FY23 – Priority will be focused on completing a conceptual design for the e+ prototype experiment at LERF; objectives are to test all the critical components, with an underlying goal to build as much of the final injector as makes sense in terms of performance and hardware. Repair of the FEL QCM should begin. Path for the CEBAF QCM decided. Estimates for operation of the LERF should be tallied. The e+ R&D team continues conceptual and simulation studies for the full power positron injector, and tasks related to delivering positrons to halls at 12 GeV (transport lines, magnet reversals, spin rotators, developing clearer costing of 123 to 12 GeV beam transport).

JLab resources

* Carlos/Gabriel – Modify GTS gun as 300 kV polarized photogun + 300 kV Wien filter
* Alicia/Reza – Design and modeling of full electron injector (>2 pC @ 1497 Mhz)
* SRF – Repair of FEL QCM, later “healthy” QCM
* Yves/Dennis/JoeG./Max/? – Extraction of e- beam to target, dp/p and bunch compression/injection to CM, 123 MeV transport lines, CEBAF injection
* Amy/Yves/Dennis/Victor/Cristhian – If awarded, LDRD study of CEBAF acceptance
* Silviu/Andriy/Probir/Bob – development of e+ source (target-solenod-linac)

Collaborations

* Sami – finish PhD, start-to-end concept to 12 GeV
* Fanglei – spin rotators for e+
* Karl/Val/Victor/Cristhian – design/simulations of positron converter

FY24 – Priority will be the engineering work: design, fabrication and purchasing of components, and planning for installation of the electron gun/injector, transport lines, positron production target(s), collection system and diagnostics, including electron and positron polarimetry. Install repaired FEL QCM and “healthy” C20 from CEBAF (better if refurbished C75, even if takes longer). The GTS is modified with improvements as a high current polarized photo gun (no kick biased anode, better pumping, larger emission area). Software and hardware upgrades of LERF controls to operate LERF could begin, as makes sense. Start to end from 123 MeV to 12 GeV should be conceptually well developed, along with a technical risk assessment of the key critical technologies required for the full injector. By this time fairly well defined requirements by Physics are needed.

FY25 – Priority will be on installation and commissioning of the e+ prototype experiment. Major installation jobs include completing the polarized electron injector (>1 mA, 30-60 MeV), extraction beam line, positron capture (target, solenoid, linac), dispersive chicane for momentum selection, positron chirper for bunch compression, and diagnostic lines. Major commissioning jobs include SRF CM, operating of polarized gun >1 mA current, acceleration of high bunch charge upstream of target, beam on target studies.