

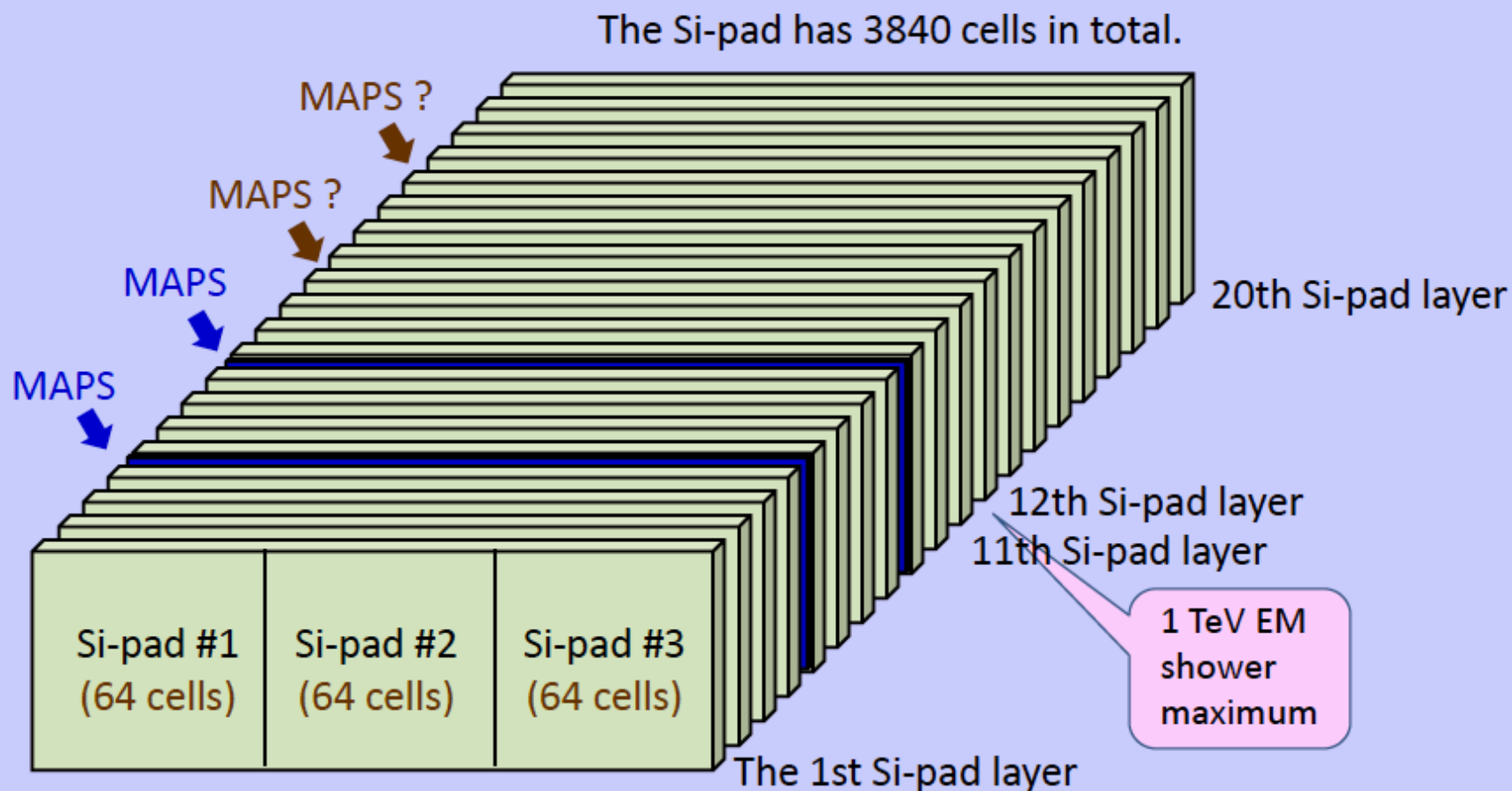
# FoCal PAD R&D status in Japan

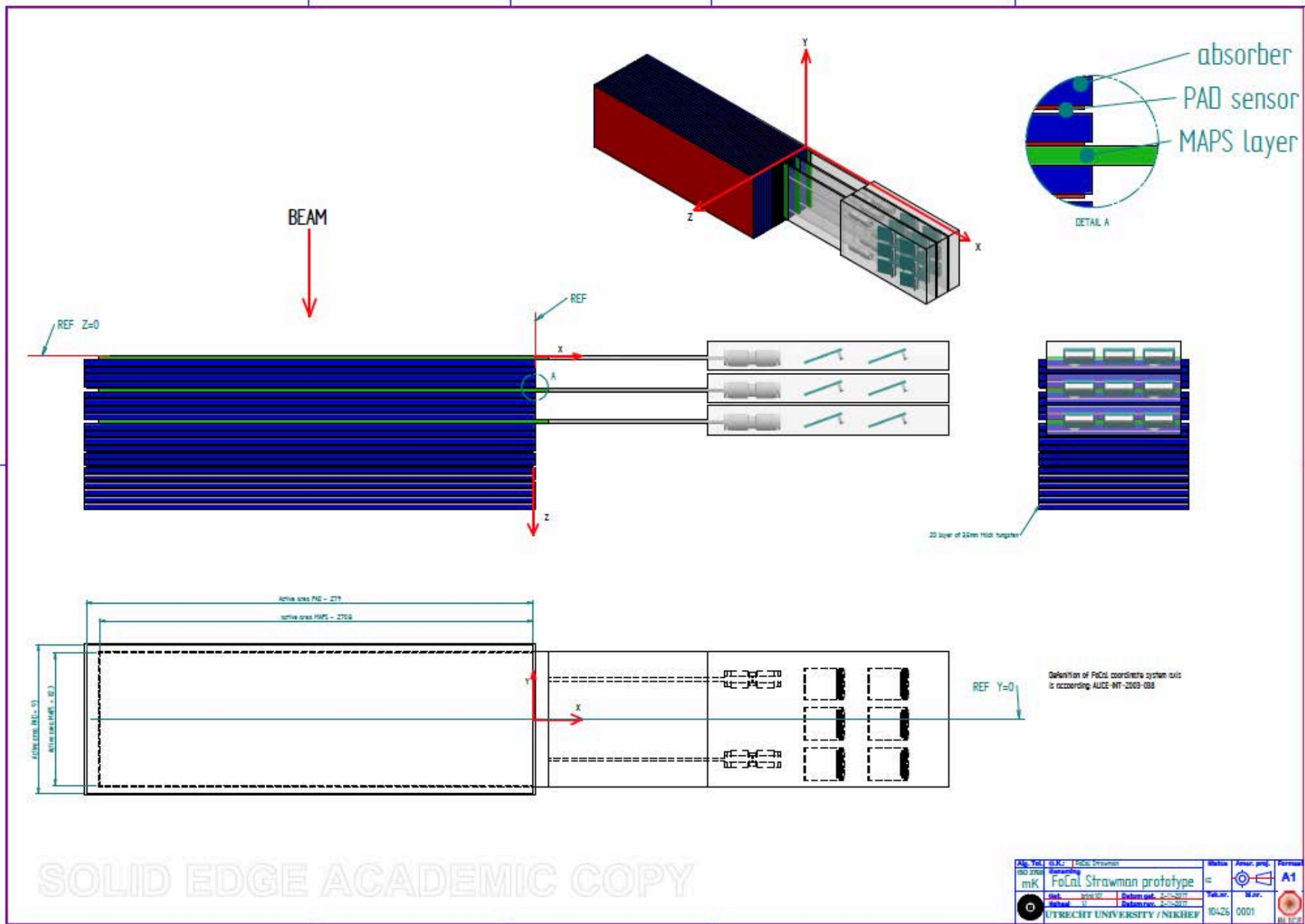
Tatsuya Chujo  
University of Tsukuba

FoCal meeting in ALICE week, Nov. 15, 2017

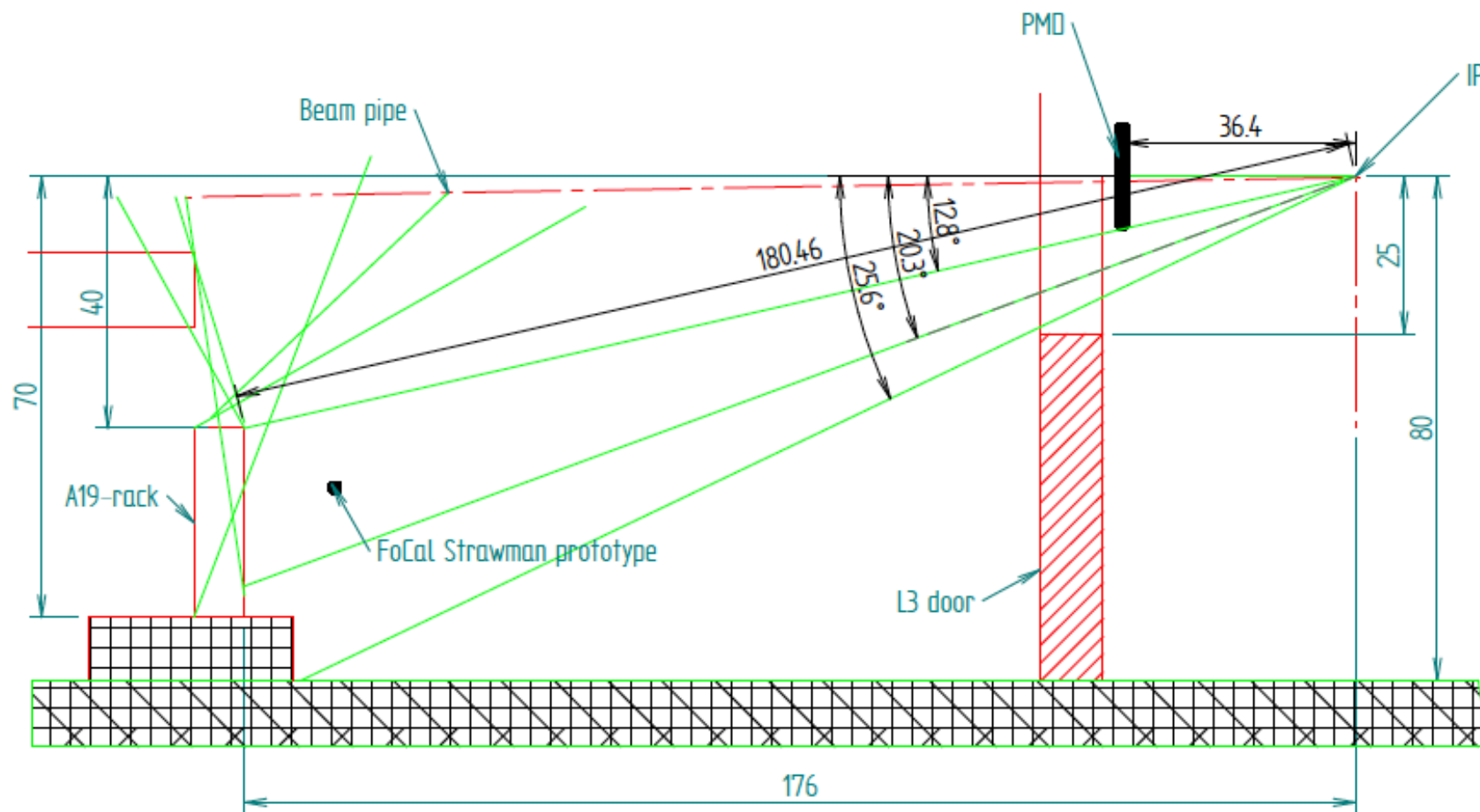
## Modification of the Mini-FoCal-E tower

We have an idea that we change the pad layout from 2x2 to **1x3** in order to matching with the size of MAPS (84 x 280 mm<sup>2</sup>).





# mini-FoCal (possible location)



byTon

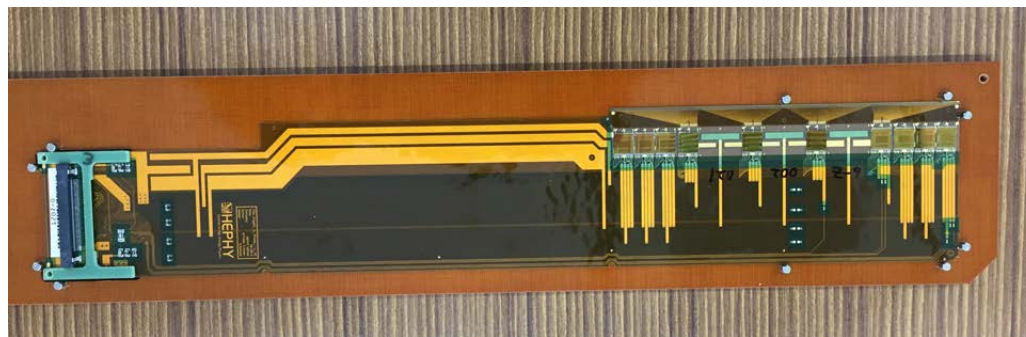
80 = 8 meter

- Silicon sensor:
  - bidding is done, order in place.
  - HAMAMATSU Si PAD (~1cm<sup>2</sup> PAD size, 8×8, 11.3 x 11.3 mm<sup>2</sup> total area, 320 um thickness)
  - No. of sensors: 61
  - delivered by end of Feb. 2018
- Tungsten:
  - bidding is done, order in place
  - W (94%), Ni (2%), Cu (4%)
  - No. of plate: 20
  - delivered by end of Feb. 2018

- Readout electronics
  - Option 1: SAMPA
    - discuss with Marcelo on Nov.2.
    - Obtain info to start
      - SAMPA readout in FPGA mode
      - contacted MHC group
      - seems to difficult to obtain the working full readout chain (SAMPA, CRU etc.) for 2018 data taking.
  - Option 2: APV25
    - Plan: PCB production w/ APV by the experienced company (RINEI) (KEK Belle-II SVD and J-PARC E-16 GEM TPC)
    - meeting with the company next week (Nov. 20).
    - keep communicating with H. Muller (RD51): APV and SRS integrated system.

- KEK (Belle-II): 61 chips
- UK (Geoff Hall): 60 chips(?)
- We need 60 chips for 20 layers X 3 (dual gain)
- APV chip on flex PCB or signal transmission to the edge?
  - multi-layer flex cable with ground plane (Kharkiv group)

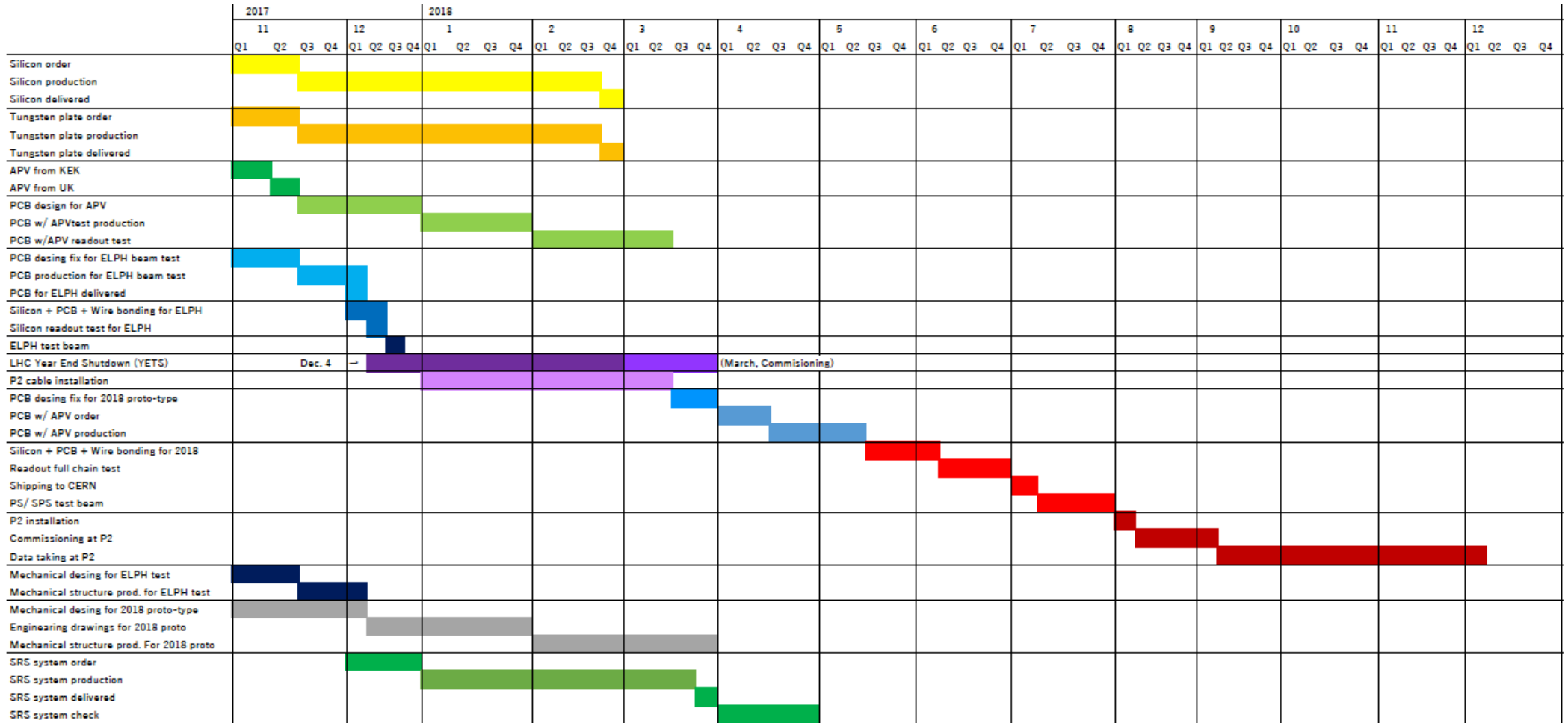
## APV25 chips from Belle-II



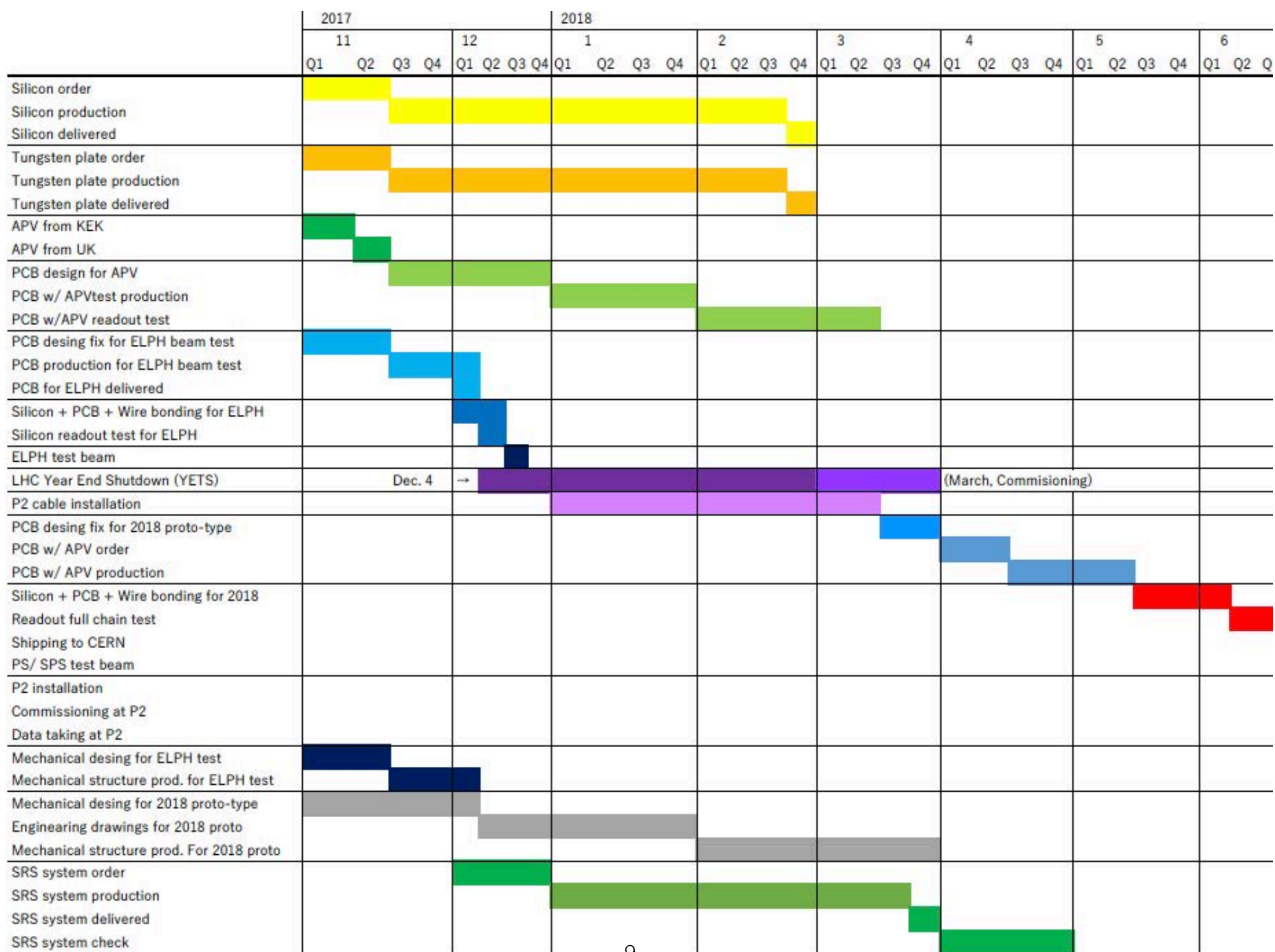
PCB with APV (Belle-II SVD)



# Schedule







# Thickness

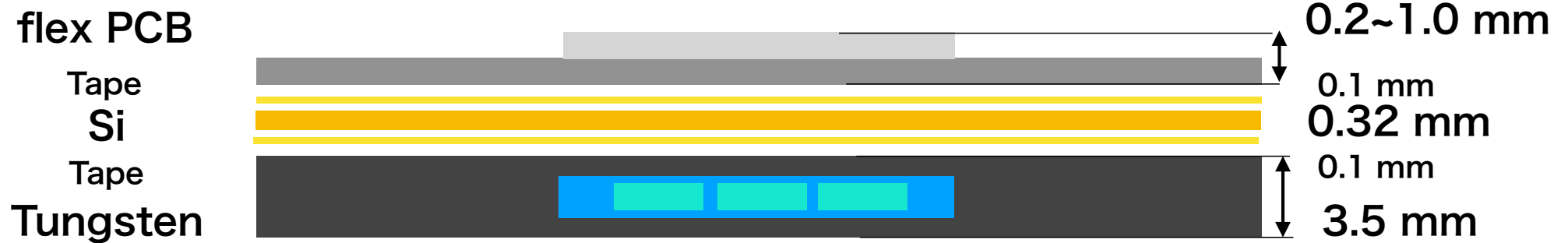
Components  
(RC, APV chip)



Total thickness: 4.2 ~ 5.0 mm

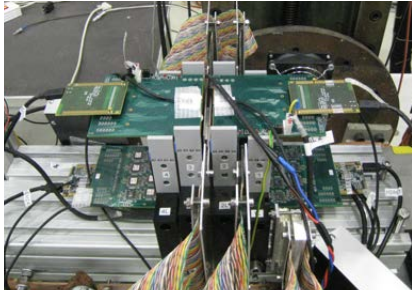
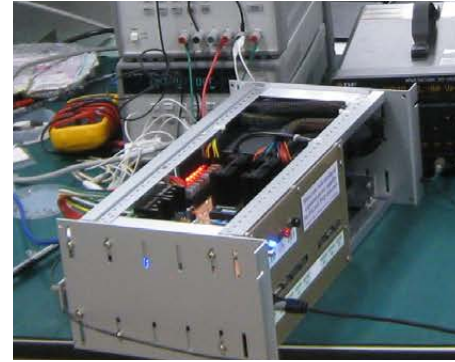
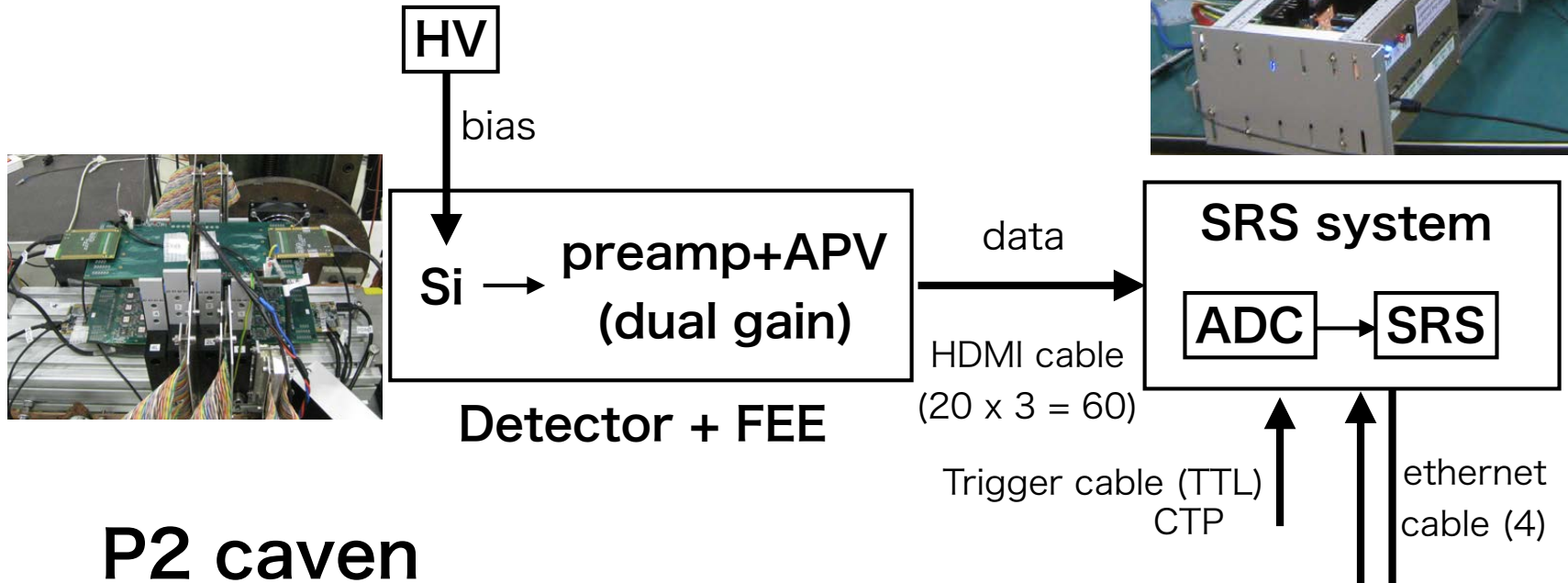
# Envelope

Components  
(RC, APV chip)

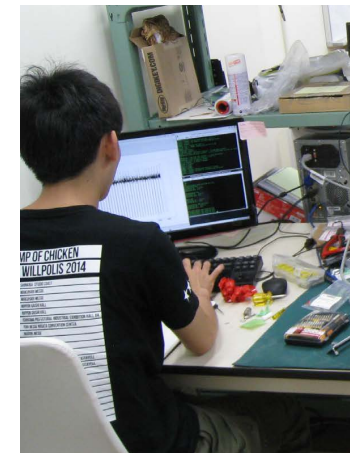
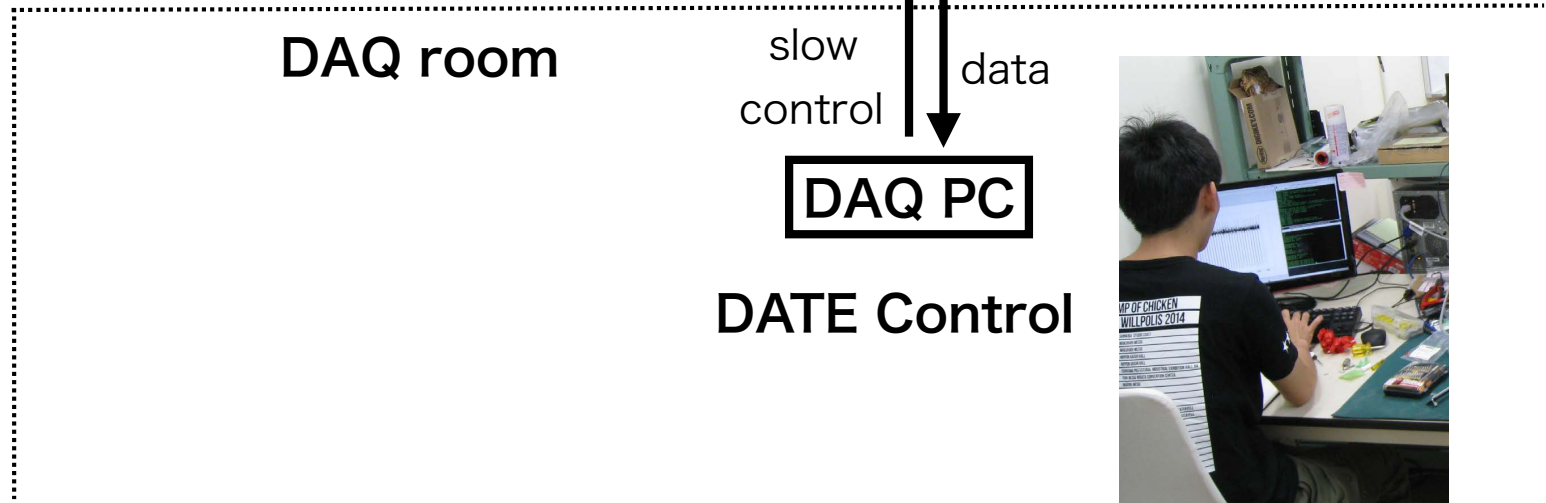


On the side of Tungsten plate, put 3 APV ports,  
each port has 128 ch (64 ch x 2, dual gain)  
APV port: micro HDMI

# Readout electronics chain (APV option)



**P2 caven**



- P2 caven:
  - 60 HDMI cables (detector - ADC)
  - 1 trigger cable from CTP (lemo)
  - 4 ether net cables from P2 caves to DAQ (w/ switch?)
  - Power consumption:
    - ATX power supply for SRS crate: ~550 W x 4 (crates)
    - HV for Si bias: (small)
    - Air cooling fan?
- DAQ room @ P2:
  - DAQ PC

We would like to discuss with Technical coordinations in this week.

- **ELPH test beam in December**
  - < 1 GeV electron beams.
  - readout test with own silicon sensor (APV)
  - position dependence of response
  - test different preamp choices, PCB test
  - Calibration with IR laser and beta lay/ cosmic lays at the lab
- **FoCal PAD NIM (ORNL, Tsukuba, Tokyo)**
  - reanalyzed the 2015 data again, possibility to improve the PAD and electronics calibration.
    - non-linearity corrections of APV
    - pad-by-pad gain calibration.
  - holding a regular meeting, next meeting is Dec.1
  - plan: finalize the contents by the end of 2017.
  - somewhat connected to the better understanding of detector calibrations (both hardware and software sides).
- **Test beam proposal at PS/SPS by the end of this week**