

Individually Recirculating ERLs and SRF Technology



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Basis for future accelerators:

- New materials
 - Future ERL technology
- Research for future ERL based options after HL-HLC

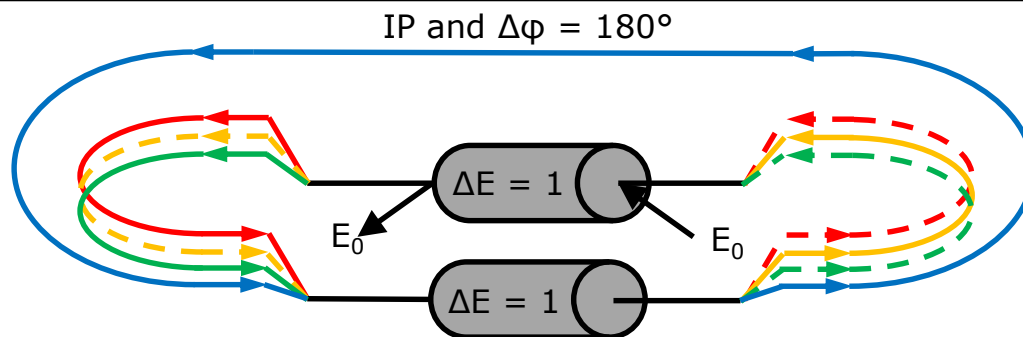


Using a multi-turn sc ERL with PERLE as ERL prototype



FCC-he based on a multi-turn sc ERL

- Requirements:
 - Robustness
 - Reliability
 - Efficiency
 - Flexibility



→ Separated-beam-transport concept (twice-recirculating as example)

- 3 intertwined projects to support R&D for future large-scale facility ERLs
- Part of successful **STENCiL Collaboration**, continuation in **TOSCA Collaboration**

Higher order beam dynamics for individually recirculating ERL (Project 1)

- Beam-dynamics simulations for individually recirculating multi-turn ERL
- Focus on optimized energy resolution by non-isochronous optics and mitigation of non-linear effects

• 1 PhD position

Optimization of individually recirculating ERL operation (Project 2)

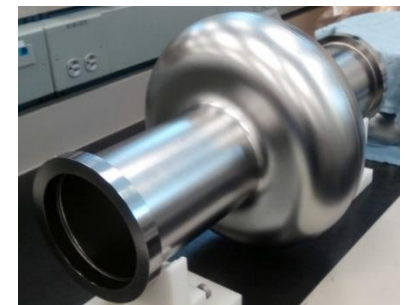
- Establishment of surrogate model of accelerator response function (Polynomial Chaos Expansion of output process variables)
- Identification of machine parameters critically affecting the beam tuning by transfer-entropy analysis
- Test model on low-current ERL (S-DALINAC)
- Optimization of injection section of future ERLs including booster
- Design study of a booster cryostat module for 802-MHz single-cell cavities (future ERL frequency)

• 2 PhD positions

Nb_3Sn thin film coating (Project 3)

- Enhancement of cavities by Nb_3Sn treatment
- Test on single-cell Cu cavity, measurement in vertical bath cryostat

- 1 PhD position
- 60% Postdoc position
- Invest for sputtering process



Picture by
F. Marhauser (JLAB)