CDC

Shoji Uno (KEK)

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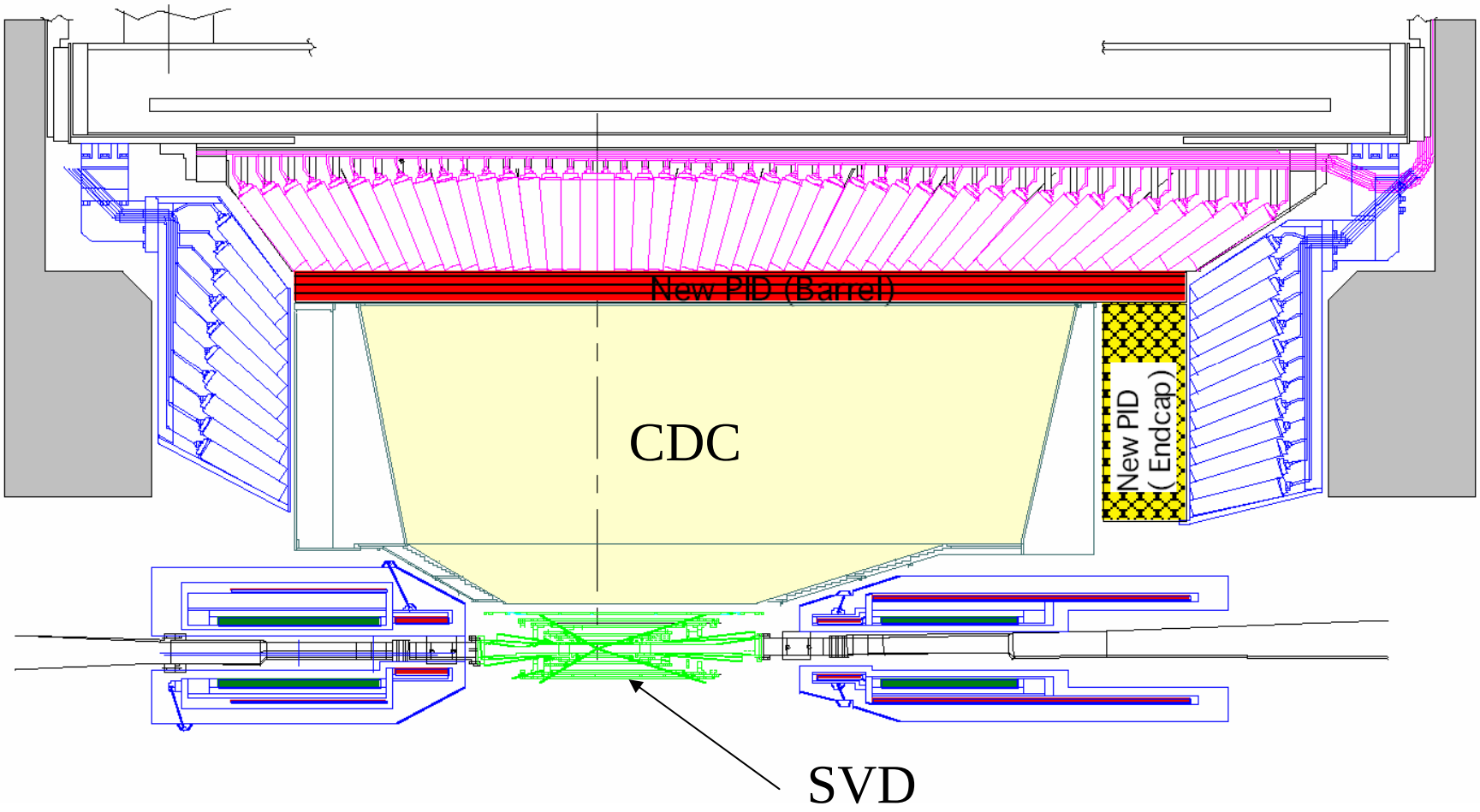
- Baseline design
  - → Chamber radius
  - → Wire configuration
  - → Main parameters
  - → Electronics
- Summary

Baseline design



Chamber Radius

- Inner radius
  - → Physics : Vertexing efficiency using Ks
  - → SVD determines the boundary.
  - → At present, the boundary is 15cm in radius.
- Outer radius
  - → New barrel PID device determines the outer radius.
  - → At present, 115cm is selected, tentatively.
- The boundary condition is important to start construction.
  - →Basically, CDC can manage any radius.

Wire configuration

- 9 super-layers : 5 axial + 4 stereo(2U+2V)
  - → A 160*8, U 160*6, A 192*6, V 224*6,
  - → A 256*6, U 288*6, A 320*6, V 352*6, A 388*8
- Number of layers : 58
- Number of total sense wires : 15104
- Number of total wires : ~60000

Main parameters

	Present	Future
Radius of inner boundary (mm)	77	160
Radius of outer boundary (mm)	880	1140
Radius of inner most sense wire (mm)	88	172
Radius of outer most sense wire (mm)	863	1120
Number of layers	50	58
Number of total sense wires	8400	15104
Effective radius of dE/dx measurement (mm)	752	978
Gas	He-C_2H_6	He-C_2H_6
Diameter of sense wire (μm)	30	30

About readout electronics

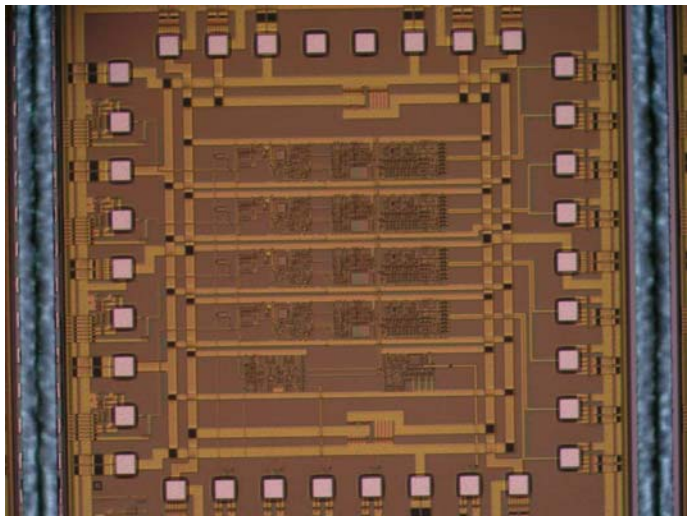
- At present,
  - → S/QT + multi-hit TDC
  - → S/QT : Q to Time conversion
  - → FASTBUS TDC was replaced with pipeline COPPER TDC.
- Three options,
  - → High speed FADC(>200MHz)
  - → Pipeline TDC + Slow FADC(~20MHz)
  - → ASD chip + TMC(or new TDC using FPGA) + slow FADC near detector.
    - ASIC group of KEK Detector Technology Project is developing new ASD chip.
    - New TDC using FPGA is one candidate for TDC near detector.

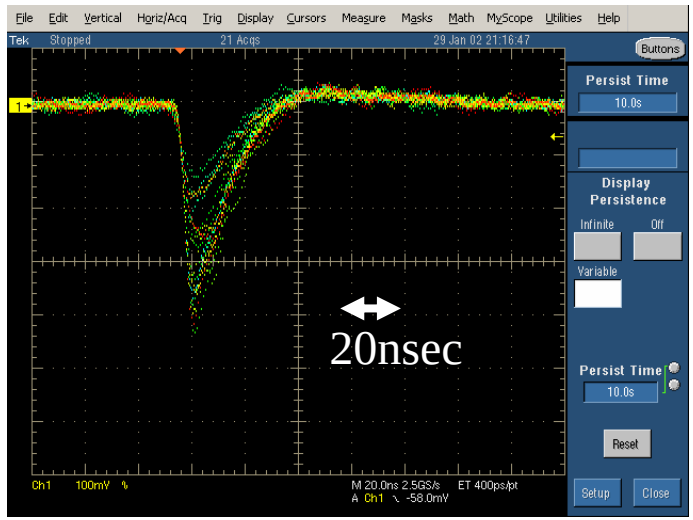
ASD chip

Gain : ～7V/pC

Integration time : 1nsec

1/t tail cancel. PZC





Fe-55 5.9keV X-ray

Summary

- When Belle group decides the upgrade plan, we can start construction of the new chamber soon.
  - → It takes three years to construct the chamber.
- Outer radius(and inner radius) should be fixed as soon as possible.
  - → Barrel PID determines the schedule.
  - → Inner radius should be determined by SVD.
  - → Supporting structure should be discussed.
- One big worry is man power.
  - → No one come to the meeting room today morning.
  - → I hope many people join us when the upgrade plan starts.