panda

Forward Endcap Cables outside

Mechanics Workshop
Darmstadt, 27+28.4.2015

C. Schmidt

Helmholtz-Institut für
Strahlen- und Kernphysik

universität**bonn**

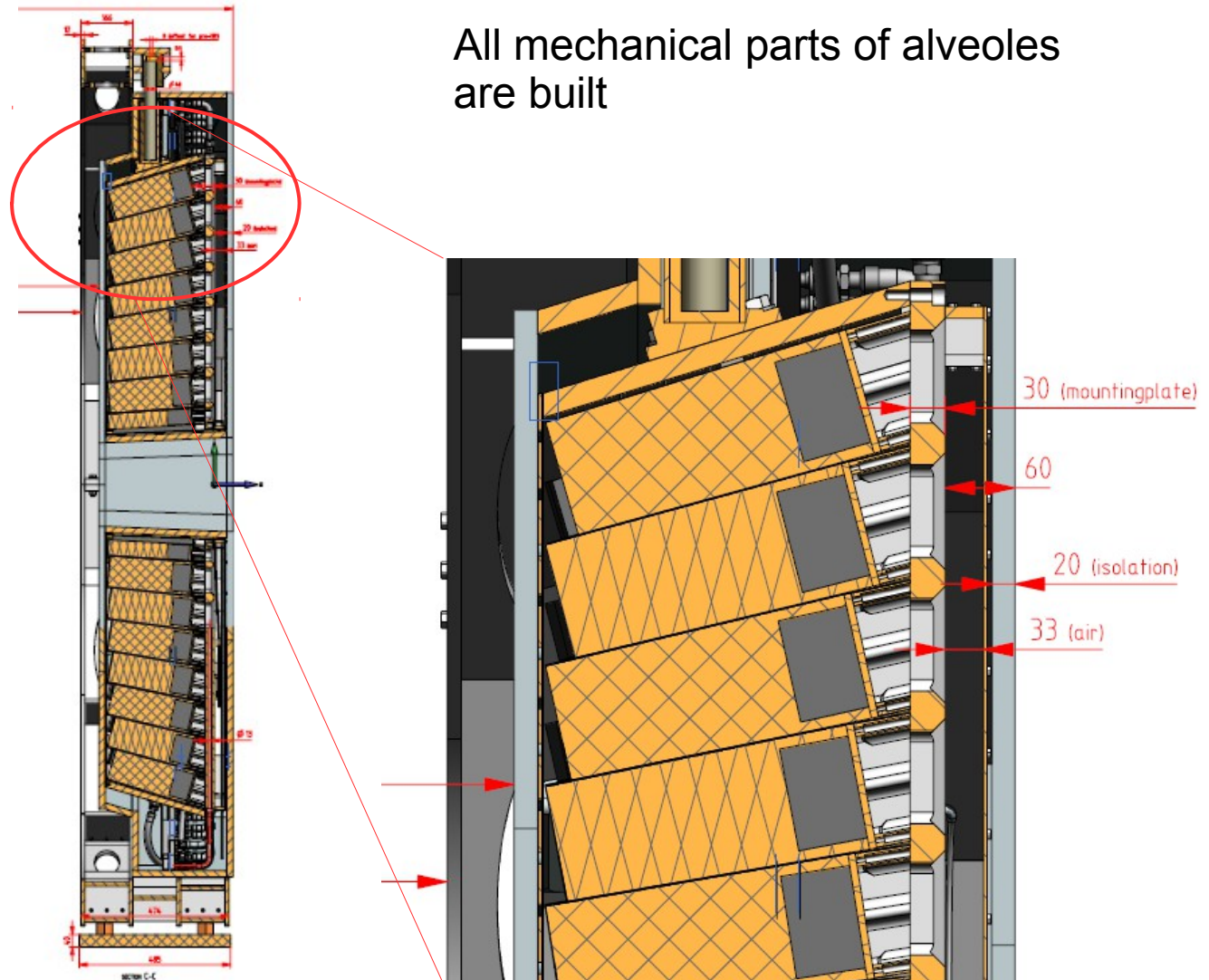# Forward Endcap – side view

3856 crystals
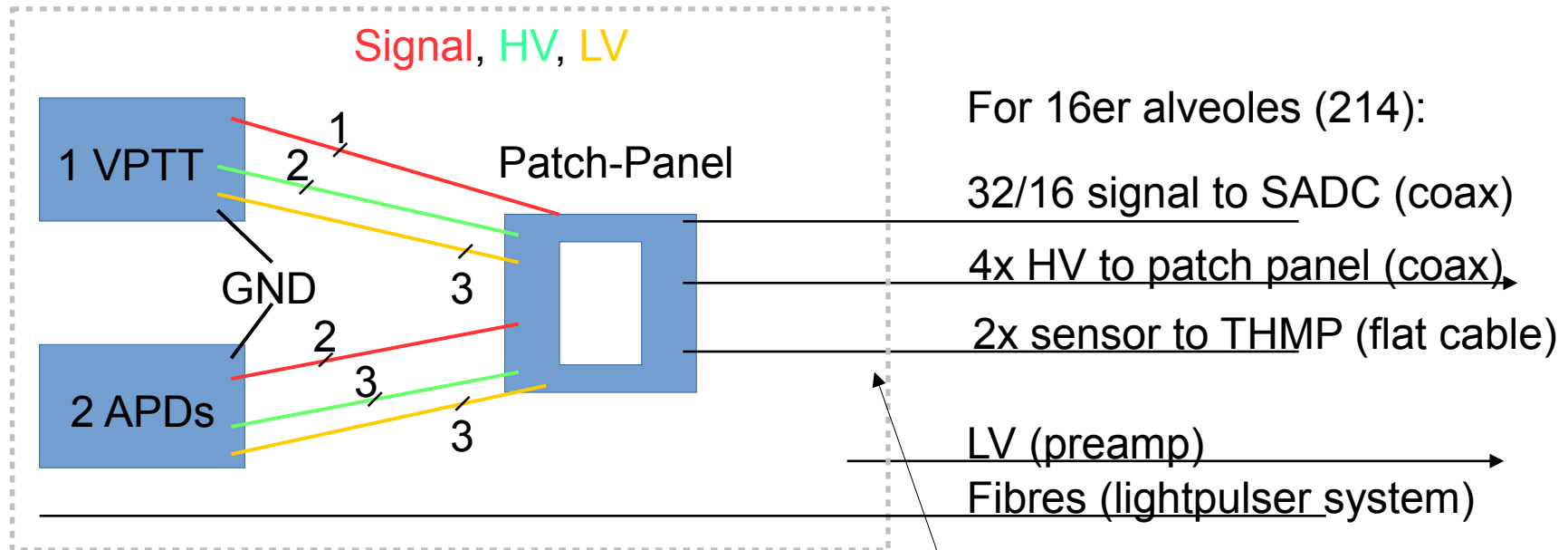
3088 with 2 APDs
768 with 1 VPTT

Alveoles
214 with 16 crystals,
54 with 8 crystals

All mechanical parts of alveoles
are built

30 (mountingplate)

60

20 (isolation)

33 (air)

Wiring scheme / order status

Forward Endcap

Signal, HV, LV

1 VPTT

2 APDs

GND

Patch-Panel

For 16er alveoles (214):

32/16 signal to SADC (coax)

4x HV to patch panel (coax)

2x sensor to THMP (flat cable)

LV (preamp)

Fibres (lightpulser system)

Current status of ordering for final production

|				
Signal (~7000pcs)	delivered		Signal (~12km)	ordered
HV (~11500pcs)	assembly company		HV (~13km)	delivered
LV (~11500pcs)	assembly company		LV	final cable choice
GND wire (~4000pcs)	delivered		Sensor (400m)	delivered

HV wire scheme
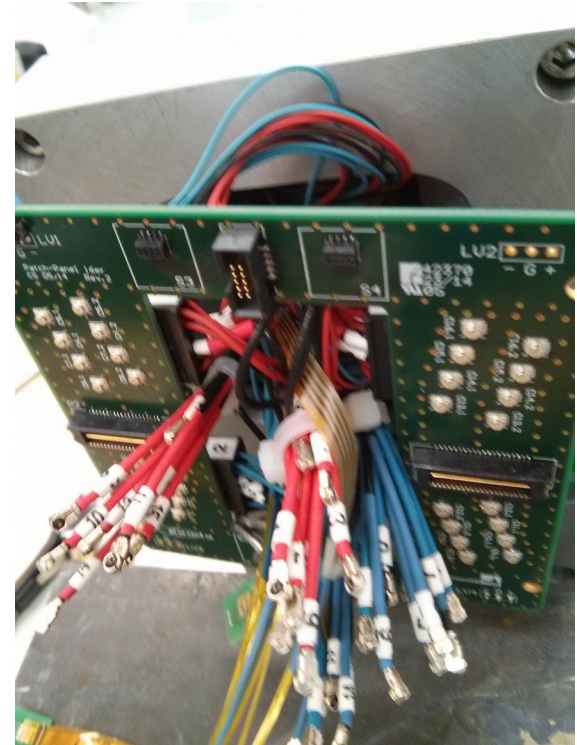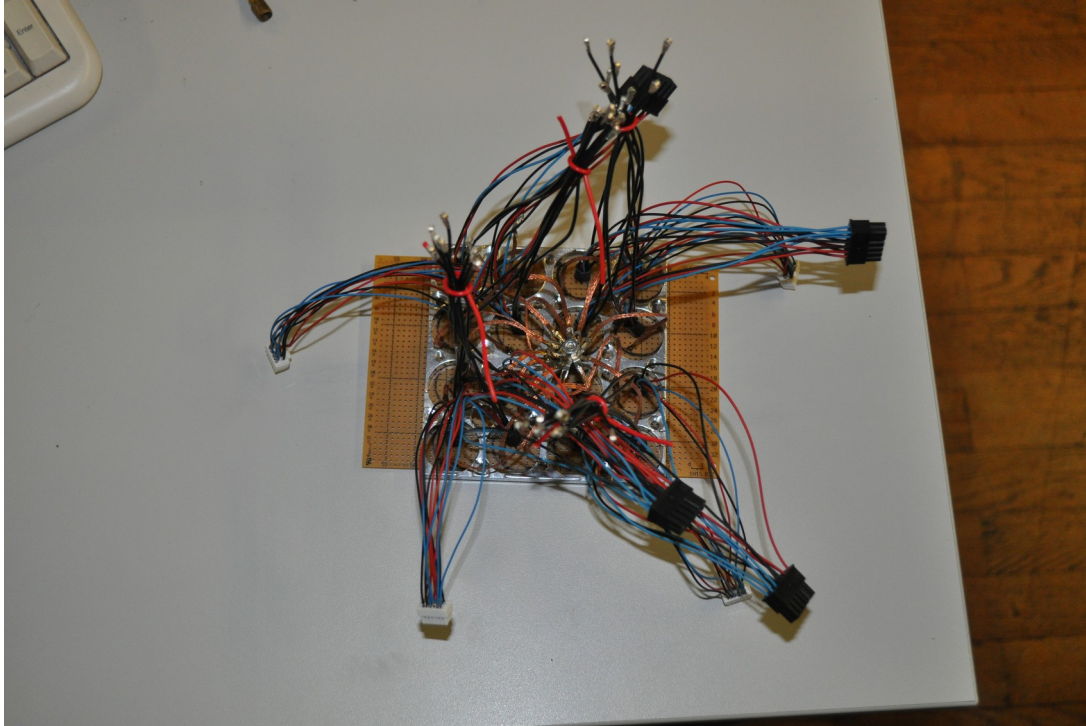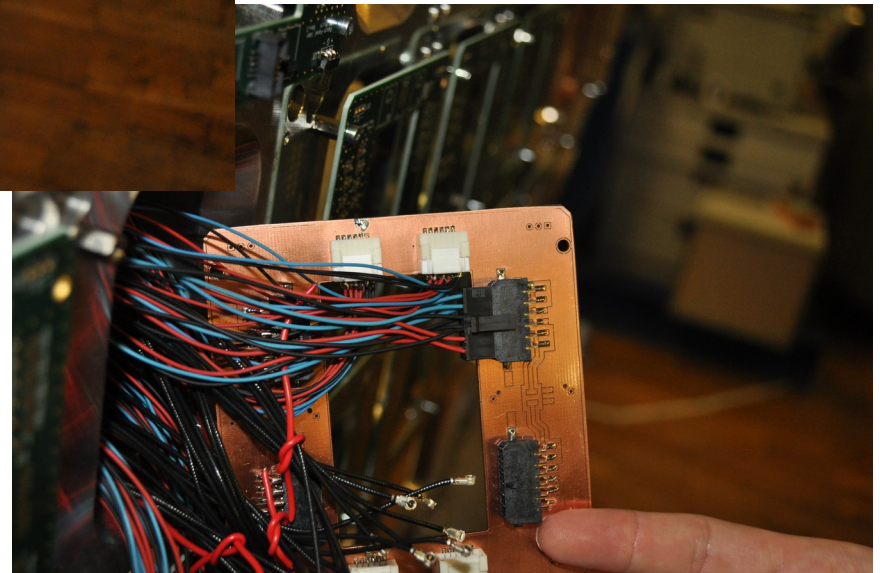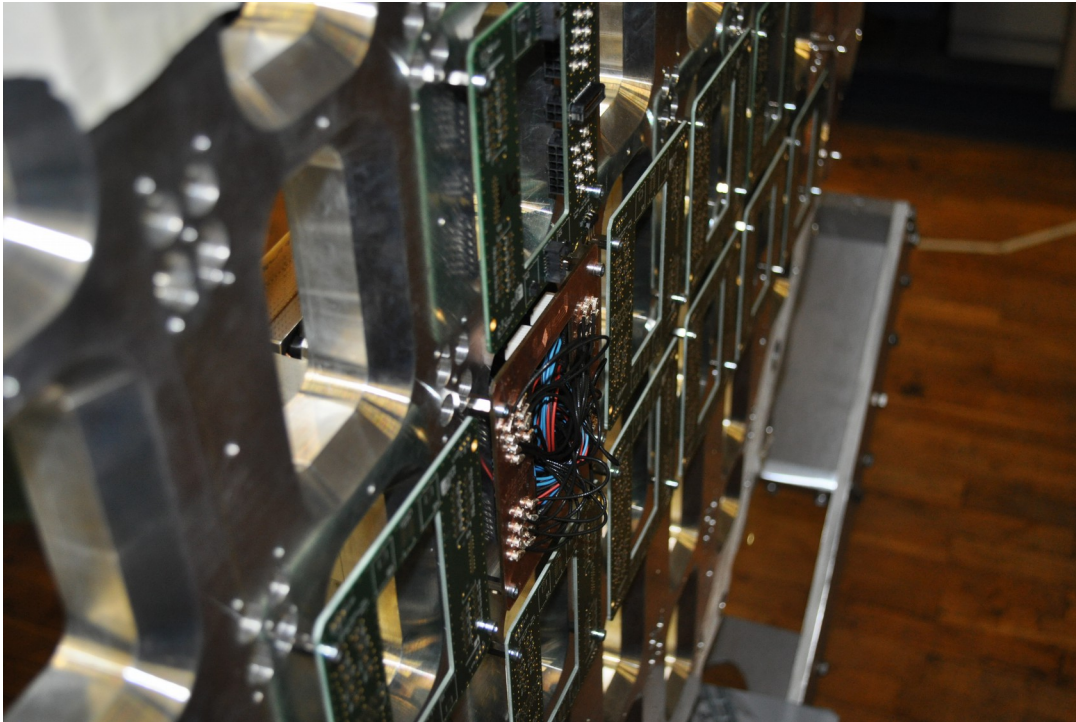
ISEG HVs not radiation hard → crates must be placed in E10
→ additional cable length needed (~1m → ~60m)
→ ~60km HV cable to buy

Magnet   Cable-Chain   E10

Endcap

Patch-Panel

964x

Non std. HV connector   SHV
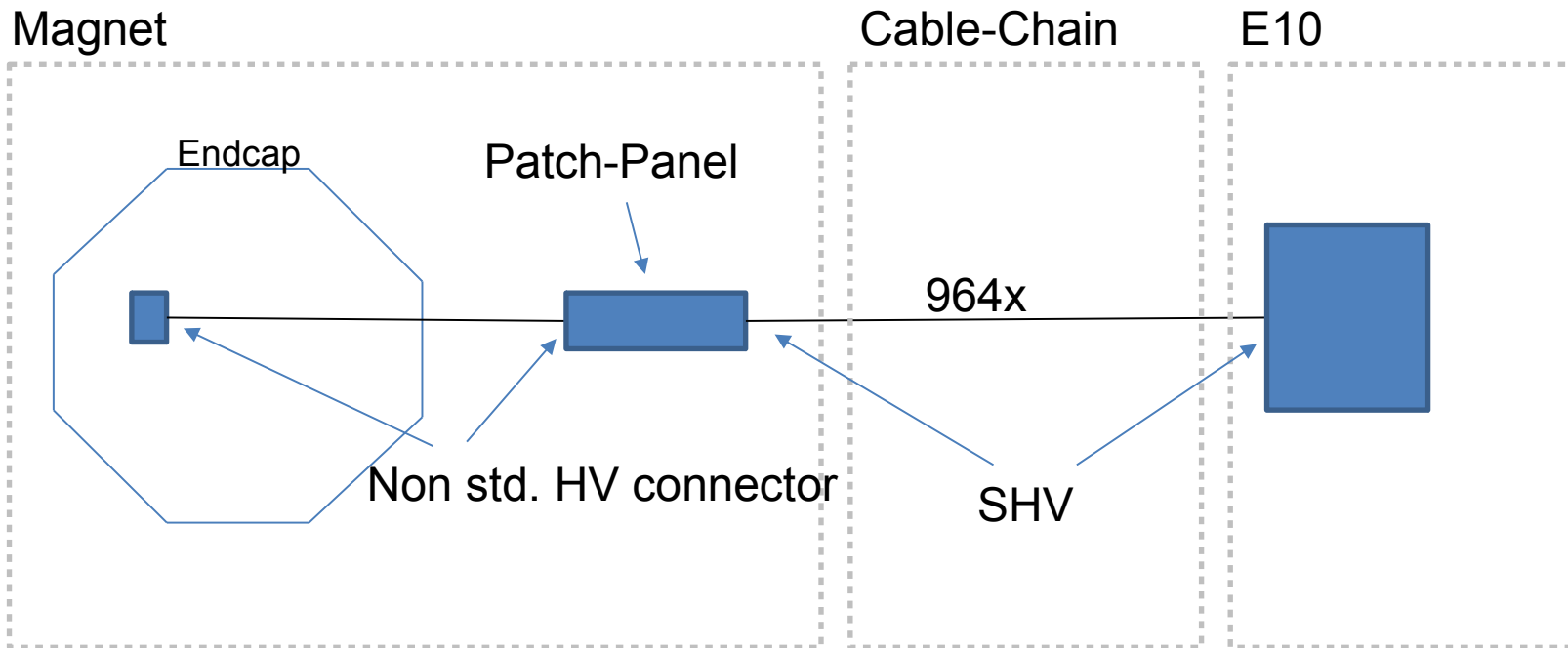
HV grouping
1 HV channel for 4 VPTTs / 8 APDs

universität**bonn**

Patch panel in racks on magnet
- Adaption from non std. connector to SHV
- Endcap cable from back, SHV on front
- Box with depth of 10-20cm, 1HE, 40x SHV

1HE
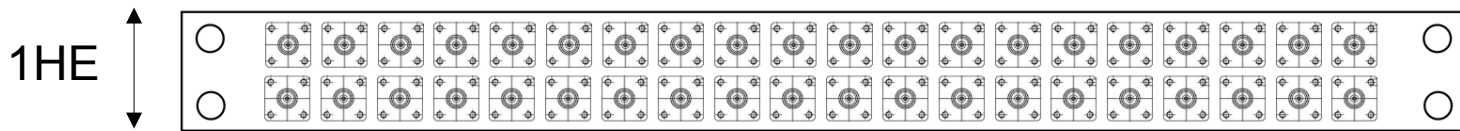
40er -> 25HEs

Patch panels
- need less space, but additional cables must be routed in the rack
  → space on the side present?
- can be placed behind other crates,
  but crates maybe not serviceable anymore from behind
- Position defined in rack?

Mounting procedure idea
- Connecting cable to patch panel
- Routing through cable-chain and tray to E10
- Cut cable to fit with no loop to HV module
- Crimping connector to cable

First quote for 1000 for
„off the shelf" cables

60m cable+connector+jacket
  → 162€/pcs
SHV connector
  → 11€/pcs

Delivery time 13-15 weeks

Data Sheet

HUBER+SUHNER
Excellence in Connectivity Solutions

Coaxial Cable
G_03262-01

Description

PE-50 Ohm - single screen

Technical Data

Construction

	Material	Detail	Diameter
Centre conductor	Copper, Tin plated	Strand-19	0.9 mm
Dielectric	PE (Polyethylene)		2.95 mm
Outer conductor	Copper, Tin plated	Braid, 96%	3.6 mm
Jacket	LSFH (modified polyethylene)	RAL 9005 - bk	4.95 mm +/- 0.15

Print: HUBER+SUHNER G 03262-01 50 Ohm (PA no.)

4,95mm

LSFH = low smoke free of halogen

Alternative HV cable

Pros
- Cable is thinner
- CERN specs., radiation hard ($>10^6$Gy)
- Maybe overall cheaper (0,7CHF/m)

Cons
- Possibly problem with SHV connector,
- because of thinner cable
- More administrative overhead
- Maybe need of clamp connector
  → more expensive

Sample of cable on the way
→ to test crimping of SHV-
   connector

universität**bonn**

Draka

A brand of the
Prysmian Group

HTC-50-1-1, 0.5Lz/1.5, CEH50

Koaxiale und triaxiale FRNC-Hochspannungskabel mit geringer Leistung gemäß CERN und DESY Spezifikationen

Einsatzgebiete
siehe Produktübersicht

Normen
gemäß Cern Spezifikation 477

Flammwidrigkeit
gemäß IEC 60332-1

Kabelaufbau

Innenleiter	Cu- Litze, verzinnt 7x 0,17, Durchmesser 0,51 mm
Leiterglättung	halbleitendes PE, Durchmesser 0,70 mm
Isolierung	XPE vernetzt, Durchmesser 1,50 mm
Leiterglättung	halbleitendes PE, Durchmesser 1,7 mm
Außenleiter	Cu-Geflecht, blank
Bewicklung	Glimmerband
Mantel	FRNC, halogenfreies, flammwidriges Copolymer, Durchmesser 3,2 mm
Farbe	rot RAL 3002

3,2mm

Cable chain – HV forward endcap

Minimal crosssection of HV cables

H&S diameter 4,95mm:
→ 24,5mm² → 23620mm² ~ 236cm²

„CERN" diameter 3,2mm:
→ 10,24mm² → 9871mm² ~ 99cm²

In real it is much more, could be factor 2

Is there a table of assigned crossection?

Properties of cables
- Stiffness of cable ?
- Should there be some subgrouping ?
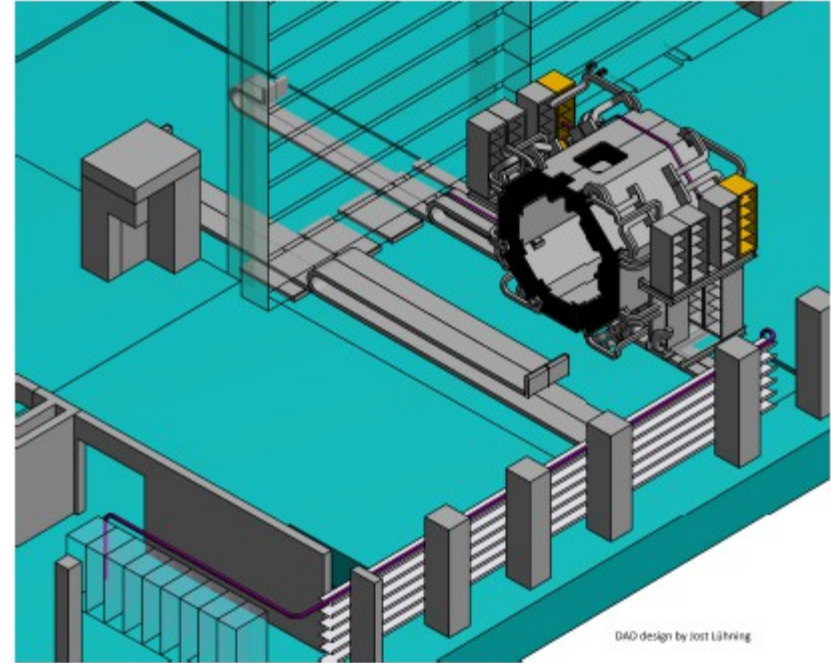
Racks in E10
- Have racks space on each side (like in server racks)
- Do one need to consider buffer space in rack for cables or is there a „public" place?
- Cable trays above racks? Or double bottom?

Routing

How should the routing be done ...

→ direct connection?
→ patched connection?

E.g. DAQ optical fibres...

If patched,
- Position of patch panels / splice boxes?
- Off the shelf panels (24 connections)
  for the forward endcap ~21HE
- Multifibre connector?

Trunk Assemblies:

Product Facts
■ Multimode 62.5/125 µm and 50/125 µm
■ Singlemode 9 µm, 8° angle interface
■ Available with female LIGHTRAY MPX connectors (without guide pins) and/or male LIGHTRAY MPX connectors (with guide pins)
■ LC, SC, ST, FC or MT-RJ terminations available for hybrid configurations
■ 4, 8 and 12 position ribbon fiber sub-units
■ LSZH (Low Smoke Zero Halogen) sheathed cable (round construction)
■ Internal/external cable
■ Custom lengths available

MTP or MPX

TE
connectivity