LINEAR COLLIDER COLLABORATION

Designing the world's next great particle accelerator

LCWS 2014 Source WG summary

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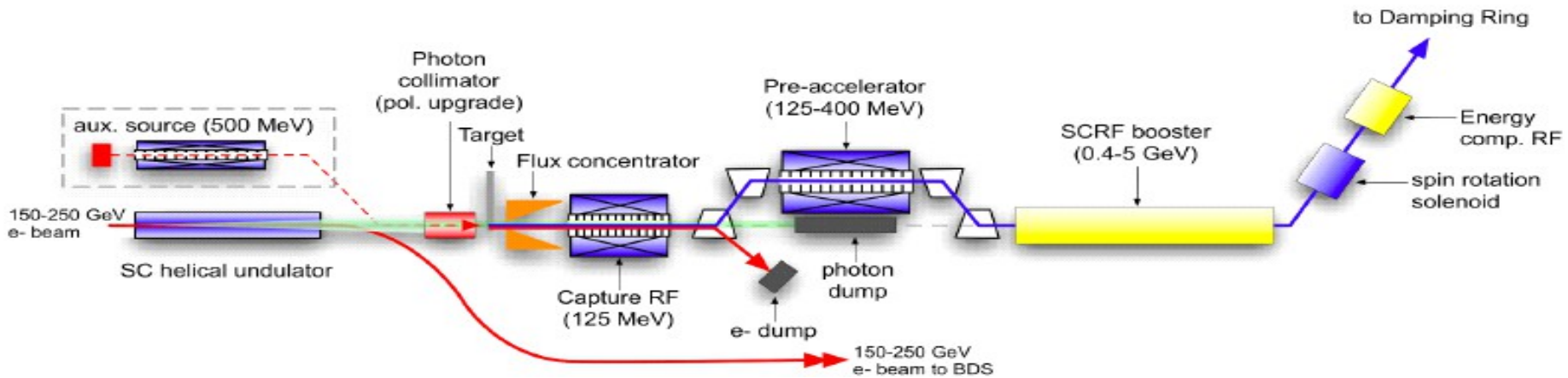
Source WG summary

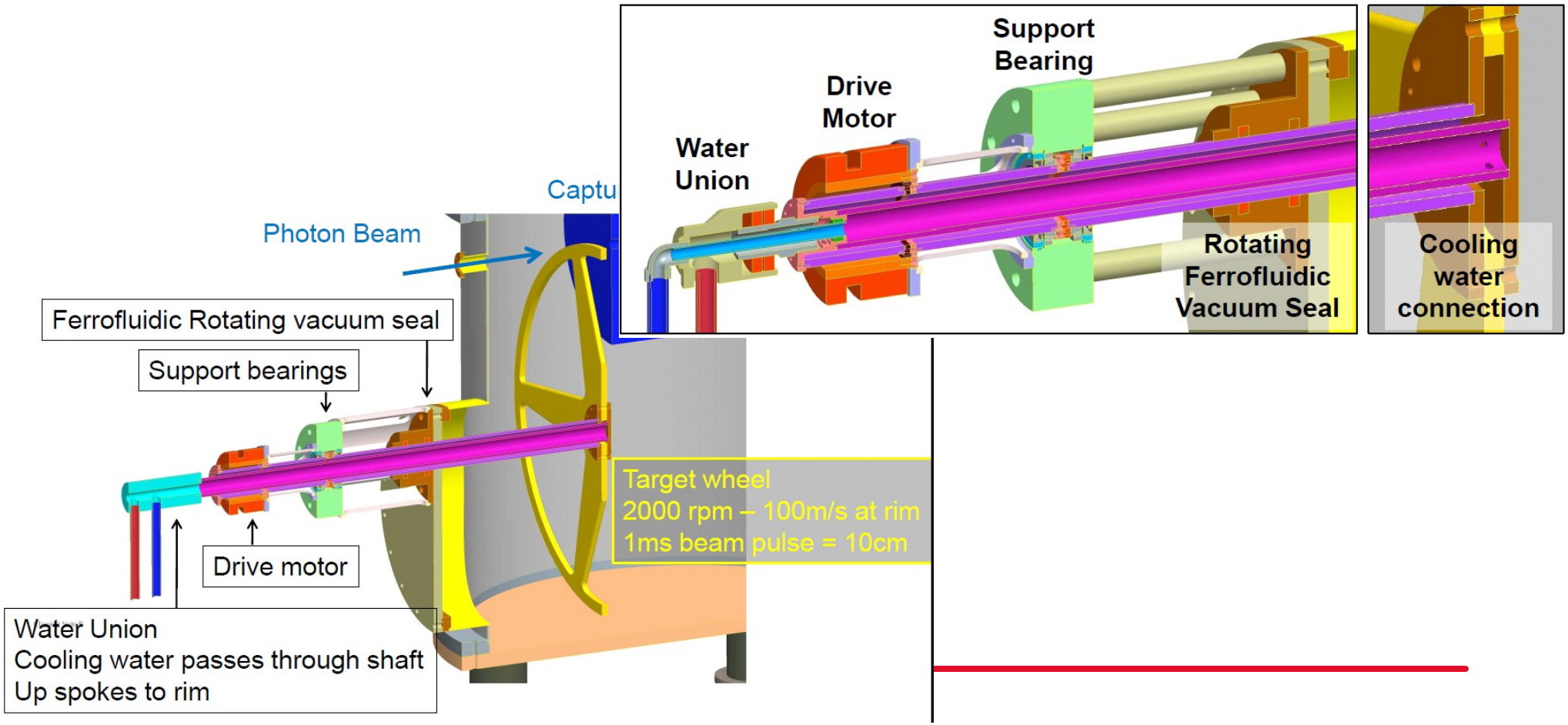
- 3 talks for the undulator positron source
- 6 talks for the conventional positron source
- 2 talks for Compton positron source
- 2 talks for the electron source
- 2 talks for the related issues
- A joint session with TB about R&D
- A joint session with CFS group

Undulator Positron Source (Baseline)

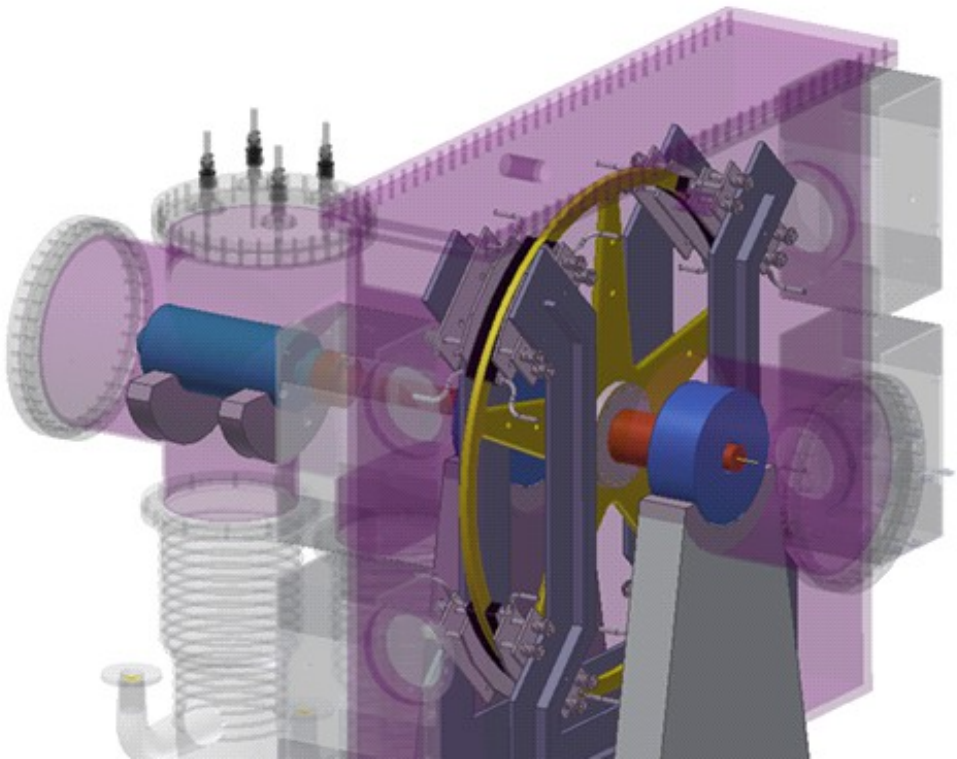
- Gamma rays from undulator radiation is converted to positron.
- 30% polarization (up to 60% optionally).
- The system design is almost completed.
- The design for the target rotating with 100 m/s tangential speed is not yet fully established.

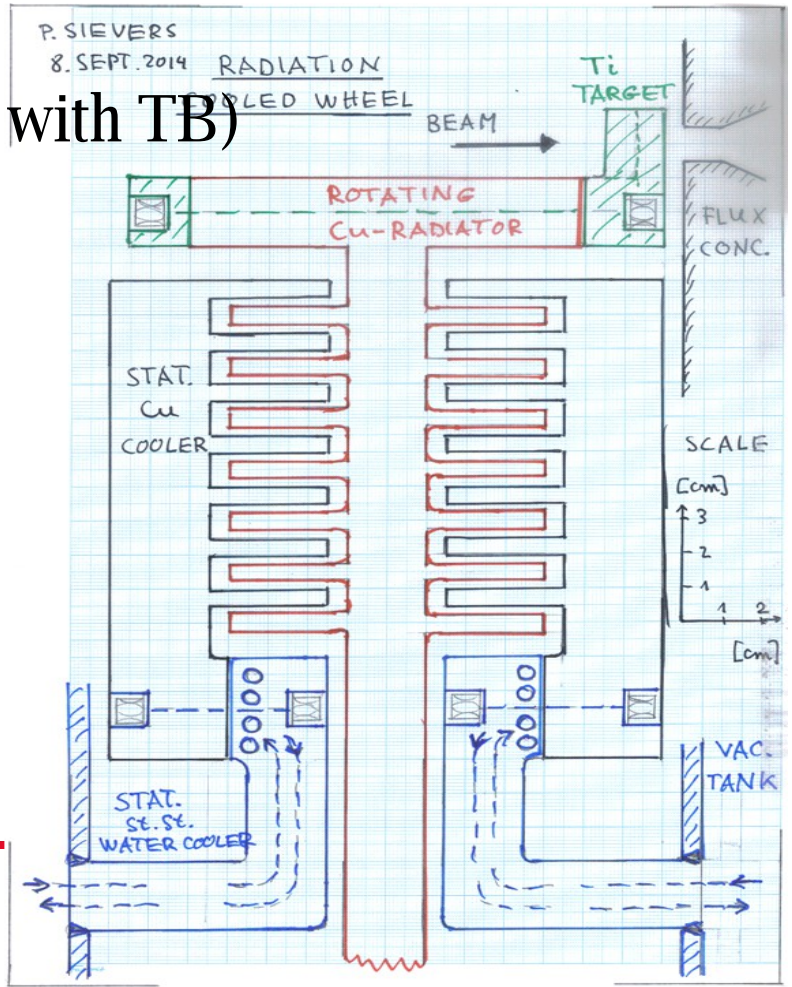


- A prototype was built at LLNL and and has been operated to test the 100m/s-rotating target in vacuum, but currently this R&D work stopped due to funding problems.



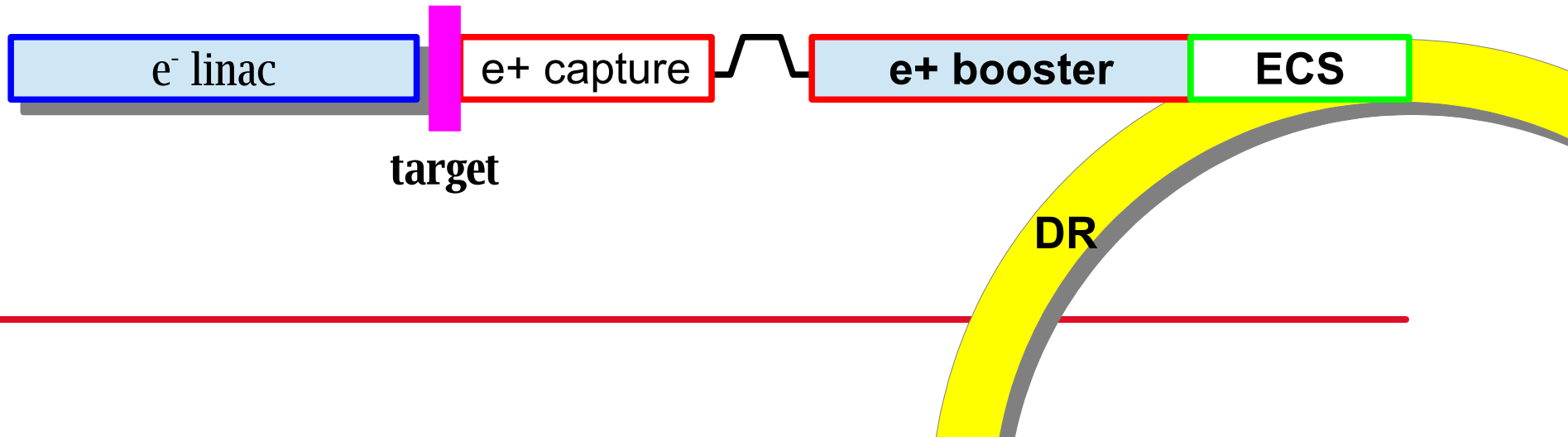
- We need a test for the target system.
- Currently we have three approaches: water cooling, radiation cooling, and contact cooling.
- We need a time to choice.
- We have to identify key issues/components for each approaches.
- Cost and manpower must be considered.
  (Disscussion was made in a joint session with TB)





300Hz electron driven scheme

- 6 GeV electron driver made positrons through pair-creation.
- The basic design is almost established. The lattice can be fixed soon.
- Target prototyping is progressing. A full size prototyping should be made in two years.
- The multi-bunch acceleration test has been successfully carried out at KEK-ATF.
- The system design (CFS, power source, layout) is the next issue. The disscussion was initiated in the joint session with CFS group.

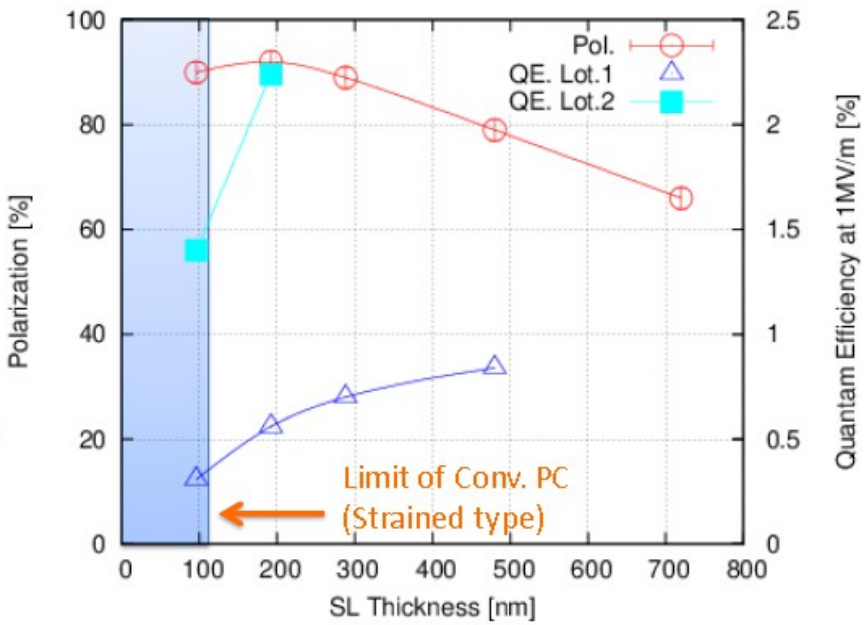


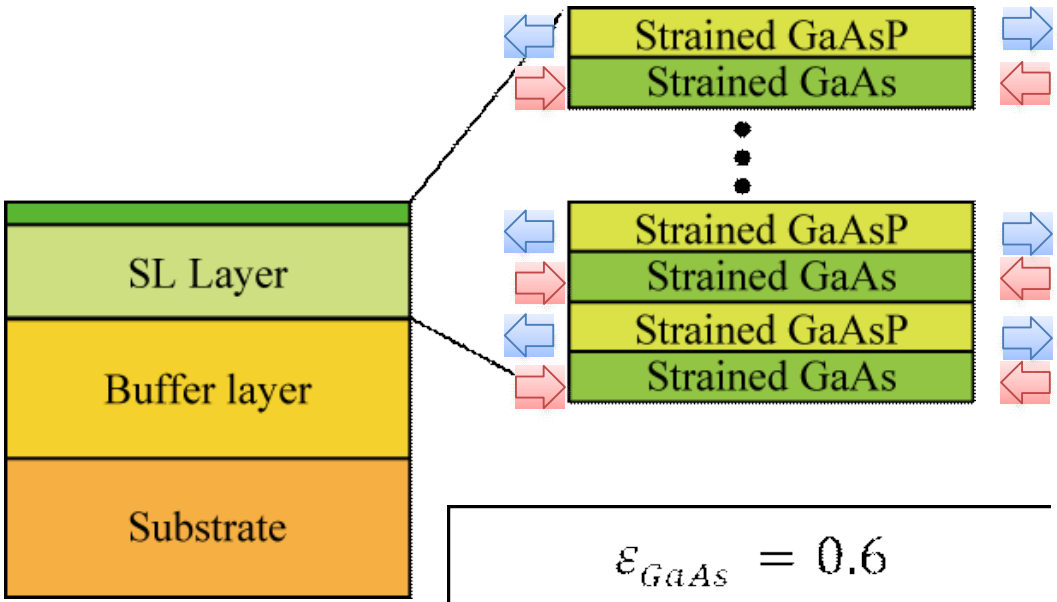
A joint session with CFS group

- **Positron source layout and related cetral region arrangement were disscussed.**
- **In the site-specific design, CFS will be re-arranged and positron source CFS should be revisited.**
- **The issues are**
  - Target area, target installation and exchange procedure,
  - Conventional positron source requirements (size, weight, electricity, cooling water),

Electron source

- The latest study by Nagoya showed 92% polarization and 2.0% QE. (Current parameters are 80% polarization with 0.5% QE)
- If the reproduciability is confirmed, we can propose a change configuration request.
  - 85~90% polarization at IP
  - 2.0% quantum efficiency





$$\varepsilon_{GaAs} = 0.6$$
$$\varepsilon_{GaAsP} = -0.6$$
$$L_{GaAs} \cong L_{GaAsP} = 4nm$$

Net strain $\cong 0$

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Luminosity comes from the source