

Using EIC Multipass ERL Projects as a Testbed for XFEL and Compton Gamma Sources

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ERLs were first proposed in 1965, and there have since been a handful of successful test accelerators. However, unlike other concepts of similar vintage, for example strong-focusing storage rings, there are as yet no “production scale” ERL facilities. There has also never been demonstration of a multi-pass ERL. There are however facility proposals with parameters which can **only** be achieved by an ERL. Hadron cooling in EIC is one of these, the others being drivers for high average power FELs, narrowband Compton gamma sources, and as a source of electrons for LHeC. In this presentation we show that many accelerator physics challenges are common, and discuss examples of experiments that can be performed on the EIC ERL test projects, CBETA and ER@CEBAF, which can demonstrate feasibility of concepts for FEL and Compton sources. We argue that there is mutual advantage between EIC and other ERL uses in the establishment of ERLs as attractive production facilities – which is not yet the case.