

Pulse Stretcher Adjustment S-AB-P-052 Rev B

Scope: Use this procedure to adjust the stretch ratio of LS1 or LS2 short-pulse beams by moving the primary mirror of the stretcher along its optical axis. Re-timing of the TBWP (SPO) is required to ensure proper overlap between seed and pump beams of the CLARA. Perform this procedure only with the authorization of the Laser Sources Group Leader and under the direction of System Science.

Prerequisites: LSO Type 1C Qualification Shot Procedure, S-AB-P-071.

Procedure:

Run the Sources configuration macro(s):

1 • Select **Restore** ⇒ **LS(1,2)_SP_ Qualshot** from the Macros pull-down menu.

2 Verify OPCPA is operating nominally.

3 Reduce all OPCPA throttles to minimum position.

Reduce CLARA PCU voltage to 1.0 kV.

4 Deactivate the Regen Slicer Pockel's cell.
• Verify the output pulse is no longer present.

5 Verify both *Stretcher* and *S1* centering and pointing of the TBWP.
• If not within specification, resolve the problem before proceeding.

6 Verify the current stretcher position is recorded in the *EP Stretcher Log*. Report any discrepancies to the Laser Sources Group Leader.

7 Move the primary mirror to the desired pulse-width (i.e.: stretcher position) required by System Science.

Record new position in *EP Stretcher Log*.

8 Use OPCPA S1 pointing (fine) and centering mirrors to re-verify *S1* pointing and centering.

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Change the Colby 40 timing delay relative to the TBWP using this calculated adjustment:

$$\text{Timing Adjustment (ns)} = 4 * \text{stretcher move (mm)} / 300 \text{ mm/ns}$$

- 9 Note:
- Adjustment is positive when stretcher distance is decreased.
 - Adjustment is negative when stretcher distance is increased.

Record new Timing Delay in *EP Stretcher Log*.

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- 10 Verify the CLX1100 synchronizer piezo is locked on the TBWP.

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- 11 Re-activate the Regen Slicer Pockels Cell.
• Verify the output pulse is present.

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- 12 Increase CLARA PCU voltage to nominal operating energy in 0.1 kV steps, with greater than 30 seconds between steps while watching ED for stability.

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- 13 Increase OPCPA Stage 1 Pump to the desired Pump energy specified in LS(1/2)_OPCPA_Energy_Logbook.
- Verify OPCPA Stage 1 spectrum and energies are nominal.
 - If not, resolve the issue before proceeding.

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- 14 Increase OPCPA Stage 2 Pump to the desired Pump energy specified in LS(1/2)_OPCPA_Energy_Logbook.
- Verify OPCPA Stage 2 spectrum and energy are nominal.
 - If not, resolve the issue before ending.

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- 15 Inform the LSO the stretcher move has been completed.

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