Jefferson Lab

DRAFT

CW Beam Procedure

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Estimated Time to Perform: 30 minutes

Procedure Overview

This procedure describes the process of shifting from pulsed electron beam to CW electron beam and from CW electron beam to pulsed electron beam.

This procedure is divided into the following sections:

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Hazard Analysis

There are no safety hazards associated with this procedure.

Prerequisites

1. Pulsed electron beam must be established on the desired dump before shifting from pulsed to CW beam. Pulsed beam quality should meet the criteria established in the MiniPhase Procedure.

Procedure Steps

1.0 Changing From Pulsed to CW Beam

1. Ensure the BLMs are **UNMASKED** from the *FEL BLM/BLM_HV Control* screen (**FEL Main Menu⇒BLM⇒BLM High Voltage**).
2. Ensure the **ND2 Filter** and all viewers are **OUT**.
3. Ensure the **MicroPulse Frequency** is 4.68 MHz and the optical variable **Attenuator Control** is 10% or less by checking the *Advanced Drive Laser Master Control* screen (**FEL Main Menu⇒Drive Laser ⇒DriveMaster**).
4. Verify the **Machine Mode** is allowed for the desired dump.
5. Verify **Beam Mode 7** and **CW** operation is permitted. The **DLPC** may need to be **Reset**.

6. Select **CW Mode** from the *Advanced Drive Laser Master Control* screen (**FEL Main Menu⇒Drive Laser ⇒DriveMaster**).
7. Adjust E01 and E02 to a good value for pulsed beam as a starting point.
   - Wait 5 – 10 minutes while in **CW MODE**, and then shift back to **Pulsed Mode.**
   - Eliminate the "ghost pulses" using E01 and E02 by minimizing all but the 2 Hz pulses while observing Monitor 15.

   NOTE: If the machine remains in Pulsed Mode for 20 seconds or less, the EO cells will not change appreciably.
8. Shift back to the desired CW setup by doing the following:
   a. Select **CW Mode**.
   b. Set the **MicroPulse Frequency** to the minimum frequency that will achieve the desired beam current.
   c. Set the optical variable **Attenuator Control** to the desired beam current or charge per bunch as measured on the Dump *Beam Current* screen (**FEL Main Menu⇒Dumps ⇒Beam Current/Power**).
9. PROCEDURE COMPLETE.

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2.0 Changing from CW to Pulsed Beam

1. Verify the following parameters from the *Advanced Drive Laser Master Control* screen (**FEL Main Menu⇒Drive Laser ⇒DriveMaster**).
   - **MacroPulse Width** is 250 µs.
   - **Macro Pulse Frequency** is 2 Hz or less.
   - **MicroPulse Frequency** is 4.68 MHz or less.
2. Select **Pulsed Mode** from the *Advanced Drive Laser Master Control* screen.
3. Adjust E01 and E02 to minimize the "ghost pulses" while observing Monitor 15.
4. Set the optical variable **Attenuator Control** to the desired beam current or charge per bunch as measured on the Dump *Beam Current* screen (**FEL Main Menu⇒Dumps ⇒Beam Current/Power**).
5. Are the "ghost pulses" minimized?

   YES NO → **A.** Repeat Steps 3 and 4, above, as needed to stabilize the E0 cells and minimize the "ghost pulses". This may require up to 10 minutes.
6. PROCEDURE COMPLETE.