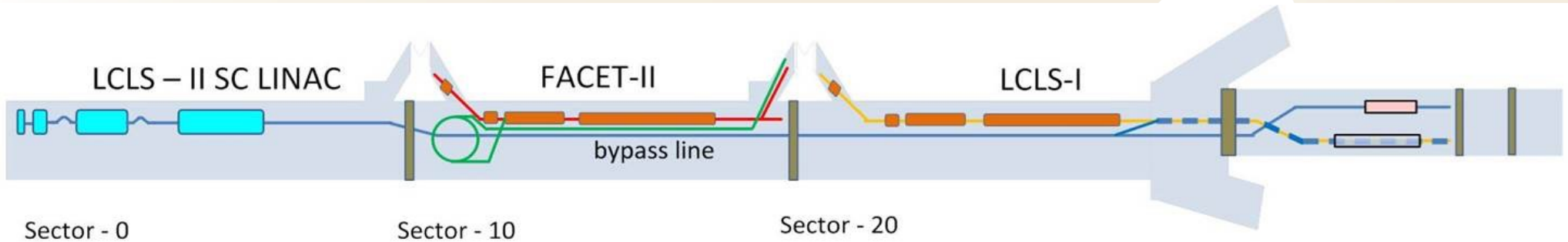


Helmholtz VI Report FACET & FACET-II Update

Mark Hogan
July 31, 2016

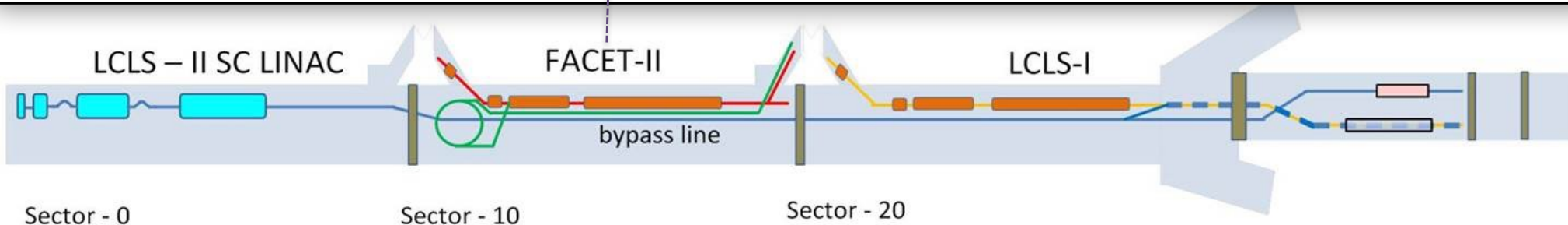
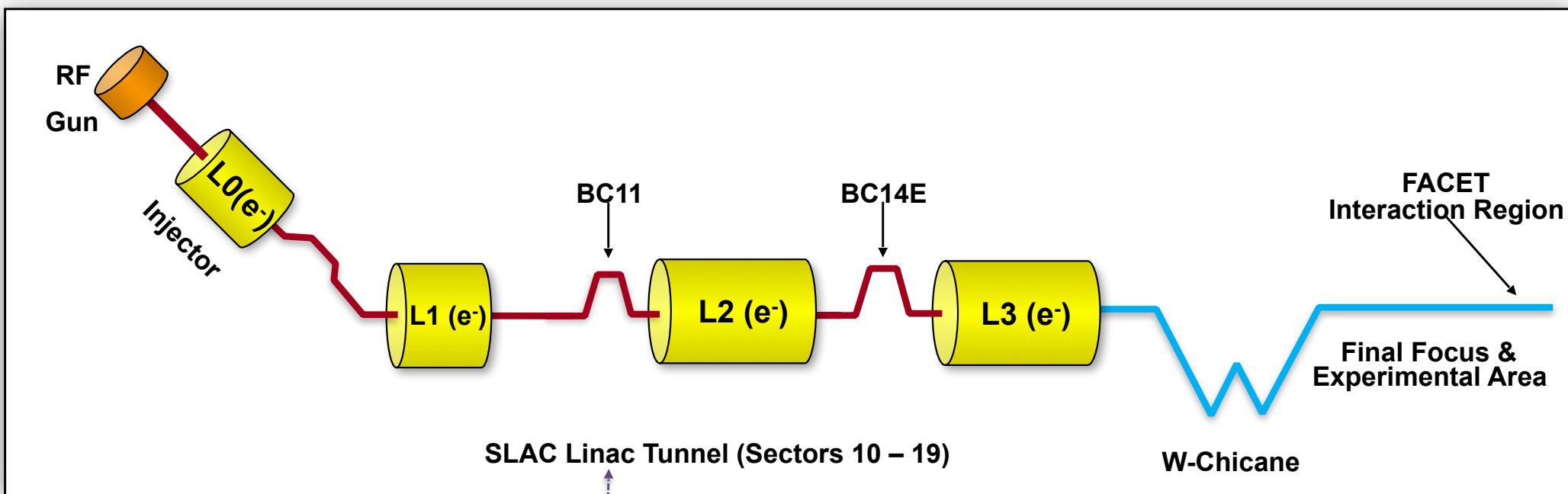
Transition from FACET to FACET-II



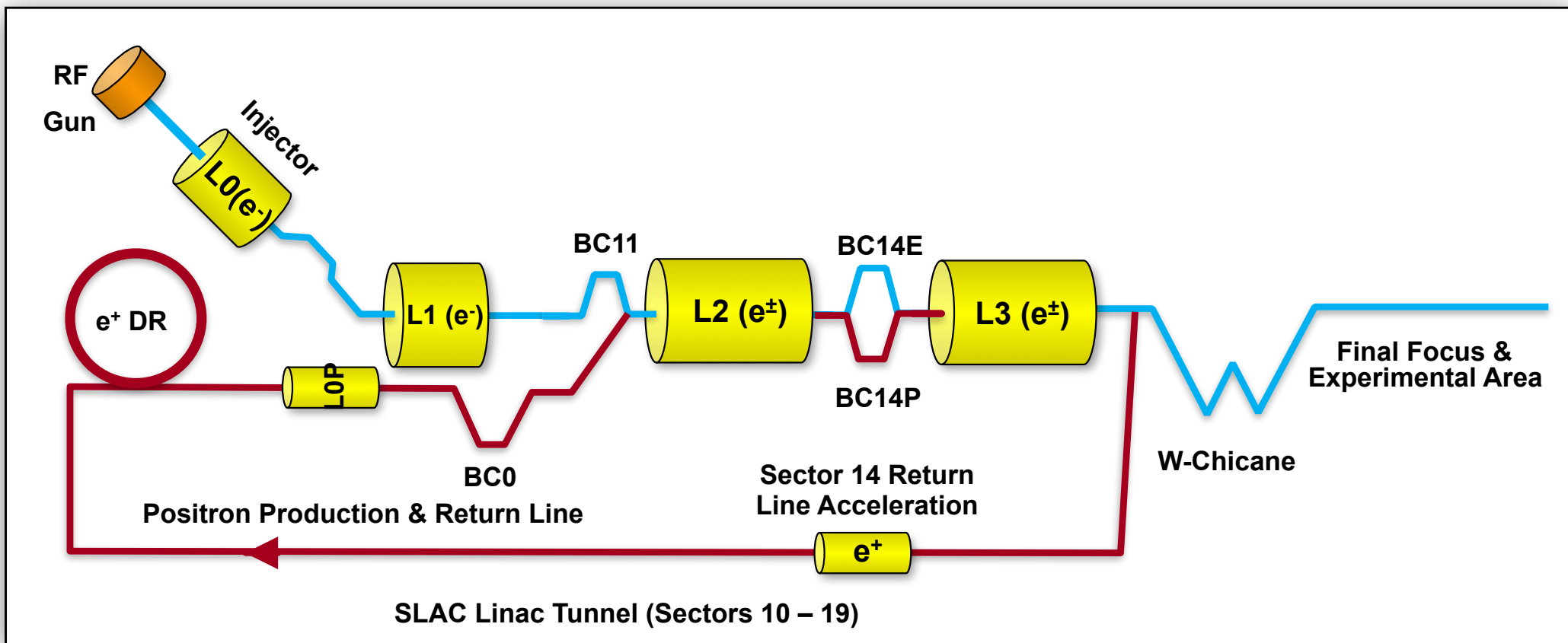
- In April 2016, the Linac Coherent Light Source-II (LCLS-II) began construction in Sectors 0-10
 - Previously occupied by FACET
 - PWFA at FACET had to end
- FACET-II will re-build and upgrade FACET capabilities in Sectors 10-20 – but still use existing experimental infrastructure
- LCLS is using Sectors 20-30

FACET-II is based on the successful beam manipulation of LCLS and on the experience operating FACET

- **Goal:** Deliver compressed electron beam from Sector 10 to experiments in Sector 20
- **Major upgrade:** Electron beam photoinjector in Sector 10
- **Scope:** Injector, shielding wall in Sector 10, bunch compressors in Sector 11 (BC11) and Sector 14 (BC14), beam diagnostics

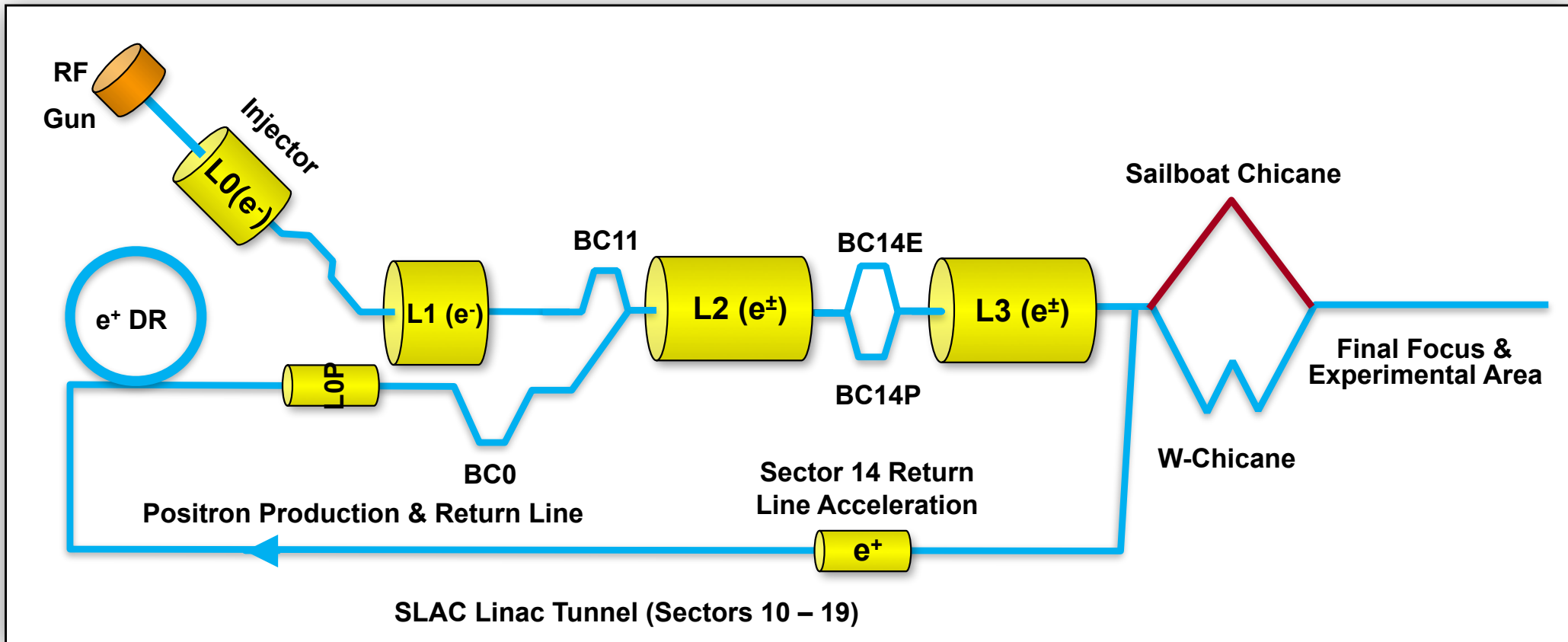


- **Goal:** Deliver compressed positron beam from Sector 10 to experiments in Sector 20
- **Major upgrade:** Positron damping ring
- **Scope:** Damping ring, positron bunch compressor & return line



FACET-II Stage 3

- **Goal:** Deliver compressed e- and e+ beam from S10 to experiments in S20
- **Major upgrade:** Sailboat chicane
- **Scope:** Sailboat chicane (currently not in project scope due to funding)



FACET-II Status and Plan

10GeV, 5nC, 10 μ m³, e⁻ & e⁺



Timeline:

- Nov. 2013, FACET-II proposal, Comparative review
- CD-0 Aug. 2015
- CD-1 Oct. 2015, ESAAB Dec. 2015
- CD-2/3A Sep. 2016
- CD-3B Mar. 2017
- CD-4 2022
- Experimental program (2019-2026+)

Three stages to enable physics program:

- Photoinjector (e- beam only) FY17-19
- e+ damping ring (e+ or e- beams) FY19-20
- “Sailboat” chicane (e+ and e- beams)

Key R&D goals:

- Staging study with witness injector
- High brightness beam generation, preservation, characterization
- e+ acceleration in e- driven wakes
- Generation of high flux THz and gamma radiation

FACET-II will enable research for a broad User Community