

# Circulator Rings for ERL-based EIC

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## Abstract

Superconducting energy recovering 5 to 10 GeV linac (ERL) was proposed earlier as an alternative to electron storage rings to deliver polarized beam for electron-ion collider (EIC, 30 to 50 GeV or higher energy of ion beam). To enhance the efficiency of utilization of a beam generated by a modern state of art polarized electron sources, it is proposed to compliment the ERL by electron circulator ring wherein the injected electron bunches will experience a large number of revolutions colliding with the ion beam.

In this way, the photoinjector and linac operate at a relatively low average current value while a high current circulates in the collider. Electron polarization is still easily delivered and preserved.

Electron bunches fast injection/ejection options and schemes of spin control are discussed. Limitations on high quality beam lifetime and luminosity due to incoherent energy loss, CSR, IBS and beam-beam interaction are considered.

This scheme can be naturally converted to pure linac-ring scheme when beneficial.

\* This work was supported by the U.S. Dept. of Energy under Contract No DE-AC05-84ER40150