

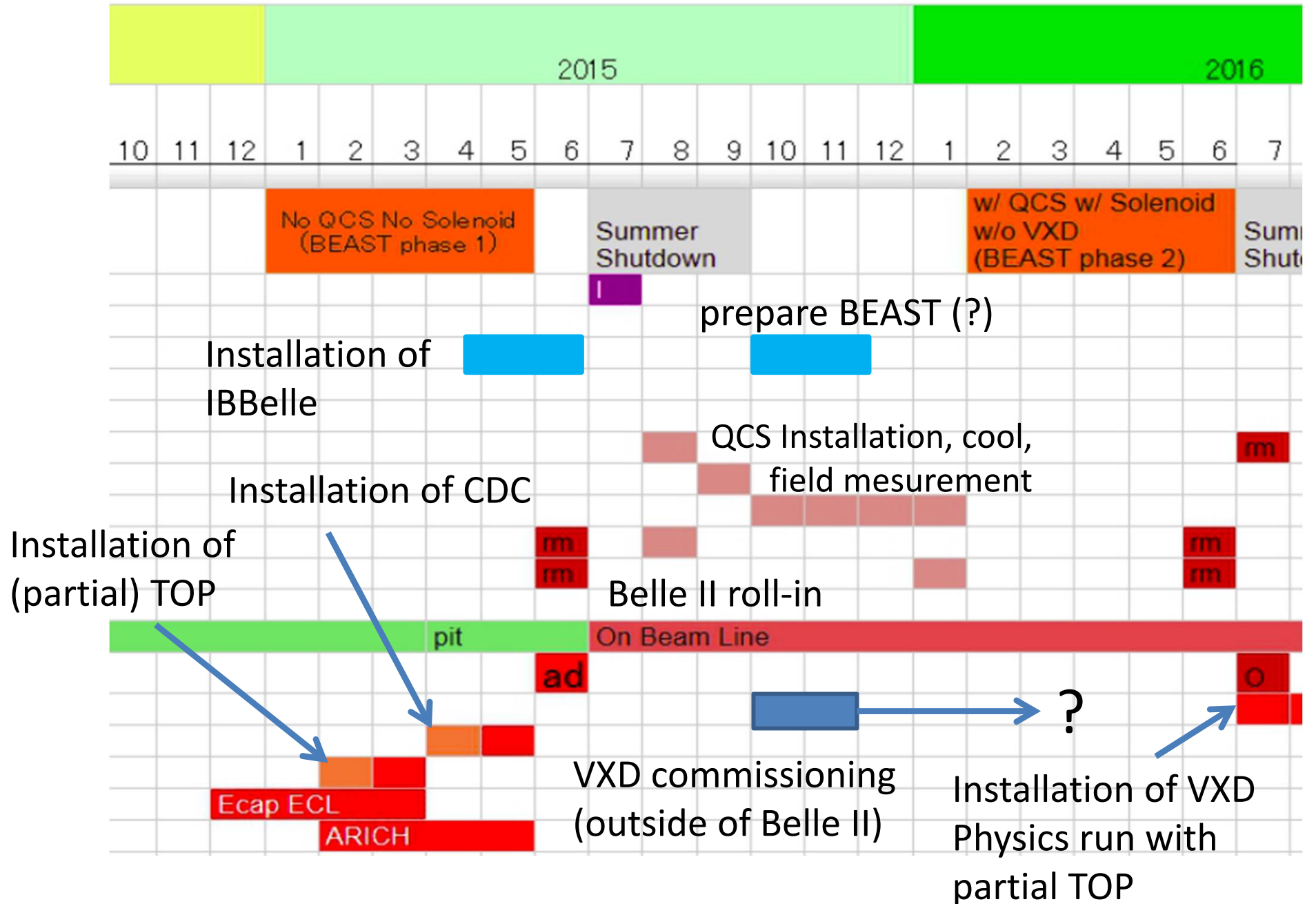


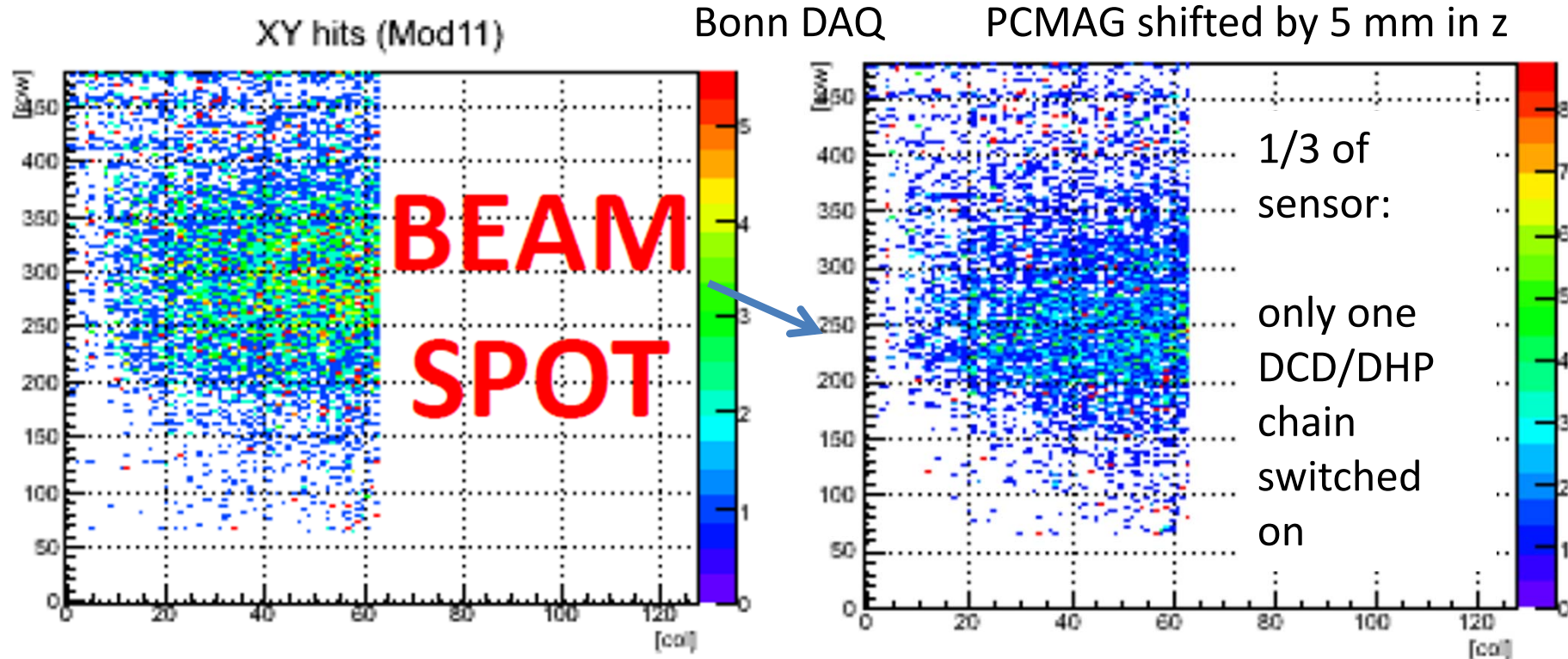
# PXD Matters

- From B2GM Nov, 2013:  
Overall Schedule for PXD Activities within Belle II
- Lessons from the DESY Test: System Aspects
- Open Questions and a Proposal
- Thinking about Commissioning
- Conclusions



# General Schedule for Belle II



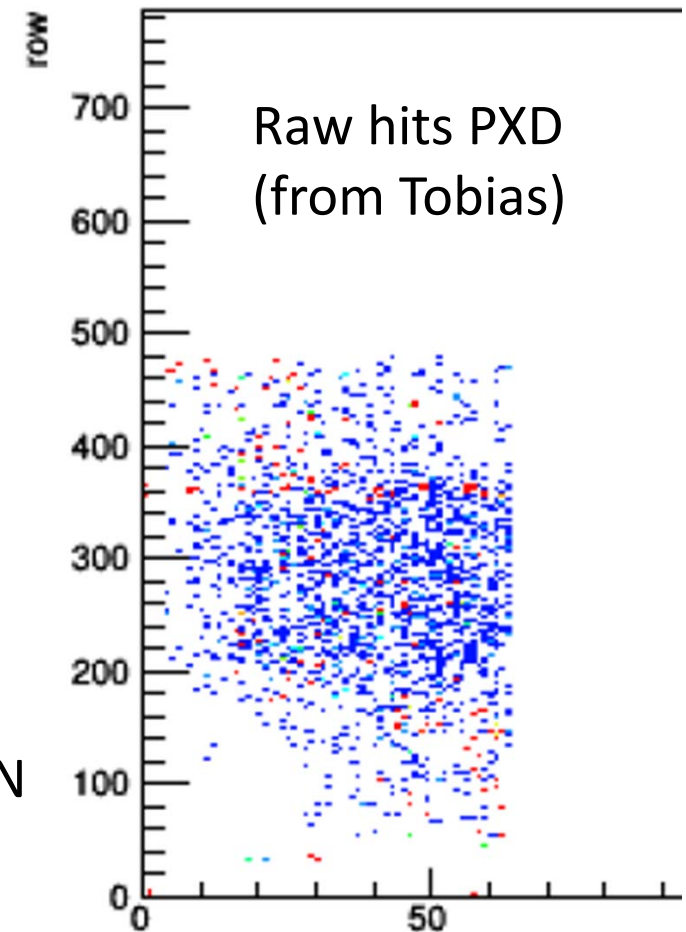
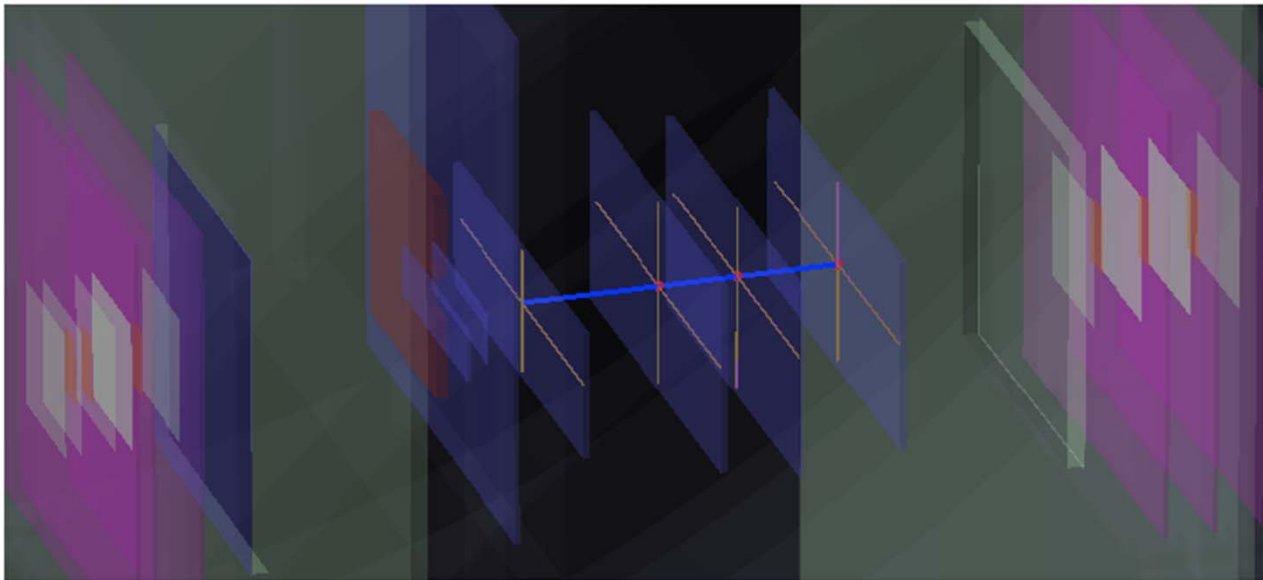


From Carlos' presentation:

Although fine tuning is necessary, the test beam is already a big success!

All the PXD hardware, software and firmware is ready to declare run conditions

Decisive step forward towards the Belle II PXD



Full System PXD SVD DAQ HLT BASF2 working !



DEPFET ASICS DHH DHHC ONSEN DATCON

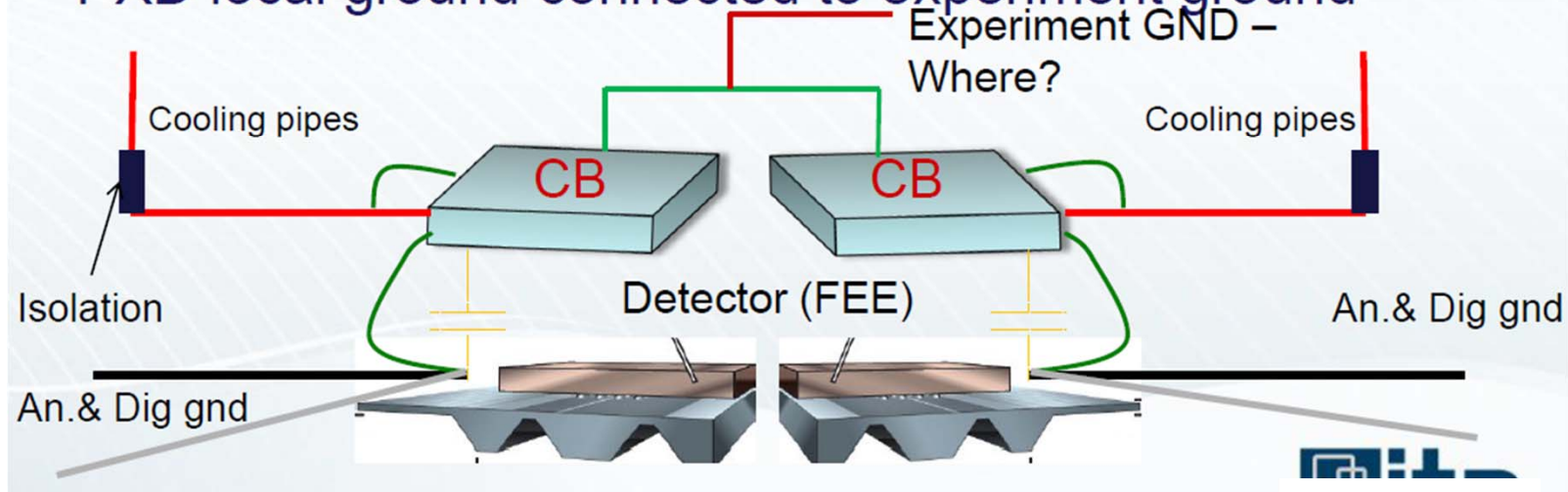
Environmental Sensors

Slow Control

ongoing: Alignment, ROI finders,  
data analysis

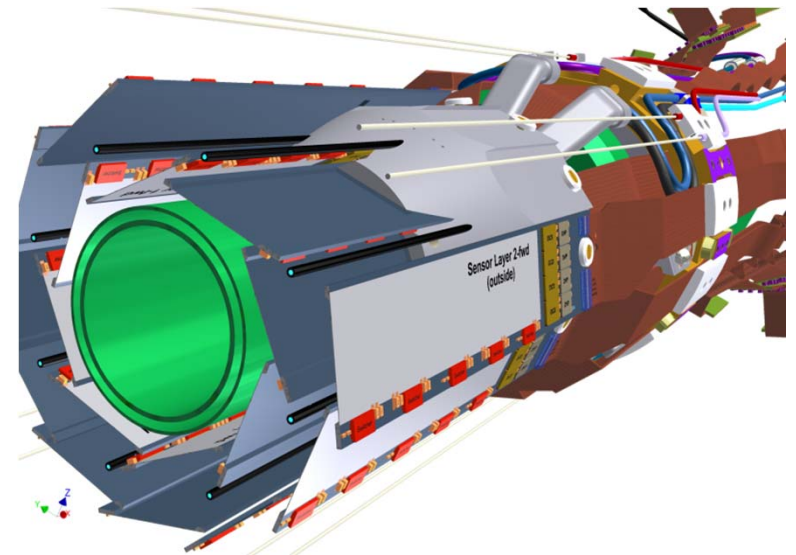
Heroic effort by many  
colleagues over many  
weeks !!

- Cooling blocks (both sides) connected via low impedance
- Cooling pipes grounded
- PXD local ground connected to experiment ground



Question to machine:  
Are we allowed to ground SCB to  
beampipe?

Alternative (endorsed by Fernando):  
Air Cooling Carbon Fiber Tubes



We learned a lot in the DESY Beam Test, but many things could not be done, e.g.:

Final sensor (PXD9) not yet tested (EMCM: details by Jelena et al.)

Final ASICs not yet tested on final sensor (details by Ivan)

Kapton cable not yet produced and tested

CO2 cooling with SCB not yet tested on final sensor

Gated Mode not yet established with final sensor and ASICs

LMU P/S not yet tested with final module

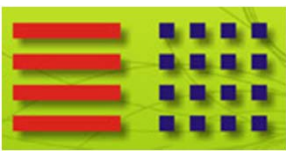
grounding scheme with final ladder not yet verified together with SVD

Lab tests are certainly indispensable (QC & QA), but for the whole NEW system no way around another (combined) beam test (at DESY).

(btw: also our SVD colleagues need a system test of their final ladders)

We are quite advanced in the PXD9 production:  
two complete batches of PXD9 finished, await metallization

- push EMCM project now with highest priority (HLL)  
decide on the final technology soon (May 2014 ?)
- metals on small number of wafers (2?), check, thin and cut  
(pre-series: two complete ladders = 4 sensors, layer 1 and 2)
- passives & ASICs FCing in early September 2014  
(Kapton to sensor, gluing to ladder end of Sept.)
- schedule next beam test by mid Oktober (here at DESY)



- Commissioning the PXD / SVD is a major task, needs thorough preparation:

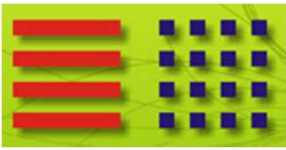
Hardware AND Software AND People

- Phase „0“: The DESY Telescope Test (DTT) – a very successful first exercise, needs a follow-up with „pre-series“
- Phase „I + II“: The Beast (I & II) - learning about the machine background set up similar to DTT in Phase II
- Phase „III“: Physics run ...
- Develop a first approximate installation and commissioning scenario for the three phases to come, based on the experience we get right now.

Target date: B2GM in February 2014

(the following first ideas were presented at B2GM in Nov. 2013)

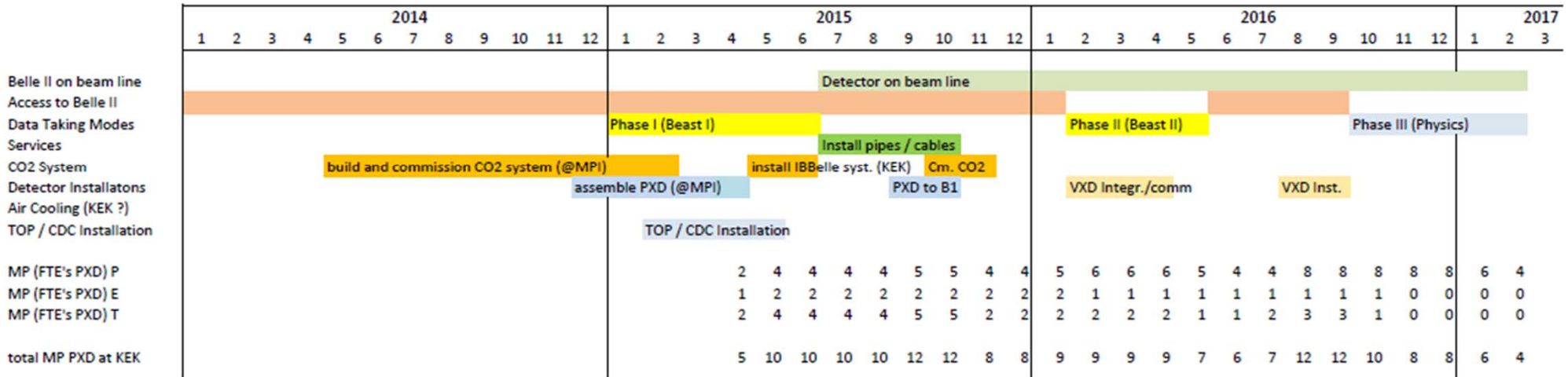




# Tentative Plan for Beast and PXD (I)



## Installation and Commissioning (BEAST + VXD)



## Key Commissioning Phases:

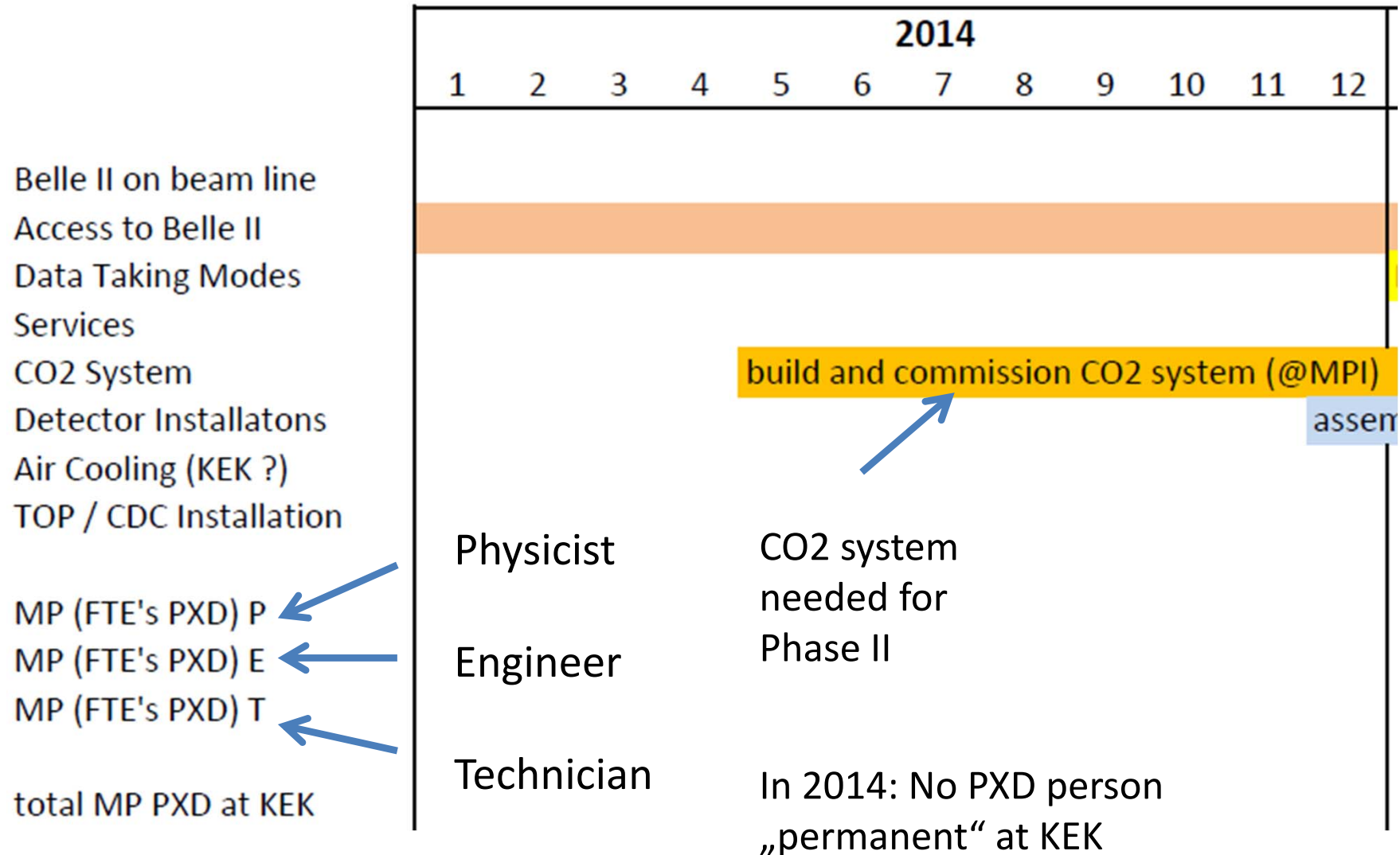
- Phase I: Bake-out (+Beast I) Jan. 2015  
(no Belle, no QCS)
- Phase II: BG optimization, target lumi =  $1 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$  Feb. 2016  
(with Belle and QCS)
- Phase III: „Physics“ Oct. 2016  
(with Belle and QCS and VXD)

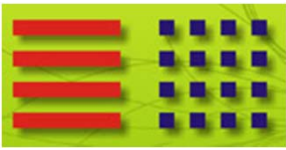


# Tentative Plan for Beast and PXD (II)



## Installation and Commissioning (BEAST + VXD)

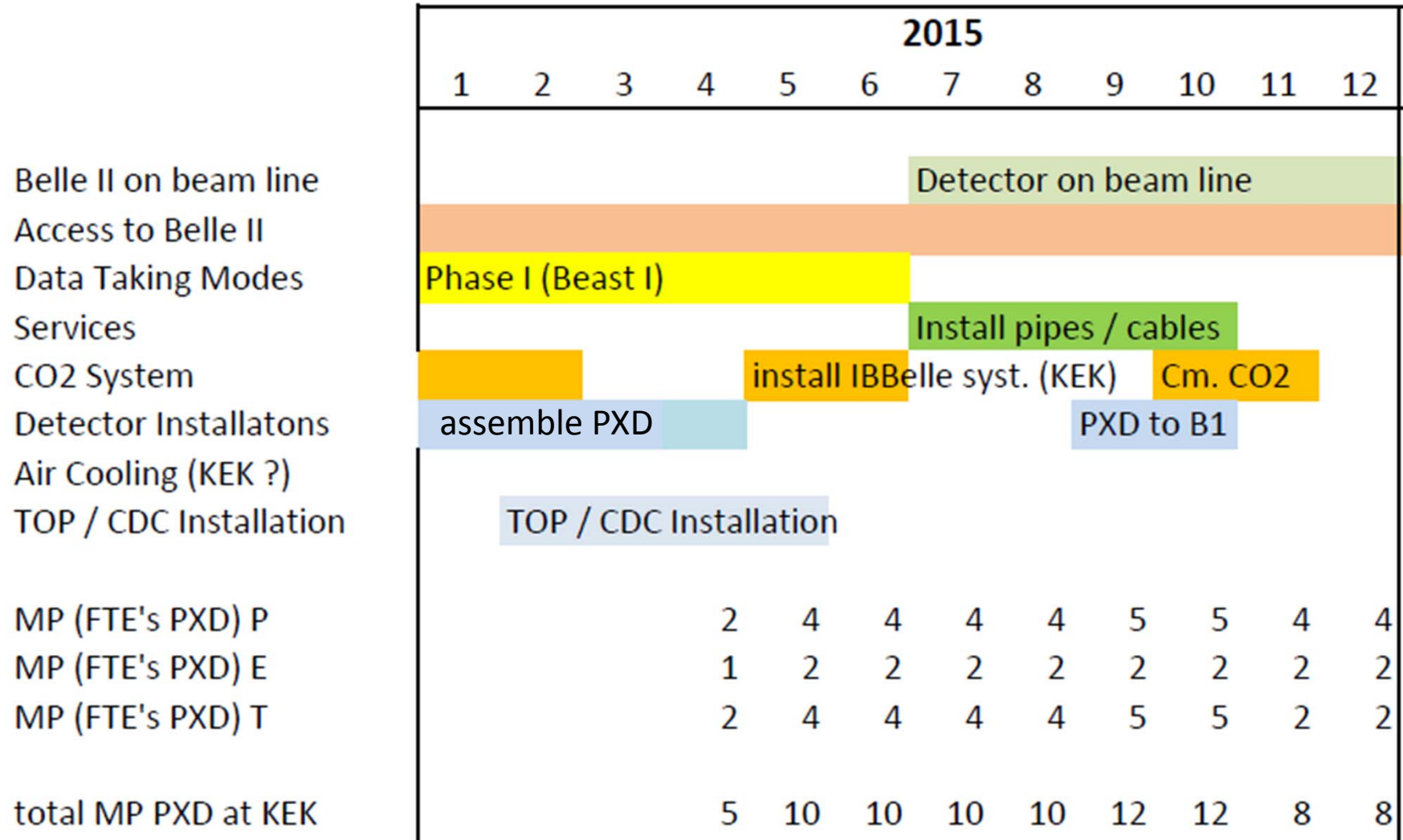




# Tentative Plan for Beast and PXD (III)



## Installation and Commissioning (BEAST + VXD)

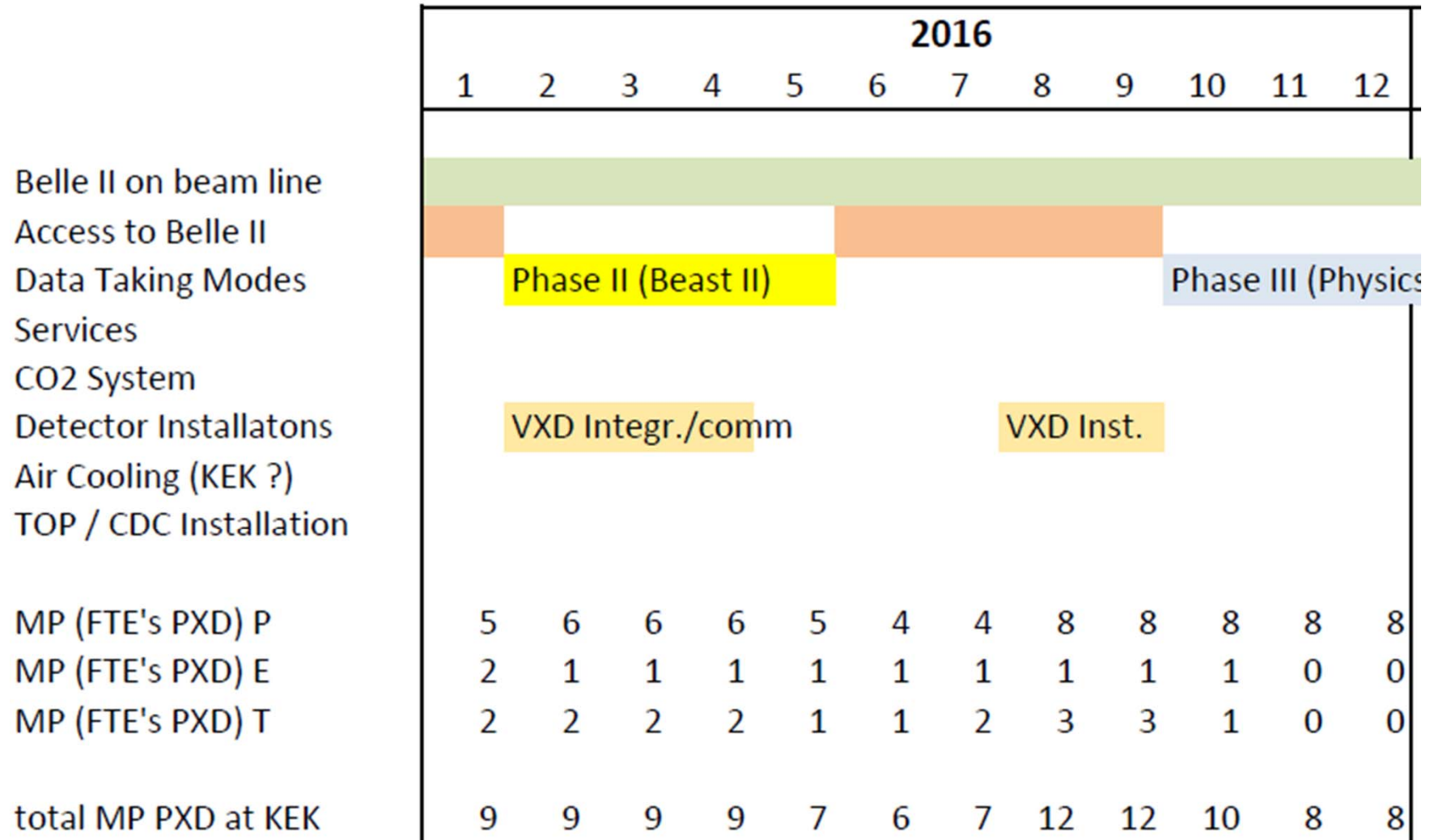


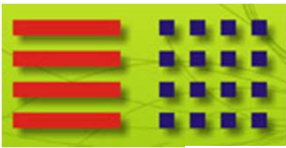


# Tentative Plan for Beast and PXD (IV)

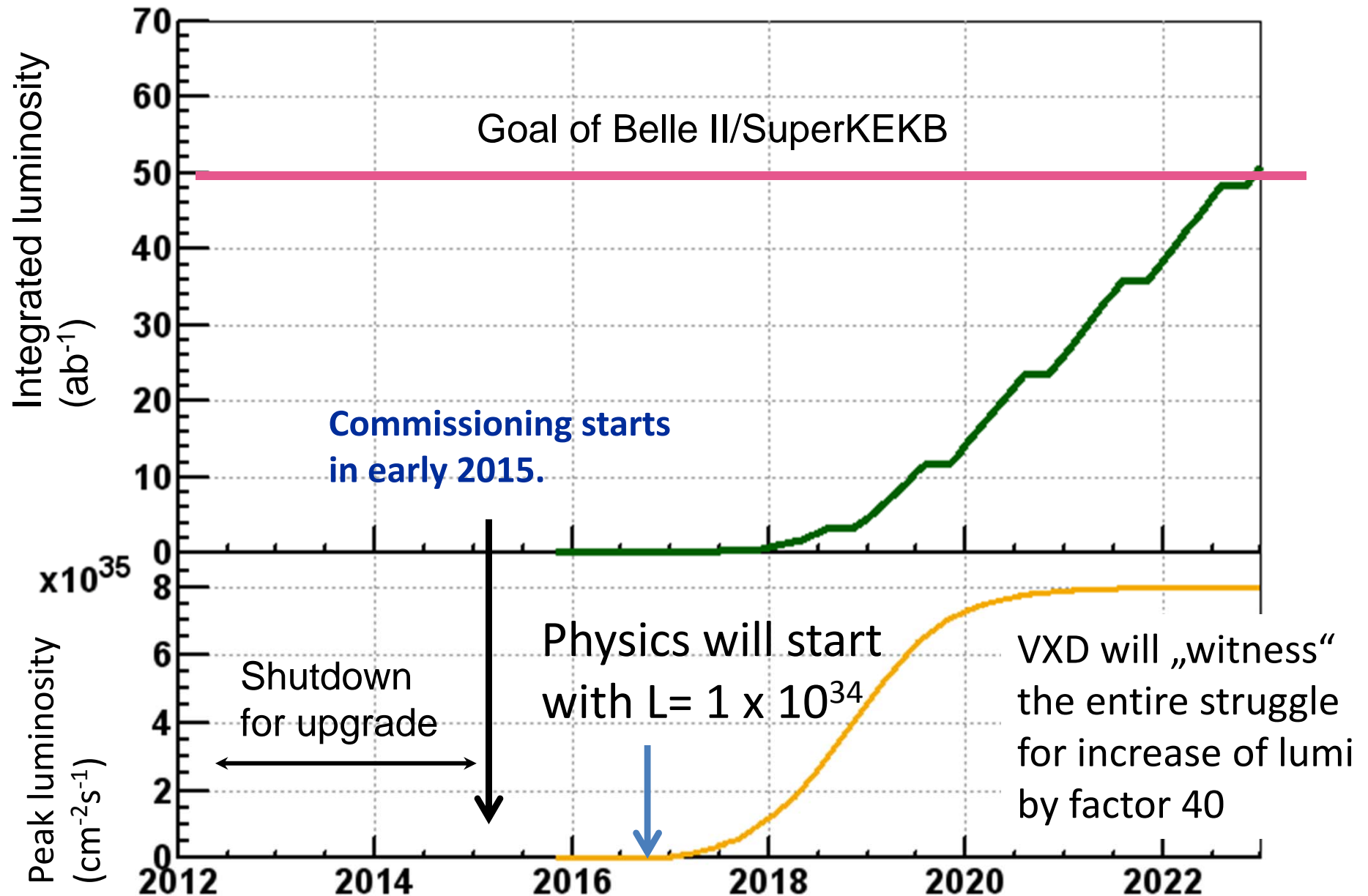


## Installation and Commissioning (BEAST + VXD)

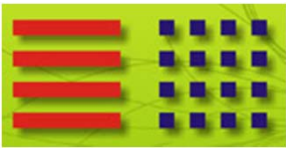




# Climbing up in Luminosity ....



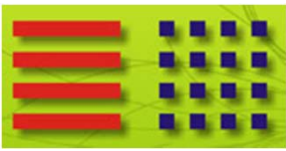
**„Upgrade“ of PXD (new production) seems mandatory**



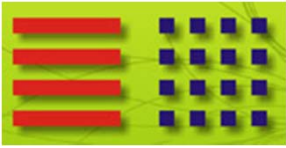
# Conclusions



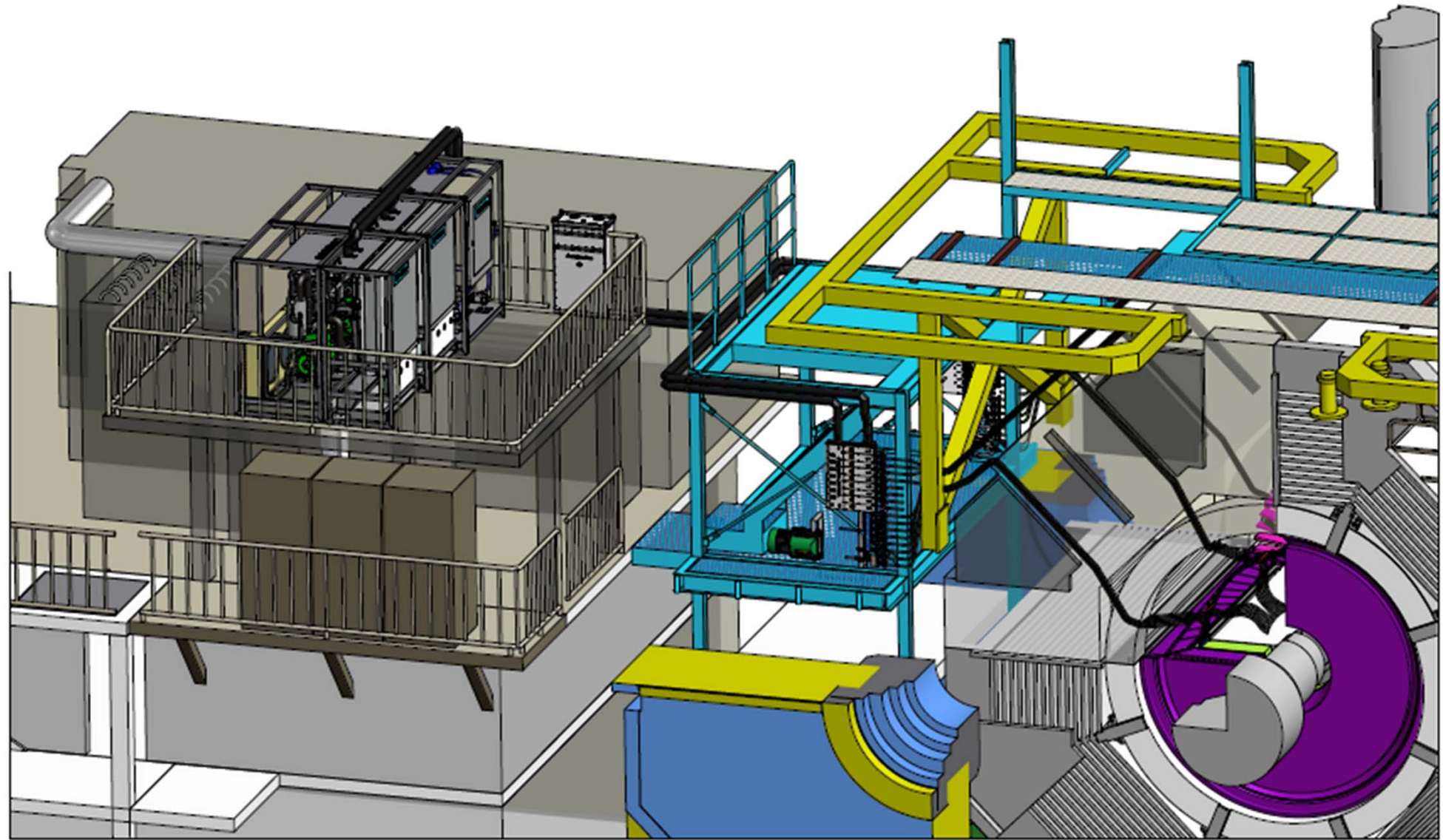
- Exciting weeks are behind us, an even more exciting week is ahead
- High profit for the PXD project concerning the all-important system aspects , still many, even more important issues ahead of us
- EMCM project (metallization) has suffered from beam test activities (manpower), but must now be pushed with highest priority
- After selection of the most promising metal technology we should consider a small pre-series of final sensors (ladder!) to be put in a test beam together with the final SVD ladder(s): “DTT2”
- More detailed thoughts should be given now to the preparation of the BEAST setup and the commissioning of the PXD
- We should be also prepare ourselves for the high lumi phase: A new production of sensors (and ASIC upgrades) may become a necessity



# Backup



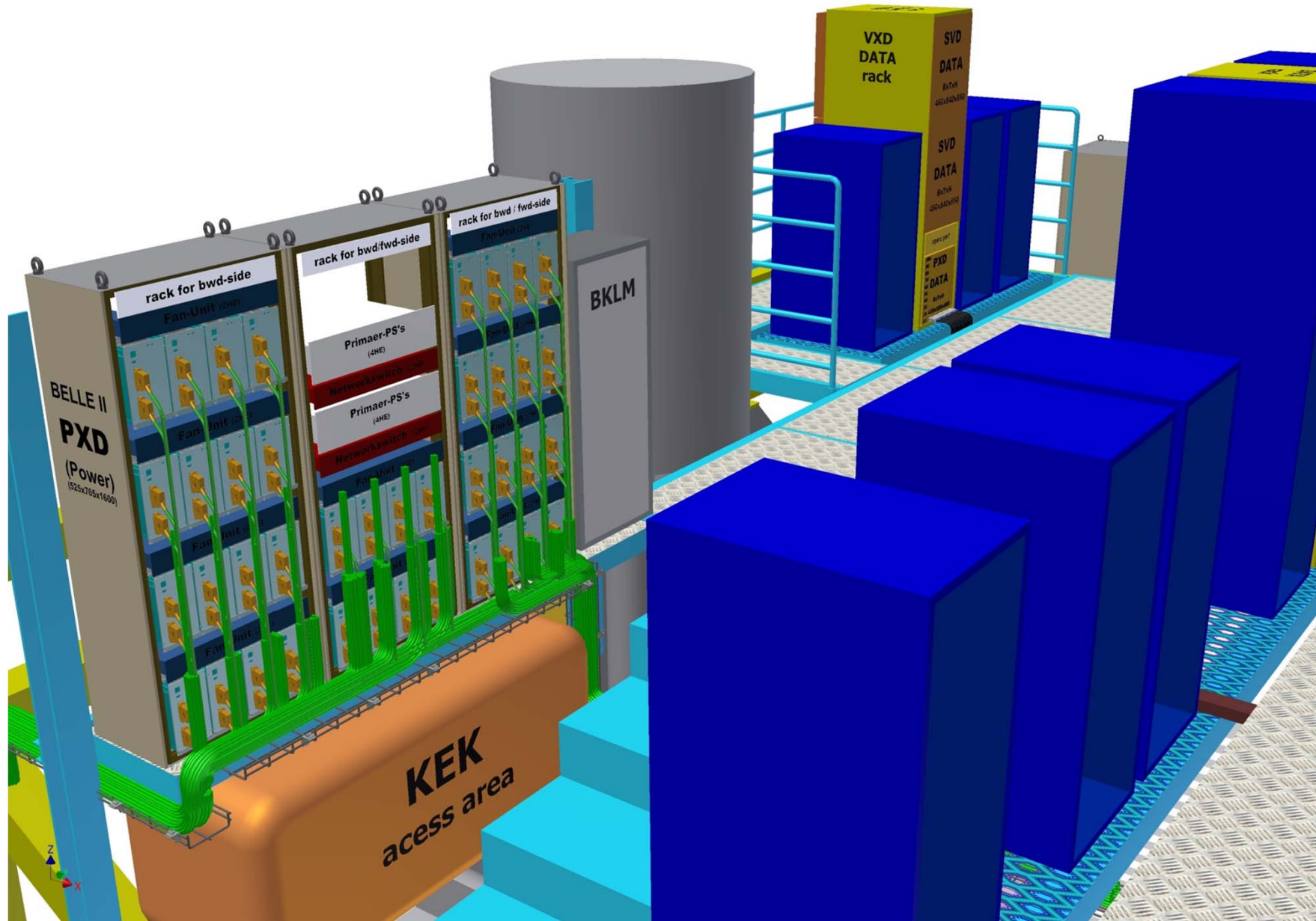
# IBBelle Location in Belle II



details on IBBelle by Luigi



# Locations of P/S and DHH/DHHC



details by Stefan

# Amazing Silicon ...

