

# Summary of Briefing Meeting for Sources

IDT-WG2, Dec.12, 2023, K. Yokoya

## ➤ Dec.7 3 Briefing Meeting

- ✓ Gudi Moortgat-Pick, Yoshinori Enomoto, Steffen Doebert, Iryna Chaikovska, Kaoru Yokoya
- ✓ Indico <https://agenda.linearcollider.org/event/10236/>

## ➤ Contact Persons

### ✓ Asia-Pacific

- Yoshinori Enomoto WPP 8-11 KEK

### ✓ Europe

- Iryna Chaikovska WPP 8,9 IJCLab
- Steffen Doebert WPP 6,7 CERN
- Gudrid Moortgat-Pick Uni. HH

## ➤ US

- ✓ US people could not participate. Hence no discussion on the electron source (WPP4) yet

## ➤ Presentation

- ✓ Gudi undulator itn-wpp-positron.pdf
- ✓ Yoshinori e-driven 231016-ITN-information-meeting-source-v5.pptx

# Undulator Scheme

- WPP6 (rotating target)
  - ✓ Design finalization, partial laboratory test, mock-up design
  - ✓ Magnetic bearings: performance, specification, test
  - ✓ Full wheel validation, mock-up
- WPP7 (Magnetic focusing system)
  - ✓ Pulsed solenoid, plasma lens, including yield calculation
  - ✓ OMD with fully assembled wheel
- WP5 (Undulator) is not included in WPP (higher maturity)

# WPP7 Magnetic Focusing System

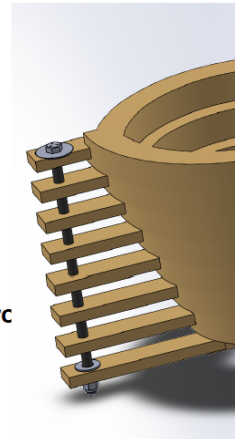
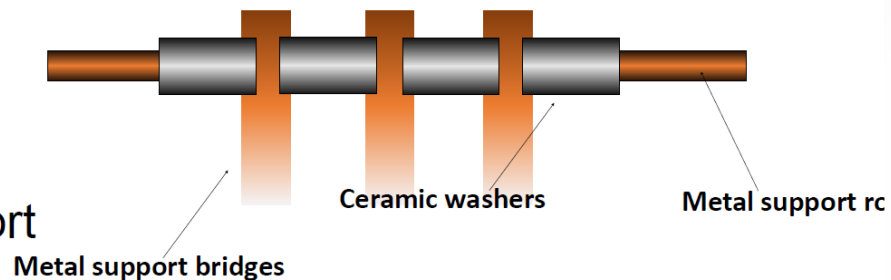
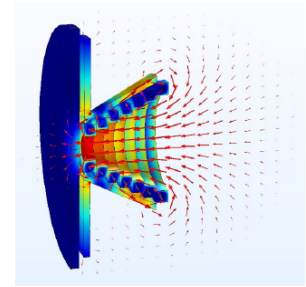
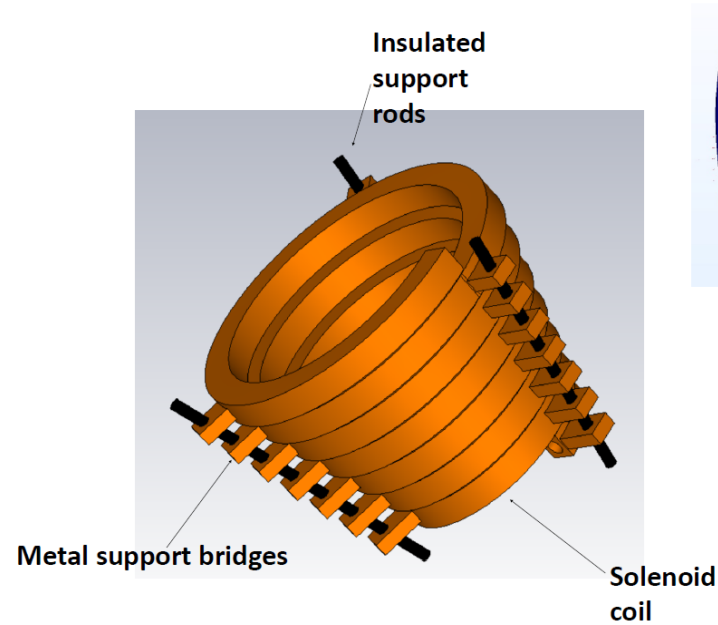
- The strongest candidate: Pulsed Solenoid
  - ✓ Other candidate: plasma lens
- Mechanical design department at DESY: available manpower for design
- DESY-CERN collaboration already going on
- Planned: prototype tests 2024
- Goal of development is a prototype solenoid to demonstrate
  - ✓ magnetic field strength, field stability, mechanical stability, thermal stability
  - ✓ Vacuum vessel not foreseen in first prototype design
- Tests : where?
  - ✓ Possible test at CERN (power supply available)

# Solenoid construction

Tenholt, Loisch, Lemke, Yakopov

## Possible mechanical design

- ▶ Solenoid coil
  - ▶ Tapered winding
  - ▶ 7 planar windings with interconnections
  - ▶ Conductor cooled from inside
- ▶ Metal supports to hold coil
- ▶ Support rods insulated from support bridges
  - ▶ Washers e.g. of SiN ceramics
- ▶ Magnetic shielding cut at support locations
  - ▶ Influence on field to be determined
  - ▶ Main shielding to target unaffected



# WPP6 Rotating Target

## ➤ Specification

- ✓ Titanium alloy, 7mm thick, diameter 1m, rotating at 2000 rpm in vacuum, photon power ~60 kW, deposited power ~2 kW, Magnetic bearings, Radiation cooling

## ➤ Already long studies

- ✓ But no plan yet for constructing prototype

## ➤ Reactivate rotating wheel effort

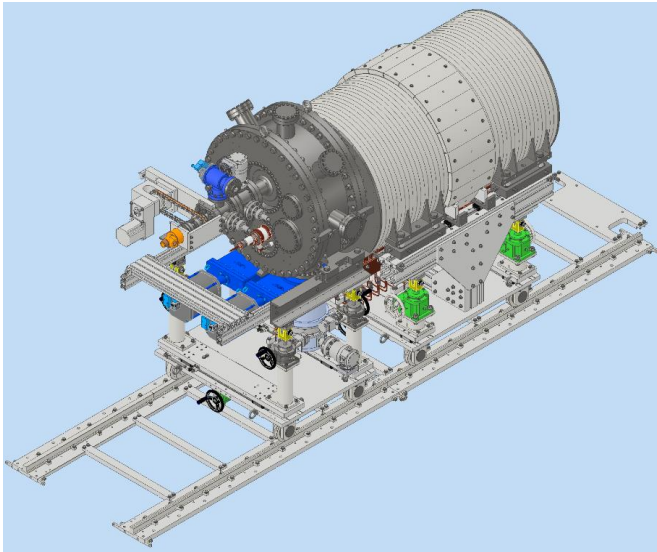
- ✓ Several meetings took place
- ✓ In principle, the plan is to construct a ‘new’ prototype
- ✓ Needed: one lab that puts the hand up
  - maybe some ITN money for the wheel available····.
  - would fit perfectly well in time since pulsed solenoid is on the way····.
  - Maybe even something at DESY possible
    - might be also needed for a HALHF-like e+ source
  - UK, US?? Questionable

# e-Driven Scheme

## ➤ WPPs

- ✓ WPP 8 Rotating target
- ✓ WPP 9 Magnetic focusing
- ✓ WPP10 Capture cavity
- ✓ WPP11 Target replacement  
(no candidate lab for WPP11)

## ➤ Test bench being constructed at KEK



# Possible Participation as ITN

- SuperKEKB and FCC-ee, CLIC already have some kind of collaboration and connection.
- IJC Lab
  - ✓ IJC lab is mainly involved FCCee
  - ✓ requirement different (ILC, FCCee, CLIC, KEKB)
  - ✓ Collaboration still useful for benchmarking, etc.
    - collaboration already several years
  - ✓ Is any money from ITN needed?
- CERN
  - ✓ Discussion about FC with CERN date back to LCWS2019 at Sendai
  - ✓ Steffen Doebert showed big progress on the development of FC at LCWS2023