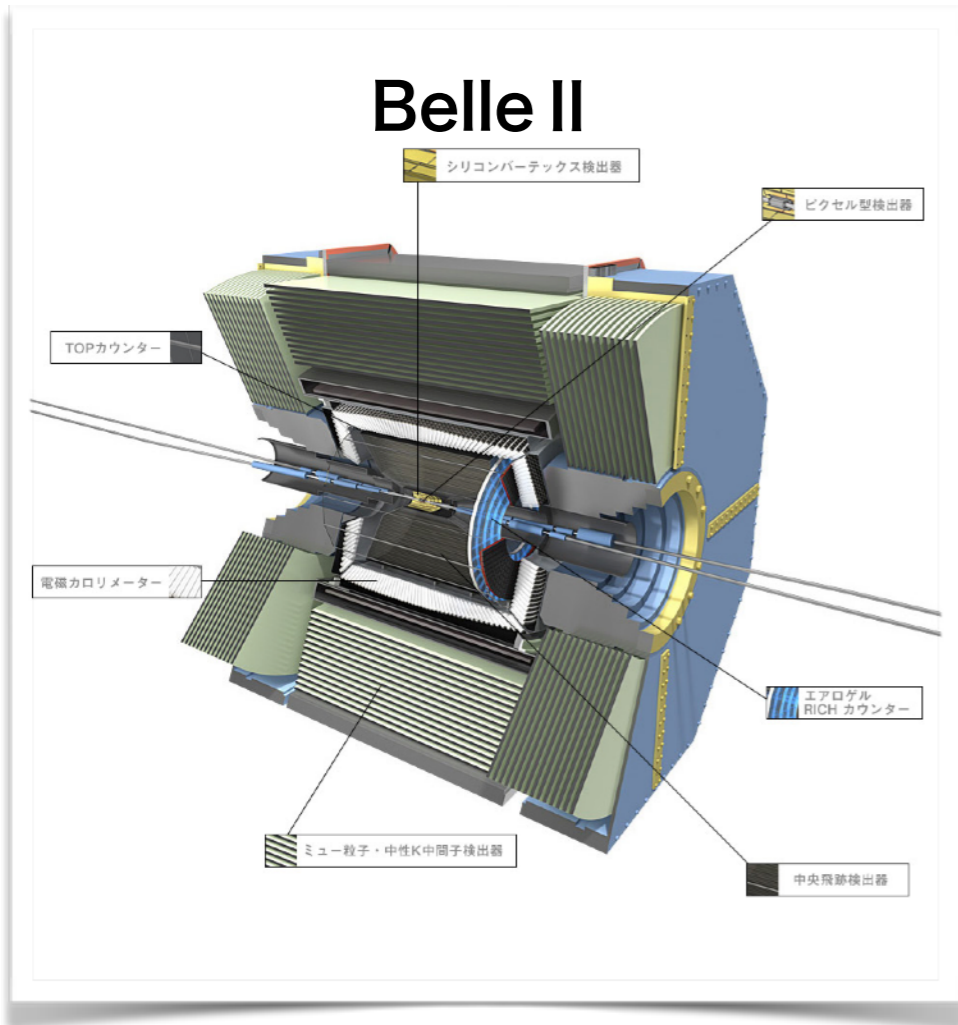GPPU progress report

SOI pixel detector for Belle II upgrade

Taohan Li

D1

SOI Pixel detector for Belle II upgrade

Pixel detector(PXD) in Belle II , is required to measure the two B decay vertices by reconstructing track with strip detector(SVD)

Belle II

5 times larger luminosity

Upgrade

For vertex detector

Hit rate 113MHz/cm^2

Radiation hardness
0.5MGy / year
2.5×10^{14} n_{eq}/cm^2/year

High readout speed.
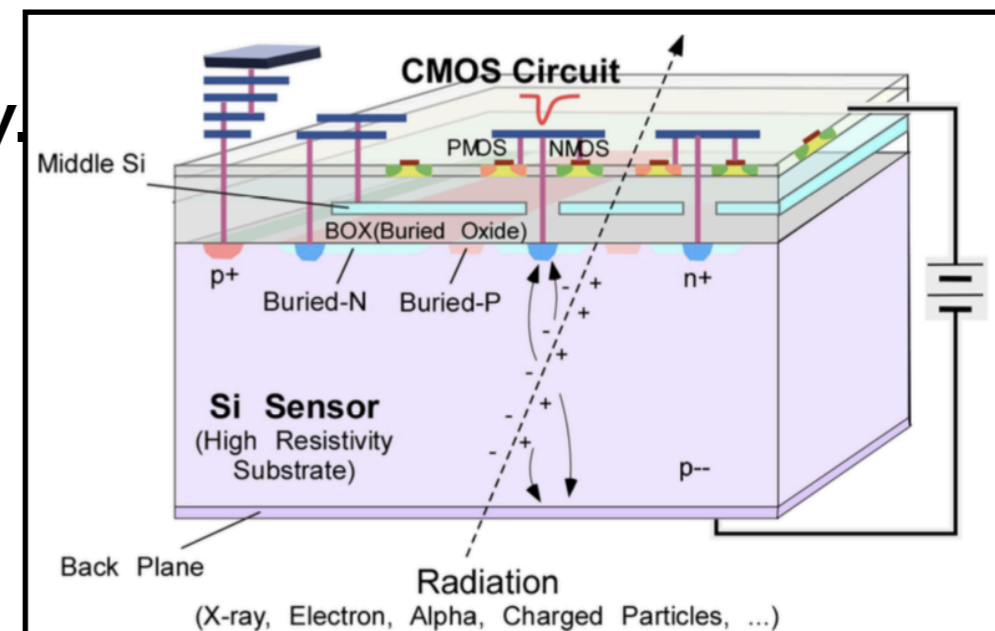Etc..

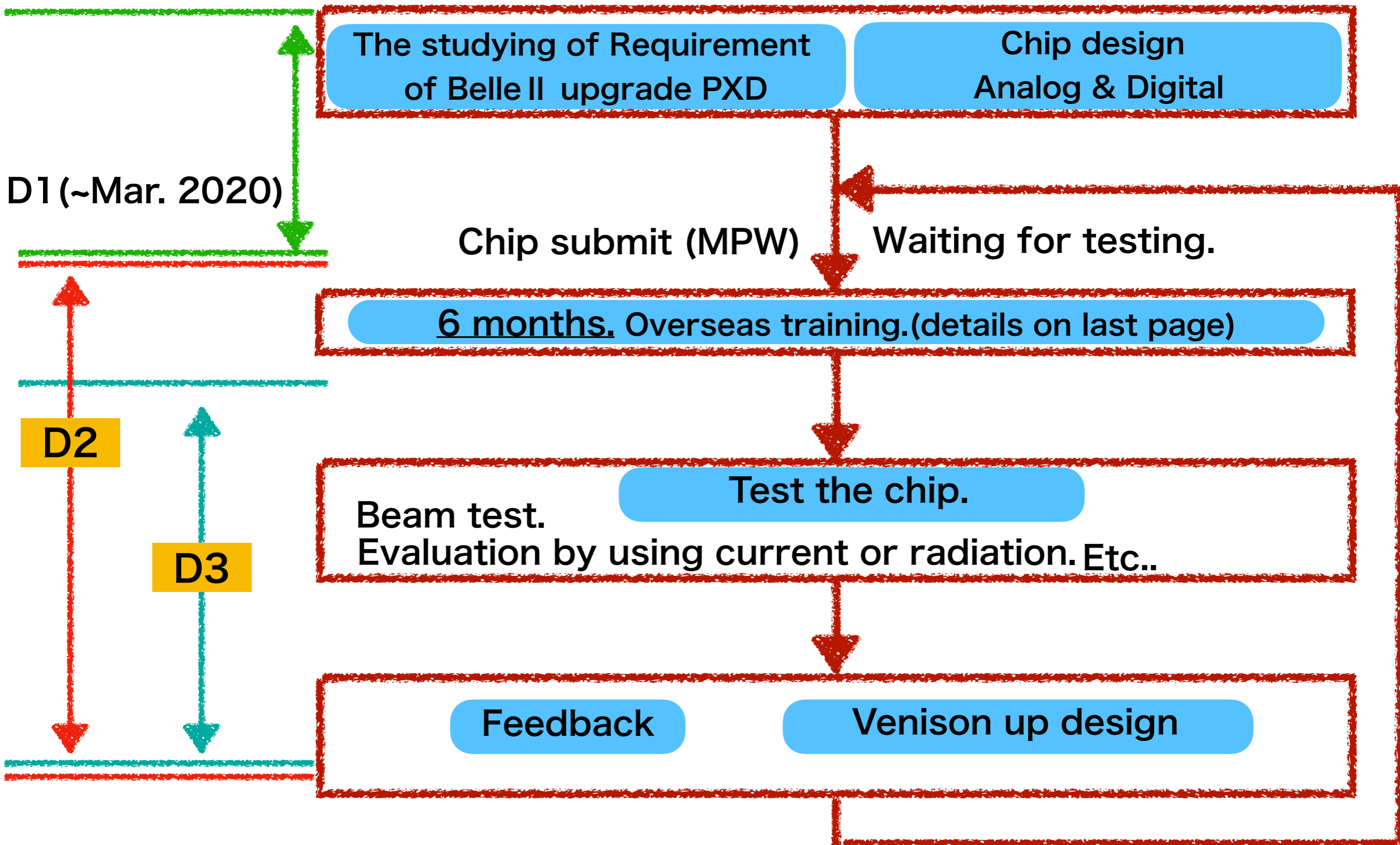We develop a pixel detector with SOI technology.

The concept of DuTip.

Dual Timer Pixel.

Dual Timer (down time counters) in a Pixel to store signal and wait for trigger signal

My research in GPPU

Development of SOI pixel detector for Belle Ⅱ upgrade.

The studying of Requirement of Belle Ⅱ upgrade PXD

Chip design Analog & Digital

D1 (~Mar. 2020)

Chip submit (MPW) Waiting for testing.

6 months. Overseas training.(details on last page)

D2

D3

Test the chip.

Beam test.
Evaluation by using current or radiation. Etc..

Feedback

Venison up design

Position in my research now

My position

The studying of Requirement of Belle II upgrade PXD

Chip design Analog & Digital

PXD(pixel detector in Belle II) is required to measure the two B decay vertices.

➡️ Decide what kind of detector we should develop

- Occupancy
  - Spatial resolution
  - Time resolution
- Radiation hardness

Geant4 simulation

My work

➡️ What pixel circuit do we should design?

- Analog circuit
- Digital circuit
- Readout circuit

Verilog

Overseas training in GPPU

2020 Apr. ~ 2020 Oct. France . Strassbourg

IPHC (Institut Pluridisciplinaire Hubert CURIEN

 Why I choose IPHC?

 They also develop pixel detector for collider experiment, and they are
 friendly with SOI group.

 Homepage (almost written in French) : http://www.iphc.cnrs.fr/-PICSEL-.html

DRS | Recherche au DRS » Du Big Bang aux particules » **PICSEL**

PICSEL

Physics with **I**ntegrated **C**mos **S**ensors and **EL**ectron machines

▸ CMOS Sensors

- Principle of operation
- CMOS Sensors and their applications
- Publications and presentations
- List of CMOS chips
- Pictures of CMOS chips
- Beam telescope
- TAF package

What can I do in IPHC?
- Studying on CMOS sensor.
- Learning how to design CMOS sensor.
- Test CMOS sensor.
- There are much more students than SOI group.