Sources Subgroup Summary

IDT-WG2, Nov.1. 2022, K. Yokoya

- Oct.24 32nd Regular meeting
  - ✓ Andriy Ushakov, Andy Lankford, Carlos Hernandez-Gracia, Gudi Moortgat, Hitoshi Hayano, Jenny List, Kaoru Yokoya, Peter Sievers, Phil Burrows, Reza Kazami, Sabine Riemann, Shin Michizono, Silviu Covring Dusa, Spencer Gessner, Steffen Doebert, Tsunehiko Omori, Yoshinori Enomoto,
  - ✓Indico https://agenda.linearcollider.org/event/9835/
- Talk
  - ✓"Positron source for SuperKEKB"
    - Y. Enomoto
      - The leader of the positron group in Japan since September
      - now joined in the WG2 sources group
    - Uploaded as 221024-IDT-source-enomoto.pptx (.pdf)
      - Big report (55 pages)
- Next meeting
  - ✓Presumably on Nov.21

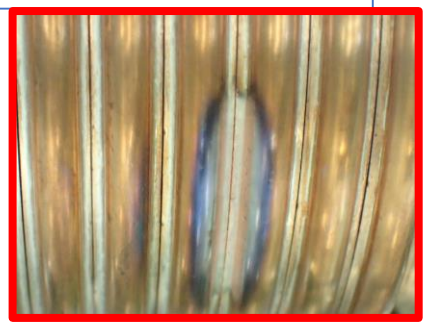
Positron source for SuperKEKB

Topics from Enomoto's slides

- From 1 nC to 3.5 nC

2016 SKEKB phase 1 started (<1nC)
2020 Major upgrade of e+ source (~ 3.5nC)

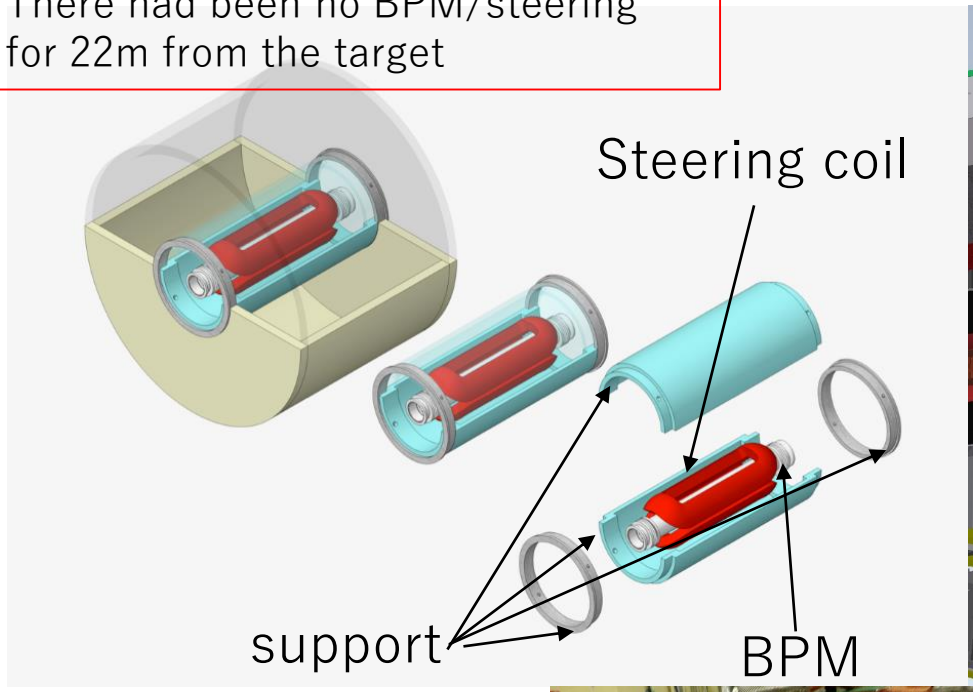
  - ✓Solve discharge problem of FC
    - Change material of FC head
    - External circuit to reduce voltage
  - ✓Improve beam handling
    - Install steering coils inside the solenoid

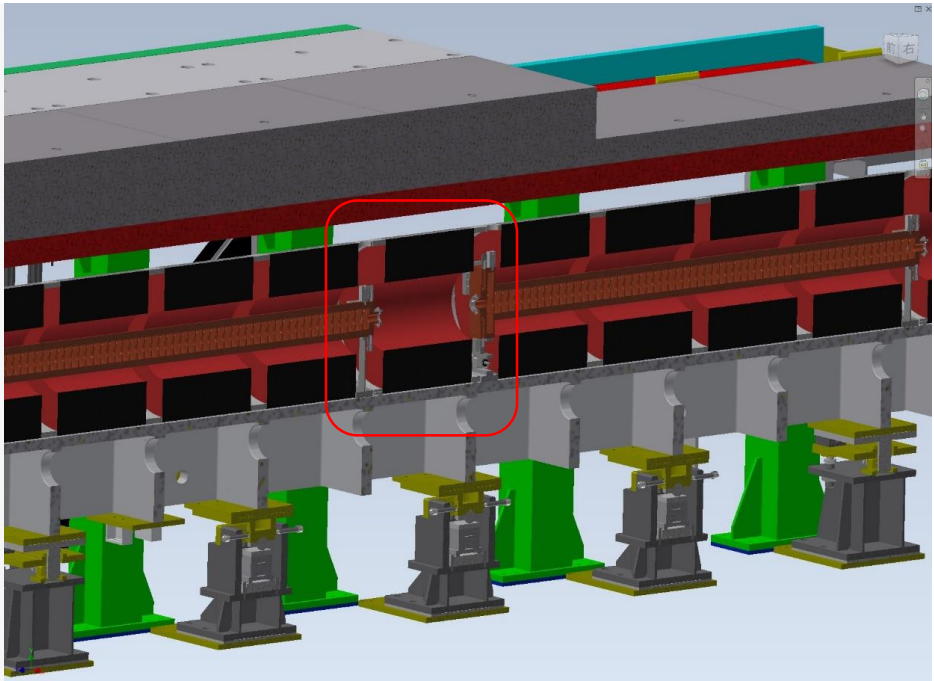


- Toward 4 nC and above
  - ✓Shorten distance between FC and 1st acc. Structure
- Another topics
  - ✓Rotating target
  - ✓Full model simulation
  - ✓Magnetic field measurement at test bench
  - ✓Evaluation of W and W-Cu connection

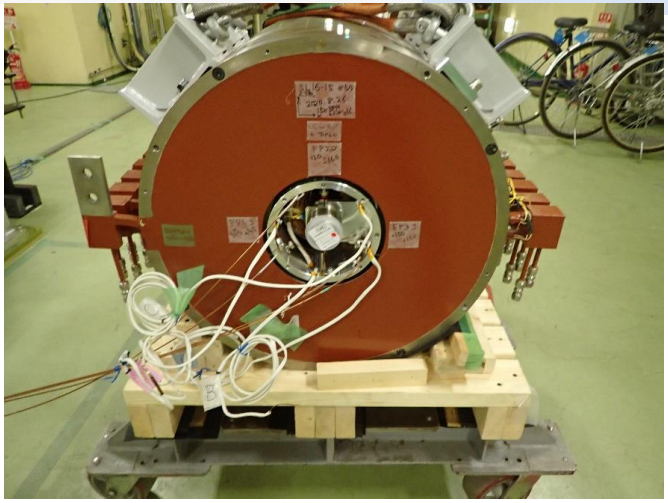
BPM and steering coils inside solenoid

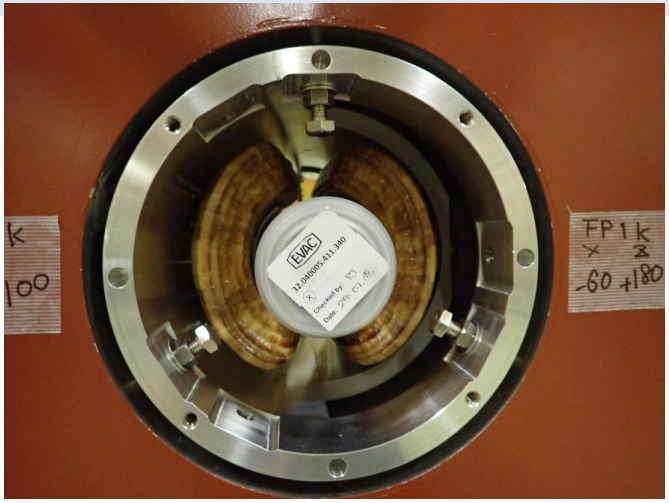
There had been no BPM/steering for 22m from the target

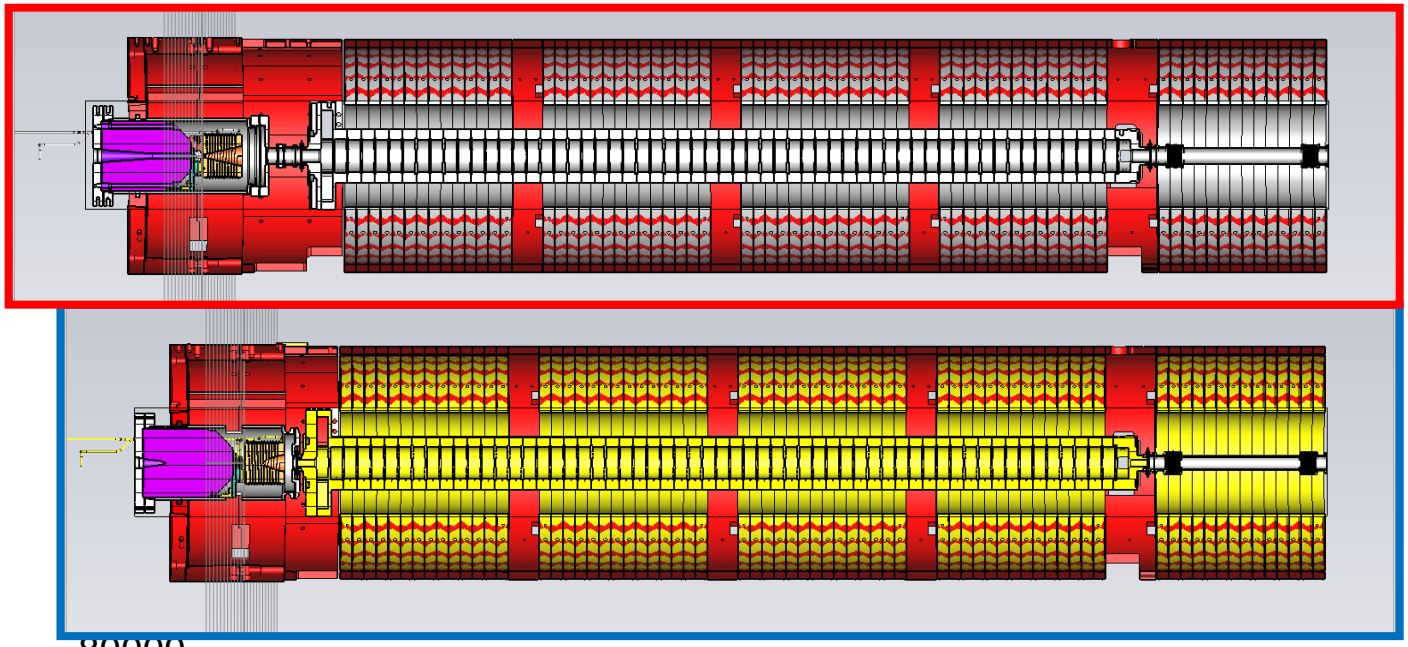




K. Yokoyama and K. Kakihara

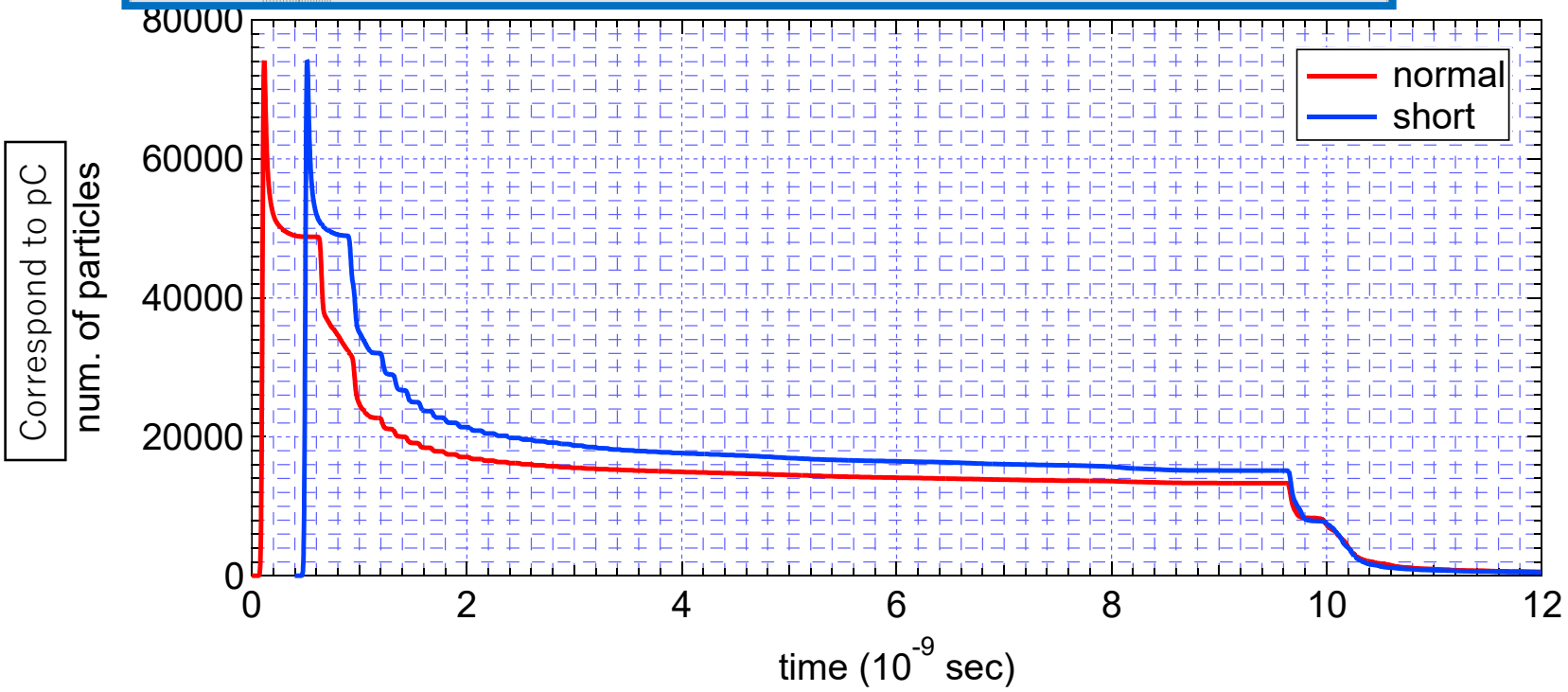






Shortended the distance from FC to cavity by ~120mm

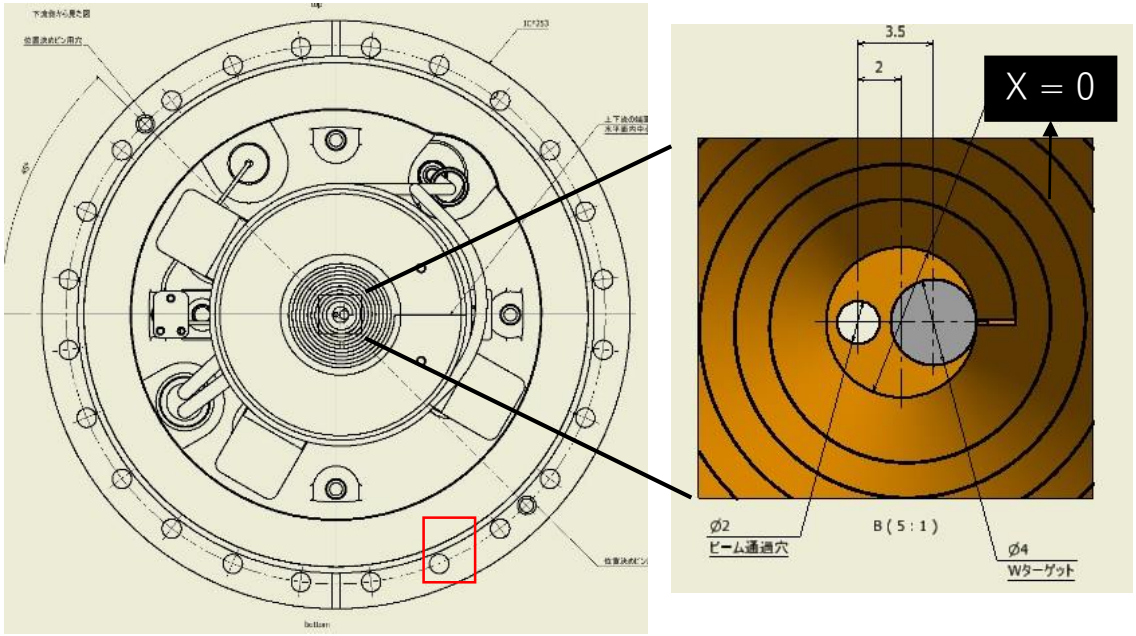
~ 30% increase of the yield



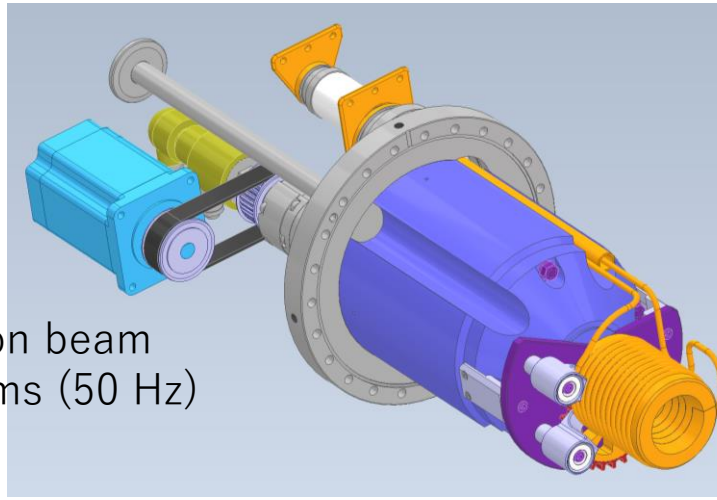
SuperKEKB positron source 3

Target material : W
Target size : Φ4 x 14
Inserted in the pule Cu block
Connected by HIP process

X = 0 hole for electron
X = 2 center of the FC
X = 3.5 center of the W target



Introduce rotating target in this asymmetric structure



Small hole limit tuning flexibility for electron beam
Switch free space and W target within 20 ms (50 Hz)
Prototype design finished

From SuperKEKB to ILC

- There are many common and similar tasks.
  - ✓ Experience in SuperKEKB will useful for designing positron source for ILC.
  - ✓ Collaboration with many other project like SuperKEKB, FCC, CLIC, CEPC etc. is important.
  - ✓ Collaboration with non-accelerating institute is also important.

Target and plan for ILC positron source

- Prepare for manufacturing prototype when pre-lab launched
  - ✓ EDR + Drawings + mockup
    - Test and develop critical components
    - Simulation
    - 3D model