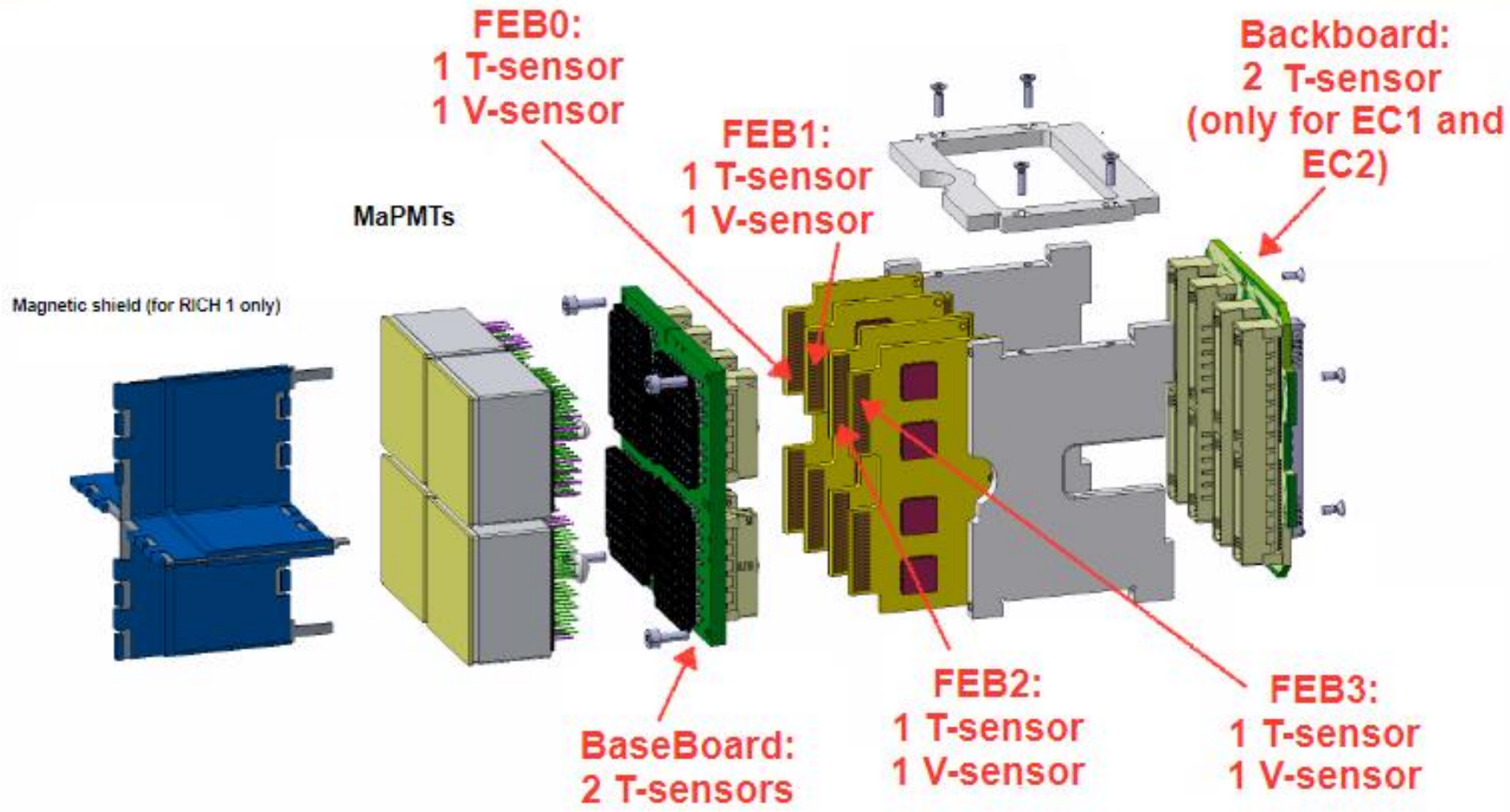
- 4 Ports → 3 zur Datenlesung & 1 zum Datentransfer (beidseitig)
- Verbindung mit MaPMTs

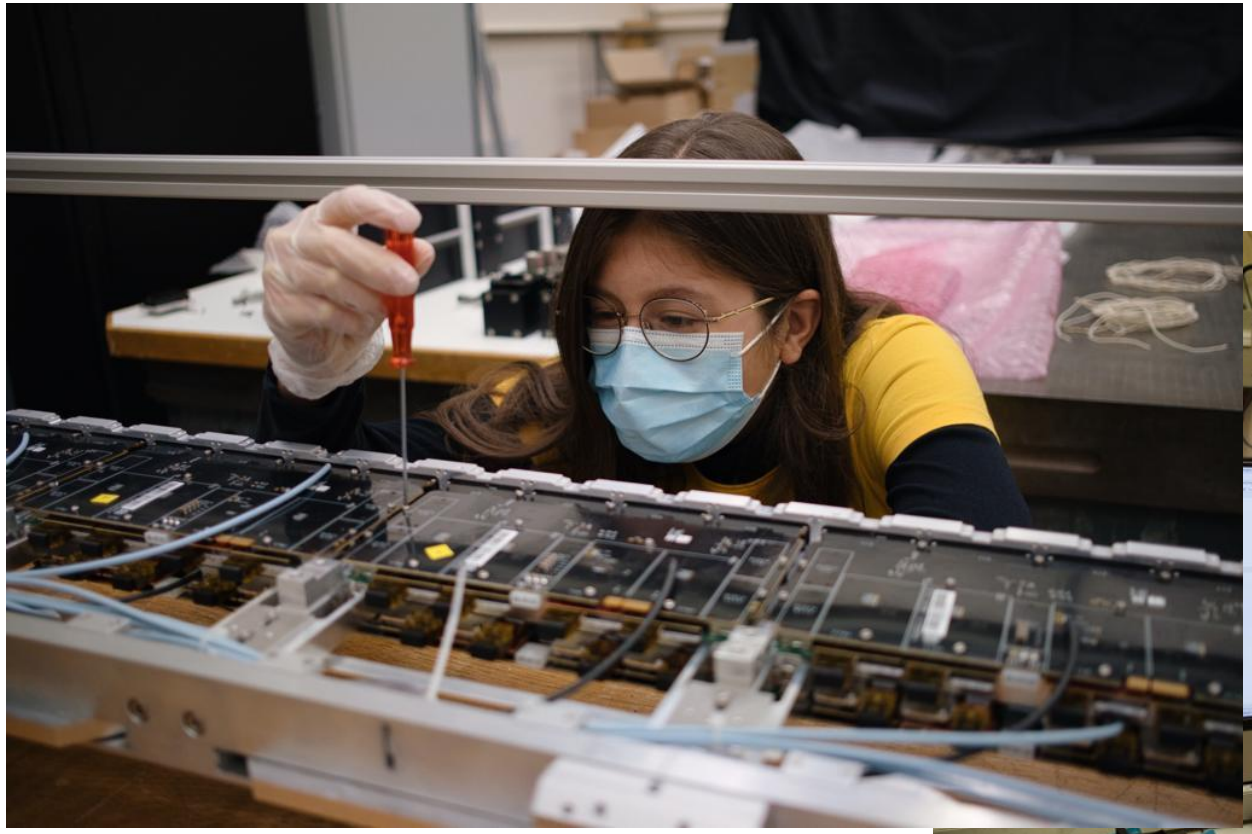


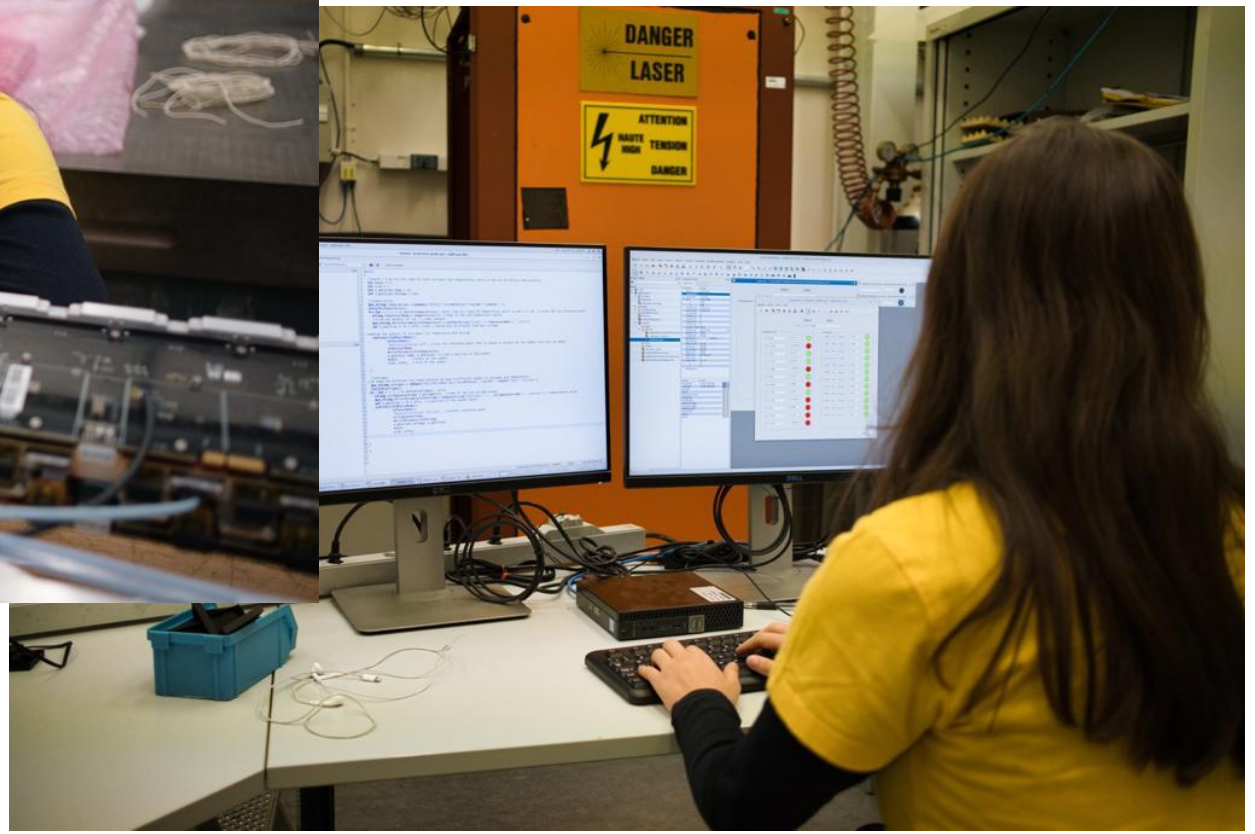
Photon Detector Modules (PDMs)

- RICH besteht aus mehreren Spalten aus PMTs
- 4 von PMTs = 1 PDMs → Digital Board
- 6 PDMs = 1 Spalte
- 4 PMTs = Elementary Cell
- H-Type & R-Type




FEB0:
1 T-sensor
1 V-sensor
FEB1:
1 T-sensor
1 V-sensor
Backboard:
2 T-sensor
(only for EC1 and
EC2)
MaPMTs
Magnetic shield (for RICH 1 only)
BaseBoard:
2 T-sensors
FEB2:
1 T-sensor
1 V-sensor
FEB3:
1 T-sensor
1 V-sensor

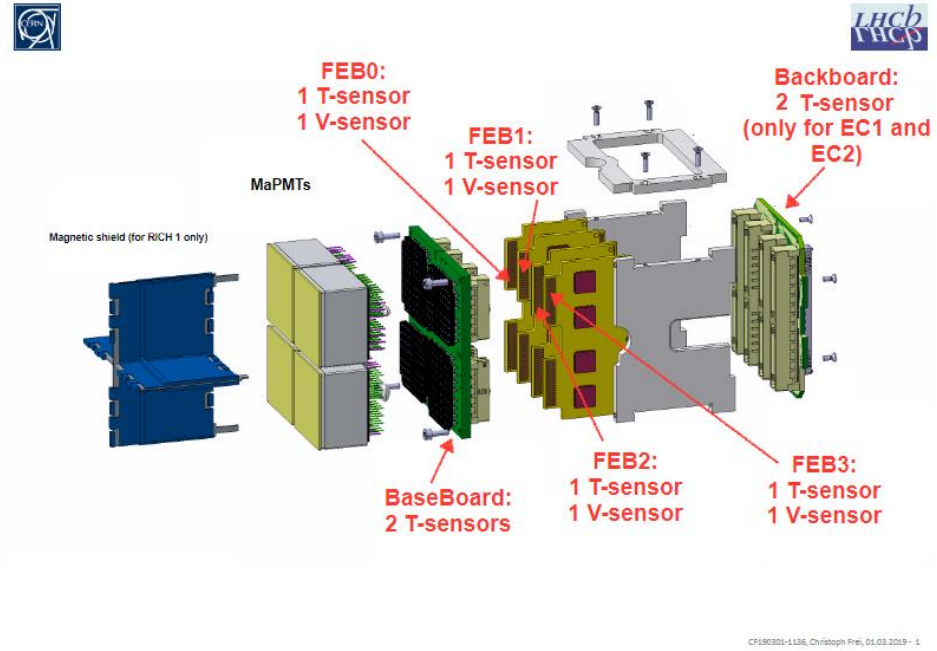




Mein Projekt

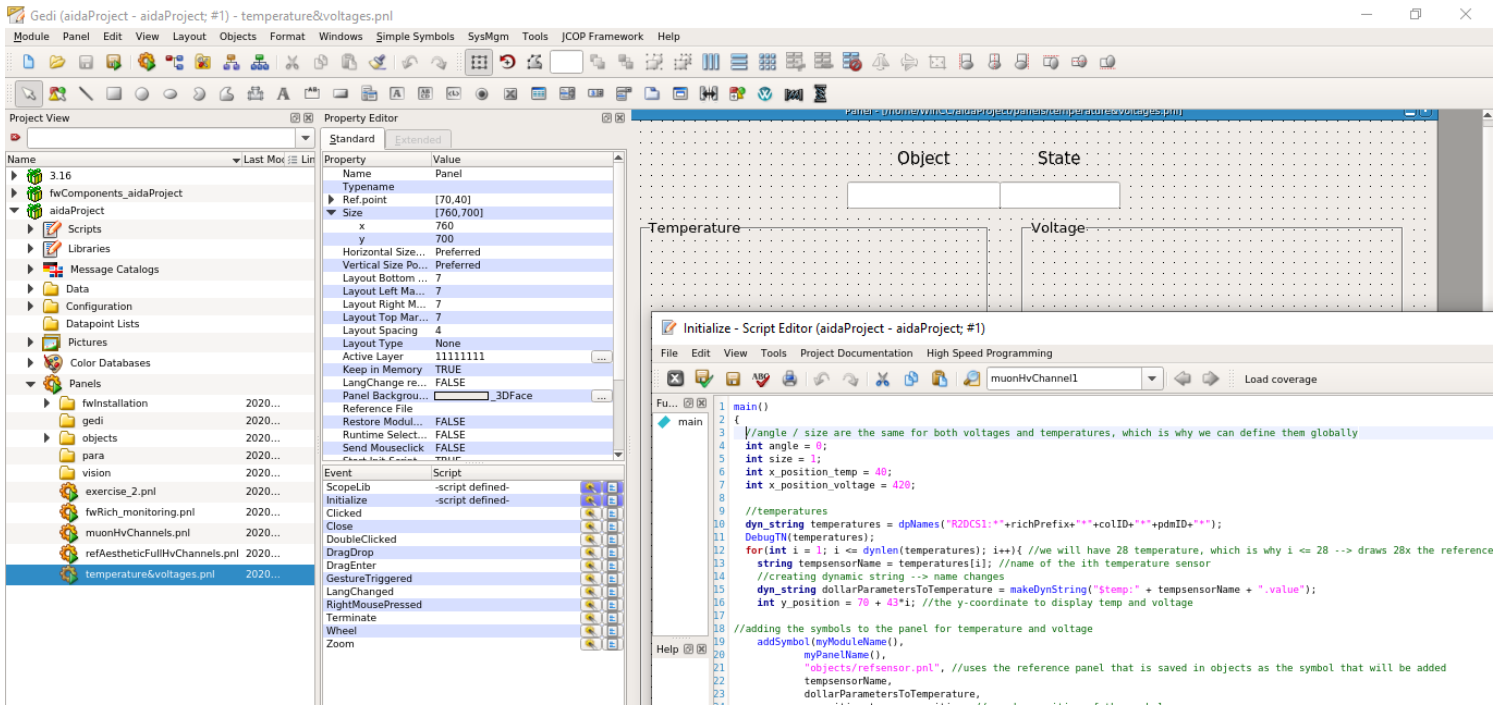
Zielsetzung

- Monitoring der Temperaturen und Spannungen innerhalb des RICH 2 Detektors
- Grenzüberschreitung
- Programm in weitere Programme des RICH Detektor implementieren



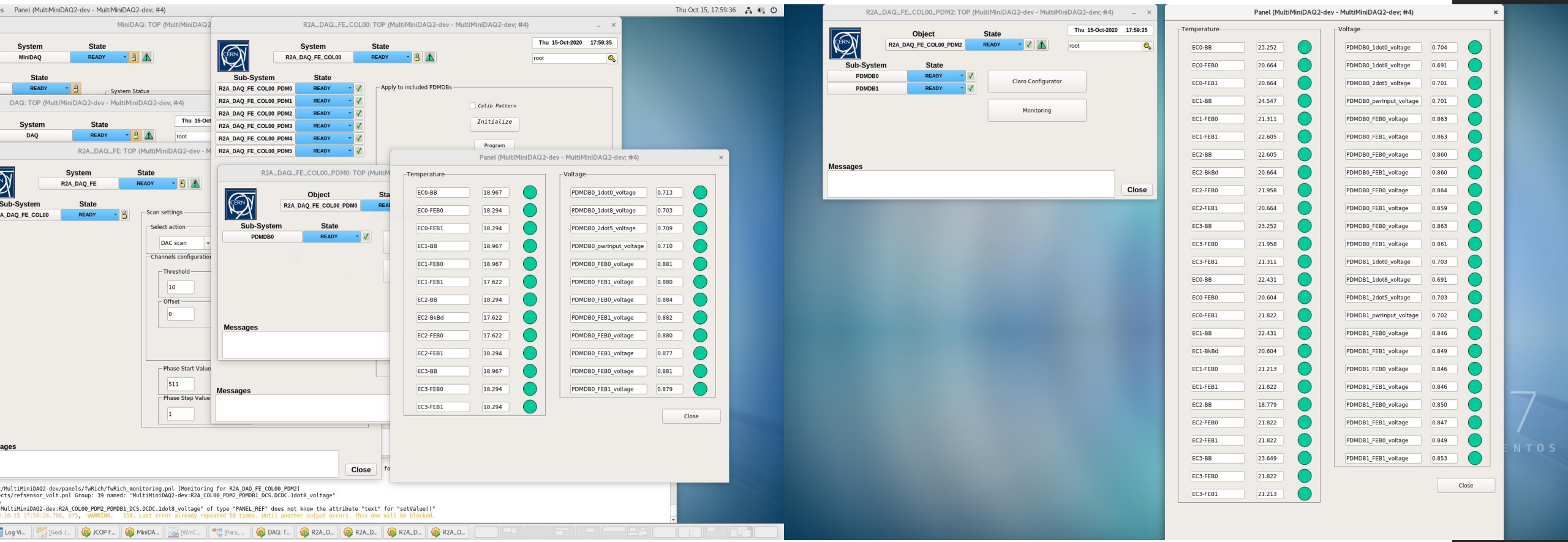
Umsetzung

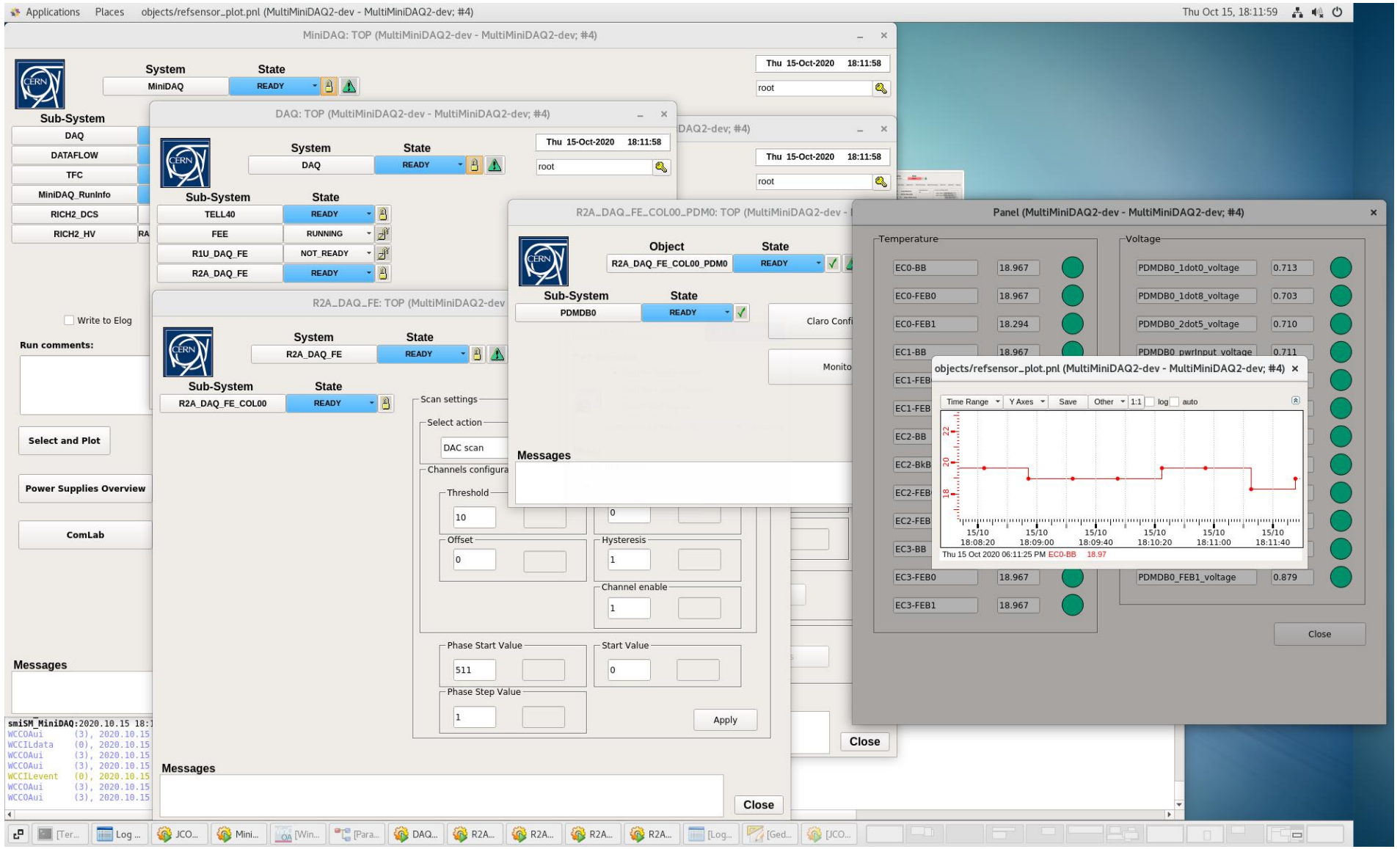
- WinCC → Visualisierungssystem von Siemens
- Code geschrieben in C
- Verbindung mit bereits vorhanden Systemen



Ergebnisse

```
main()
{
  //angle / size are the same for both voltages and temperatures, which is why we can define them globally
  int angle = 0;
  int size = 1;
  int x_position_temp = 40;
  int x_position_voltage = 420;

  //temperatures
  dyn_string temperatures = dpNames("R2DCS1:*"+richPrefix+"*"+colID+"*"+pdmID+"*");
  DebugTN(temperatures);
  for(int i = 1; i <= dynlen(temperatures); i++){ //we will have 28 temperature, which is why i <= 28 --> draws 28x the reference panel
    string tempsensorName = temperatures[i]; //name of the ith temperature sensor
    //creating dynamic string --> name changes
    dyn_string dollarParametersToTemperature = makeDynString("$temp:" + tempsensorName + ".value");
    int y_position = 70 + 43*i; //the y-coordinate to display temp and voltage

//adding the symbols to the panel for temperature and voltage
    addSymbol(myModuleName(),
            myPanelName(),
            "objects/refsensor.pnl", //uses the reference panel that is saved in objects as the symbol that will be added
            tempsensorName,
            dollarParametersToTemperature,
            x_position_temp, y_position, //x and y position of the symbol
            angle,        //angle of the symbol
            size, size);  //size of the symbol

  }

  Temperature.size(320, 45*dynlen(temperatures)); /*
                                                  changes the size of the framework, according to how many of the reference panels will be drawn
                                                  351 is the x-length (not changed)
                                                  dynlen(temperatures) --> how many panels will be drawn times the len of framework of 1 panel (45) = total y length of frame
                                                  */

  //voltages
//we need two different for-loops because we have a different number of voltages and temperatures
  dyn_string voltages = dpNames("MultiMiniDAQ2-dev:"+richPrefix+"_"+colID+"_"+pdmID+"*DCS.*.*voltage");
  DebugTN(voltages);
 for (int j = 1; j <= dynlen(voltages); j++){
    string voltagesensorname = voltages[j];  //name of the jth voltage sensor
    dyn_string dollarParametersToVoltage = makeDynString("$voltage:"  +   voltagesensorname + ".readings"); //nameofsensor.value
    int y_position = 70 + 43*j; //y-position of the symbol added
    addSymbol(myModuleName(),
              myPanelName(),
              "objects/refsensor_volt.pnl", //another reference panel
              voltagesensorname,
              dollarParametersToVoltage,
```


Panel (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
Thu Oct 15, 17:59:36
MiniDAQ: TOP (MultiMiniDAQ2
R2A_DAQ_FE_COL00: TOP (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
System
State
MiniDAQ
READY
System Status
DAQ: TOP (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
DAQ
root
R2A_DAQ_FE: TOP (MultiMiniDAQ2-dev - M
R2A_DAQ_FE
Sub-System
R2A_DAQ_FE_COL00
Scan settings
Select action
DAC scan
Channels configuratio
Threshold
10
Offset
0
Phase Start Value
511
Phase Step Value
1
Thu 15-Oct-2020 17:59:35
R2A_DAQ_FE_COL00
R2A_DAQ_FE_COL00_PDM0
R2A_DAQ_FE_COL00_PDM1
R2A_DAQ_FE_COL00_PDM2
R2A_DAQ_FE_COL00_PDM3
R2A_DAQ_FE_COL00_PDM4
R2A_DAQ_FE_COL00_PDM5
Apply to included PDMDBs
Calib Pattern
Initialize
Program
R2A_DAQ_FE_COL00_PDM0: TOP (MultiM
Object
R2A_DAQ_FE_COL00_PDM0
PDMDB0
Messages
Panel (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
Temperature
EC0-BB 18.967
EC0-FEB0 18.294
EC0-FEB1 18.294
EC1-BB 18.967
EC1-FEB0 18.967
EC1-FEB1 17.622
EC2-BB 18.294
EC2-BkBd 17.622
EC2-FEB0 17.622
EC2-FEB1 18.294
EC3-BB 18.967
EC3-FEB0 18.294
EC3-FEB1 18.294
Voltage
PDMDB0_1dot0_voltage 0.713
PDMDB0_1dot8_voltage 0.703
PDMDB0_2dot5_voltage 0.709
PDMDB0_pwrInput_voltage 0.710
PDMDB0_FEB0_voltage 0.881
PDMDB0_FEB1_voltage 0.880
PDMDB0_FEB0_voltage 0.884
PDMDB0_FEB1_voltage 0.882
PDMDB0_FEB0_voltage 0.880
PDMDB0_FEB1_voltage 0.877
PDMDB0_FEB0_voltage 0.881
PDMDB0_FEB1_voltage 0.879
Close
Messages
Close
/MultiMiniDAQ2-dev/panels/fwRich/fwRich_monitoring.pnl [Monitoring for R2A_DAQ_FE_COL00_PDM2]
cts/refsensor_volt.pnl Group: 39 named: "MultiMiniDAQ2-dev:R2A_COL00_PDM2_PDMDB1_DCS.DCDC.1dot8_voltage"
MultiMiniDAQ2-dev:R2A_COL00_PDM2_PDMDB1_DCS.DCDC.1dot8_voltage" of type "PANEL_REF" does not know the attribute "text" for "setValue()"
0.10.15 17:59:28.706, SYS, WARNING, 118, Last error already repeated 50 times. Until another output occurs, this one will be blocked.
R2A_DAQ_FE_COL00_PDM2: TOP (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
Object
State
R2A_DAQ_FE_COL00_PDM2
READY
Thu 15-Oct-2020 17:59:35
root
Sub-System
PDMDB0
PDMDB1
Claro Configurator
Monitoring
Messages
Close
Panel (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
Temperature
EC0-BB 23.252
EC0-FEB0 20.664
EC0-FEB1 20.664
EC1-BB 24.547
EC1-FEB0 21.311
EC1-FEB1 22.605
EC2-BB 22.605
EC2-BkBd 20.664
EC2-FEB0 21.958
EC2-FEB1 20.664
EC3-BB 23.252
EC3-FEB0 21.958
EC3-FEB1 21.311
EC0-BB 22.431
EC0-FEB0 20.604
EC0-FEB1 21.822
EC1-BB 22.431
EC1-BkBd 20.604
EC1-FEB0 21.213
EC1-FEB1 21.822
EC2-BB 18.779
EC2-FEB0 21.822
EC2-FEB1 21.822
EC3-BB 23.649
EC3-FEB0 21.822
EC3-FEB1 21.213
Voltage
PDMDB0_1dot0_voltage 0.704
PDMDB0_1dot8_voltage 0.691
PDMDB0_2dot5_voltage 0.701
PDMDB0_pwrInput_voltage 0.701
PDMDB0_FEB0_voltage 0.863
PDMDB0_FEB1_voltage 0.863
PDMDB0_FEB0_voltage 0.860
PDMDB0_FEB1_voltage 0.860
PDMDB0_FEB0_voltage 0.864
PDMDB0_FEB1_voltage 0.859
PDMDB0_FEB0_voltage 0.863
PDMDB0_FEB1_voltage 0.861
PDMDB1_1dot0_voltage 0.703
PDMDB1_1dot8_voltage 0.691
PDMDB1_2dot5_voltage 0.703
PDMDB1_pwrInput_voltage 0.702
PDMDB1_FEB0_voltage 0.846
PDMDB1_FEB1_voltage 0.849
PDMDB1_FEB0_voltage 0.846
PDMDB1_FEB1_voltage 0.846
PDMDB1_FEB0_voltage 0.850
PDMDB1_FEB1_voltage 0.847
PDMDB1_FEB0_voltage 0.849
PDMDB1_FEB1_voltage 0.853
Close


Applications
Places
objects/refsensor_plot.pnl (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
Thu Oct 15, 18:11:59
MiniDAQ: TOP (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
System
State
MiniDAQ
READY
Thu 15-Oct-2020 18:11:58
root
Sub-System
DAQ
DATAFLOW
TFC
MiniDAQ_RunInfo
RICH2_DCS
RICH2_HV
Write to Elog
Run comments:
Select and Plot
Power Supplies Overview
ComLab
Messages
DAQ: TOP (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
TELL40
FEE
R1U_DAQ_FE
R2A_DAQ_FE
RUNNING
NOT_READY
R2A_DAQ_FE_COL00_PDM0: TOP (MultiMiniDAQ2-dev -
Object
R2A_DAQ_FE_COL00_PDM0
PDMDB0
R2A_DAQ_FE: TOP (MultiMiniDAQ2-dev
R2A_DAQ_FE_COL00
Scan settings
Select action
DAC scan
Channels configura
Threshold
Offset
Hysteresis
Channel enable
Phase Start Value
Start Value
Phase Step Value
Apply
Close
Panel (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
Temperature
Voltage
EC0-BB
EC0-FEB0
EC0-FEB1
EC1-BB
EC2-BB
EC2-BkB
EC3-BB
EC3-FEB0
EC3-FEB1
18.967
18.294
PDMDB0_1dot0_voltage
PDMDB0_1dot8_voltage
PDMDB0_2dot5_voltage
PDMDB0_FEB1_voltage
0.713
0.703
0.710
0.879
objects/refsensor_plot.pnl (MultiMiniDAQ2-dev - MultiMiniDAQ2-dev; #4)
Time Range
Y Axes
Save
Other
15/10 18:08:20
15/10 18:09:00
15/10 18:09:40
15/10 18:10:20
15/10 18:11:00
15/10 18:11:40
Thu 15 Oct 2020 06:11:25 PM EC0-BB 18.97

Vielen Dank für Ihre Aufmerksamkeit!