

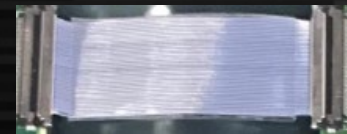
# FEV13 at test beams

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# Major changes in FEV13 and SMBv5

- ASIC: SKIROC2 → SKIROC2A
  - Individual threshold control
  - Improvements on TDC
- Dedicated power plane for AVDD\_PA
  - Power layers: 2 → 3
  - Total layers: 10 → 12
- Smaller SMB footprint
- Connection by 0.4mm-pitch flex cables
  - Two candidates, footprint compatible
- PP capacitor on FEV
  - 0.4 mm thickness, 40 mF x 6

Designed and produced  
in LLR/Kyushu collaboration

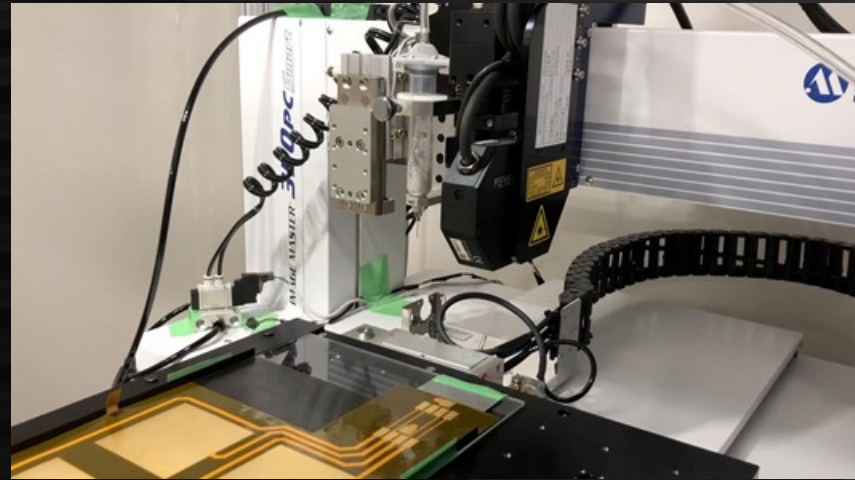


Flexible cable with  
Panasonic connector

Micro-coaxial  
cable by KEL

# Assembly of FEV13 (in Kyushu)

Glue dispenser



Gluing flex to PCB/sensor assembly with automatic alignment

P1

P2

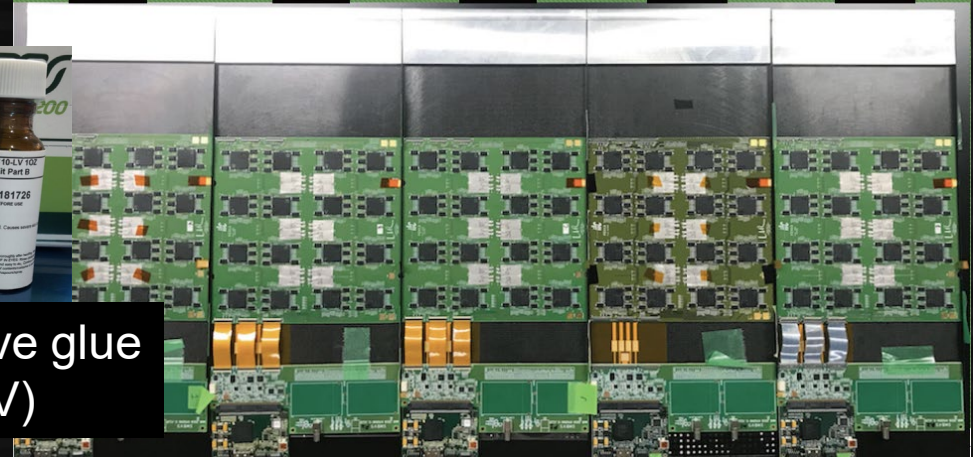
P3

K1

K2

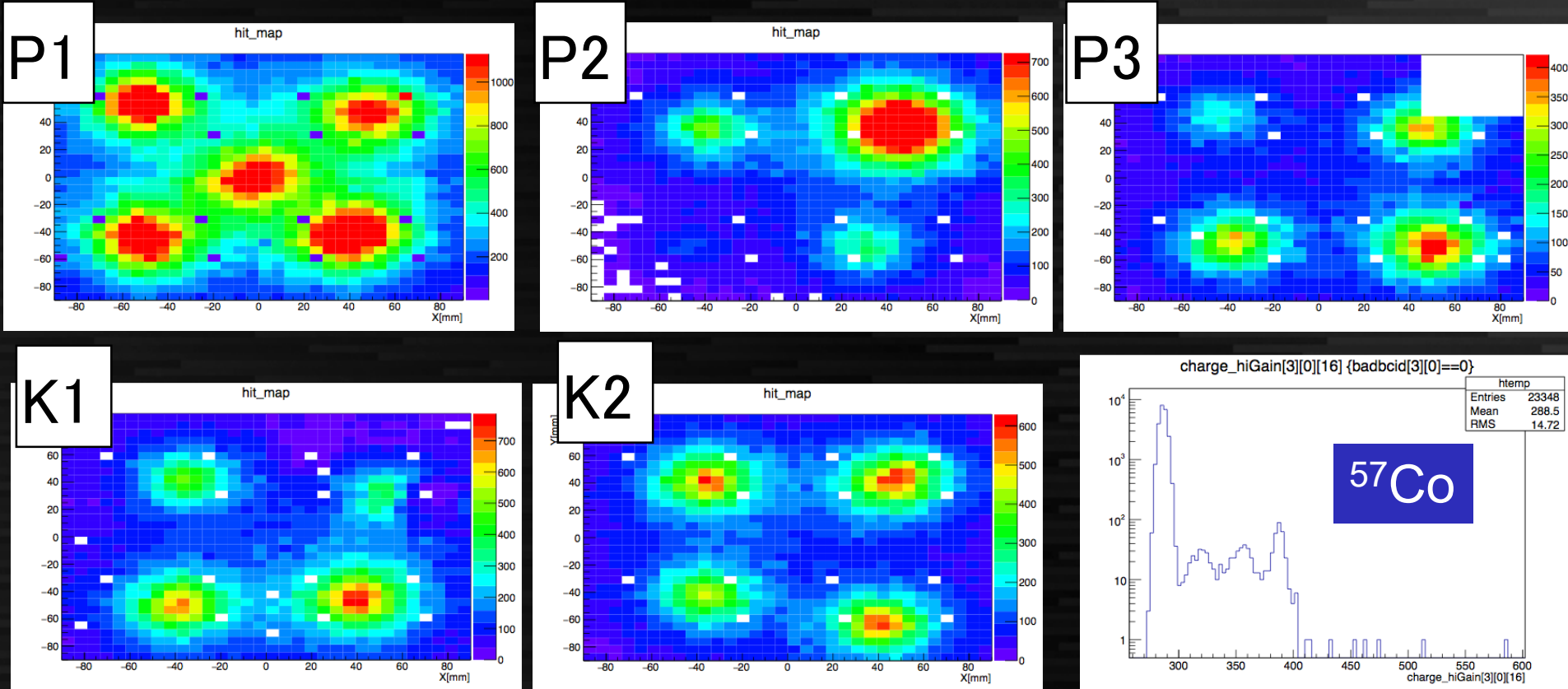


Conductive glue (E4110-LV)



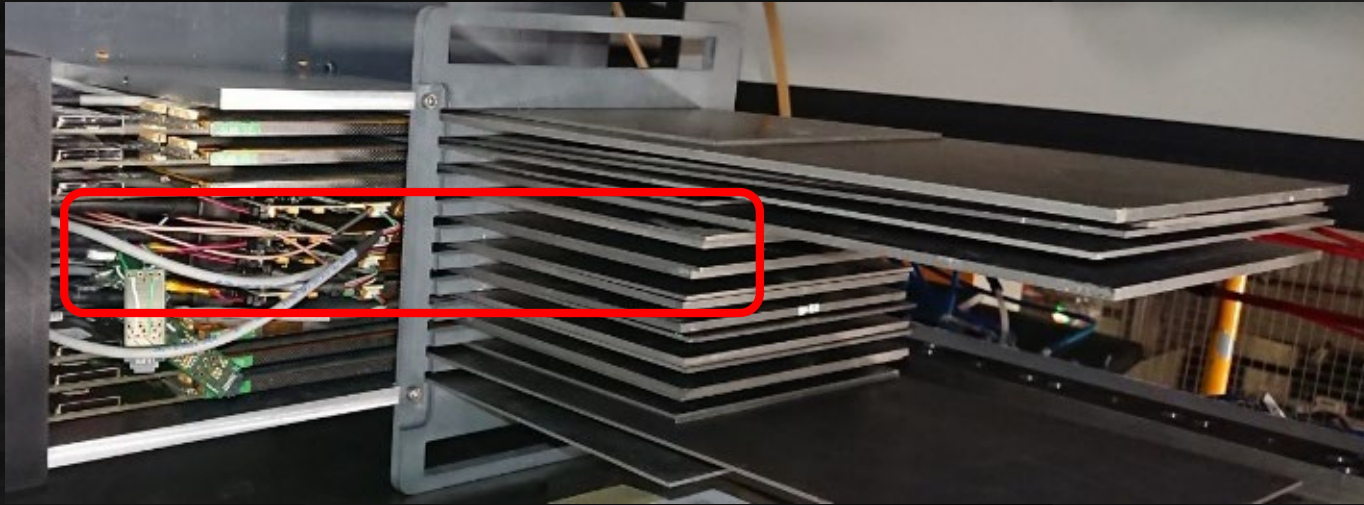


# Commissioning with $^{57}\text{Co}$ and $^{133}\text{Ba}$



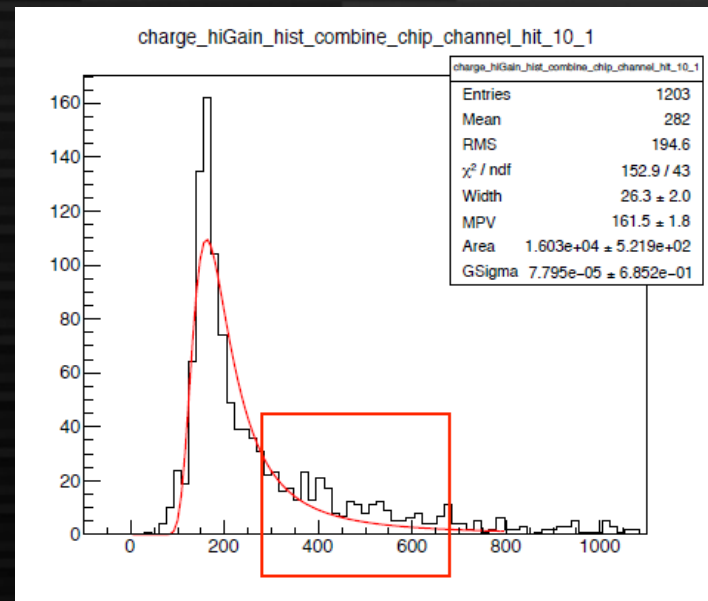
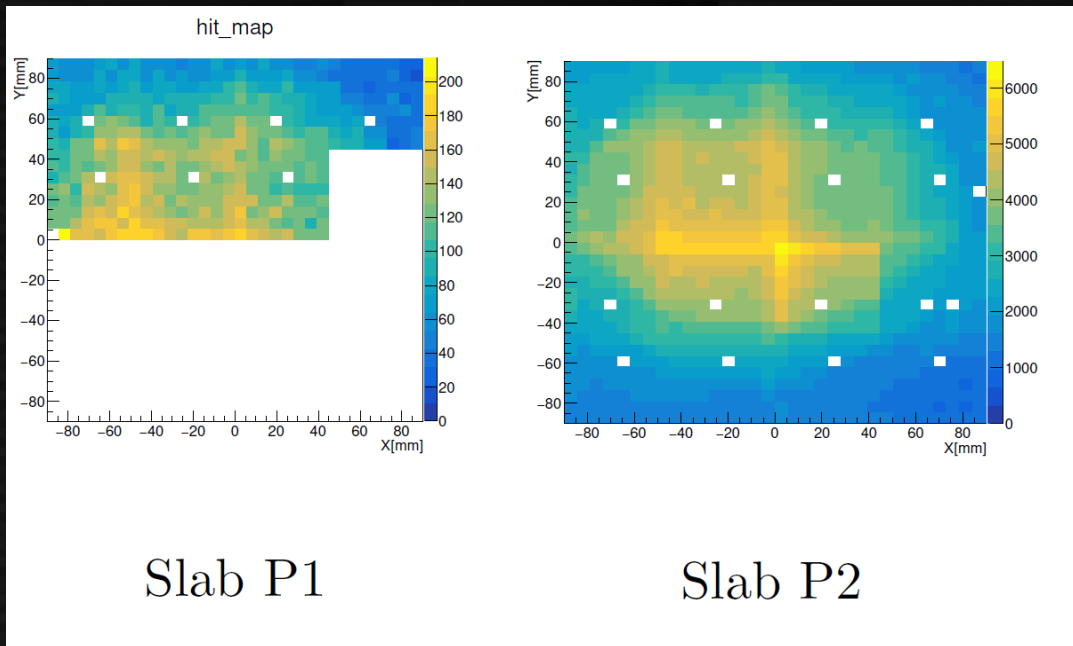
One SKIROC2A chip seems not working (out of 80), others are OK  
Got 122 keV peak of  $^{57}\text{Co}$  with S/N ratio of around 30

# CERN SPS (26 Sep. – 10 Oct. 2018)

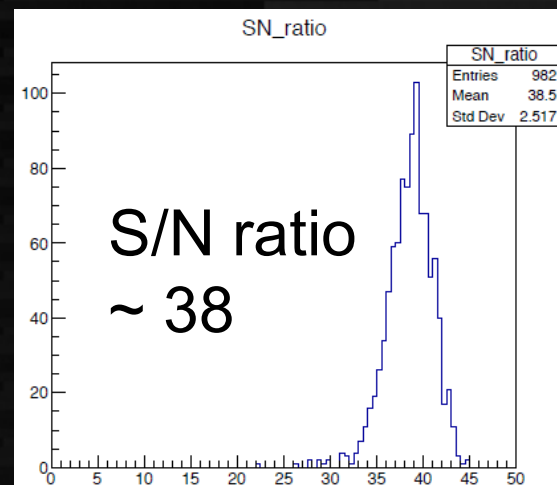
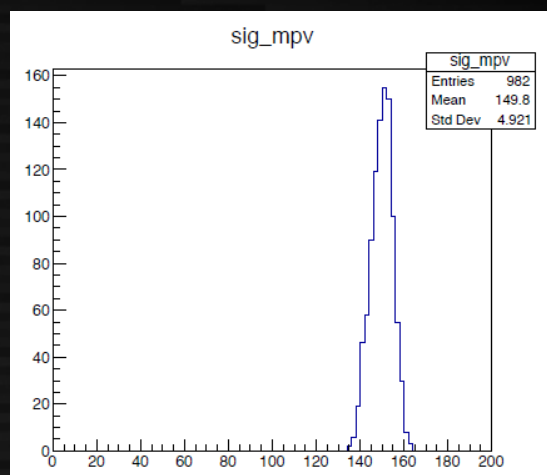


- 4 FEV13 inserted in middle of the stack (+ 6 FEV11)
- 2 out of 4 are working, other 2 not good
- Main problem: HV connection of SMB to flex (probably due to lack of back plate on them: problem did not appear in Kyushu since the slab laid on a flat plate and not on the vertical position)

# Hit map & MIP spectrum



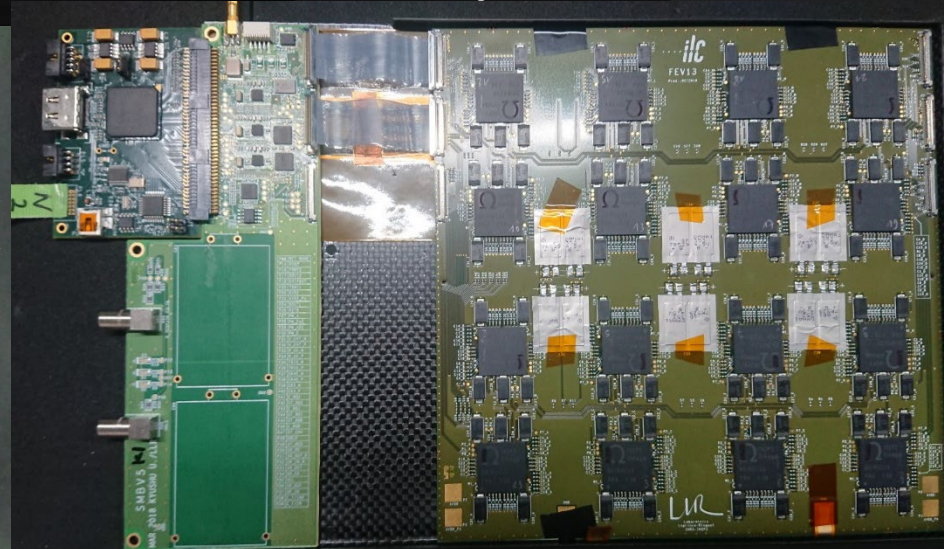
MPV  $\sim 150$  with  
650  $\mu\text{m}$  sensor  
(cf.  $\sim 60$  in FEV11  
with 320  $\mu\text{m}$ )





# Fix on HV issue for next TB

- Carbon tray of FEV8 reused for the FEV13 in 2018
  - No cut on the connector
    - need to shift FEV → no backing plate at SMB
    - HV issue at SMB-flex
- New carbon trays are produced in Japan



# Summary and plans

- FEV13/650  $\mu\text{m}$  wafer tested at CERN SPS
  - S/N ratio around 40: quite promising
    - Signal strength somewhat larger than expected (2.5 times 320  $\mu\text{m}$  wafer)
  - HV issues occurred
- Next TB at DESY in June-July 2019  
with new carbon tray to fix the HV issue