

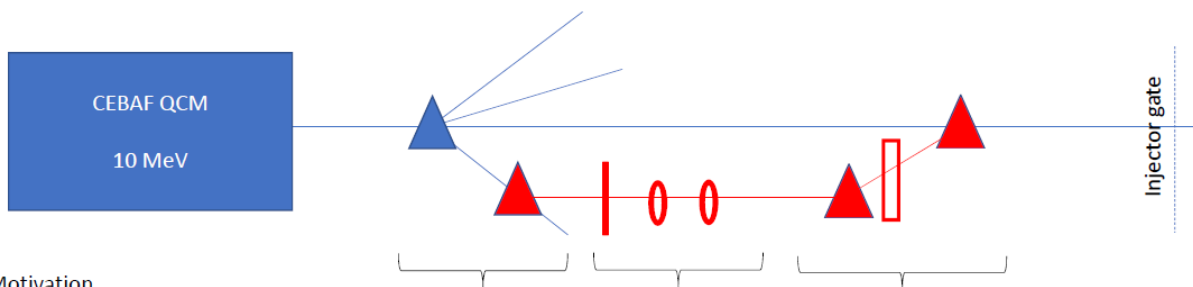
Abstract

This project proposes to establish a degrader device in the CEBAF injector beamline which can be used to degrade the transverse emittance and momentum spread of electrons and return them to CEBAF. The acceptance of 12 GeV CEBAF can then be characterized in a systematic way. The degrader device will consist of thin target foils that will degrade the transverse and longitudinal emittances through multiple scattering. Apertures and slits in the degrader beamline will define the final emittances for injection to CEBAF. Better understanding of the acceptance of 12 GeV CEBAF may provide users with new physics opportunities available with larger electron beams. The acceptance studies will also allow for better understanding of how positrons might be transported in CEBAF, as positron beams will naturally be larger than the electron beams currently transported. Finally, positrons can be generated at the degrader device and could be transported through portions of the injector beamline, for the first positrons accelerated in the injector beamline at CEBAF.

EXISTING LINES

NEW COMPONENTS

Possible concept for studying degraded e- beams to 12 GeV



Motivation

- Work supports 12 GeV accept study
- Install/commission irradiator
- CEBAF BS/SAD studies (limited)

WAG Labor

- 2 year PI
- Eng support = 25-30 pw
- WAG Materials = \$100k
- Three red dipoles = \$30k
- Three red apertures = \$20k
- Low power red target = exists + \$10k
- 4 meters of beam line & hardware = \$40k

Two dipoles bend beam out of way for CEBAF

Low power target degrades e- beam, different define trans. Emittance. Energy **too low to make radioactivity.**

Two dipoles and variable slit defines long. Emittance, returns beam to CEBAF



Once degraded e- studies are component, could flip sign of last two dipoles, put first e+ beam at 123 MeV viewer

[J. Grames schematic]