



Contribution ID: 916 Contribution code: THPC39

Type: **Poster Presentation**

Horizontal splitter design for FFA@CEBAF energy upgrade: current status

Thursday, 23 May 2024 16:00 (2 hours)

Thomas Jefferson National Accelerator Facility (Jefferson Lab) is currently studying the feasibility of an energy upgrade based upon Fixed-Field Alternating Gradient (FFA) permanent magnet technology. The current plan is to replace the highest-energy recirculation arcs with FFA arcs, increasing the total number of beam recirculations, thus the energy. In order to accommodate multiple passes in the FFA arcs, horizontal splitters are being designed to control the beam parameters entering the FFA arcs, as well as the time of flight and R56. In the current design, six passes will recirculate through the FFA arcs, necessitating the design of six independent beamlines to control the optics and beam dynamics matching into the arcs. These beamlines must fit into the current CEBAF tunnel, while allowing for personnel and equipment access. They must also be flexible enough to accommodate the beam under realistic operational conditions and fluctuations. The constraints on the system are highly restrictive, complicating the design. This document will describe the current state of the design, and indicate the work remaining for a complete conceptual design.

Footnotes

The research described in this work was conducted under the Laboratory Directed Research and Development Program at Thomas Jefferson National Accelerator Facility for the U.S. Department of Energy.

Funding Agency

Authored by Jefferson Science Associates, LLC under U.S. DOE Contract No. DE-AC05-06OR23177.

Paper preparation format

LaTeX

Region represented

North America

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Session Classification: Thursday Poster Session

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D01 Beam Optics Lattices, Correction Schemes, Transport