

Tsunami Quick Alignment Procedure

This assumes that the laser is not grossly mis-aligned; if it has been, refer to the Tsunami manual under complete alignment procedure. If there is any mirror set other than the “blue” or standard set, you will need a IR viewer and a IR card for alignment.

1. Reduce pump power and so that you can safely see the pump beam as it goes through the pump mirrors (P1, P2 etc.) and focuses on the Ti:S crystal.
2. Be sure the pump beam goes through the center of the Brewster window and hits P1 in the center. Use pump beam routing mirror(s) if necessary to align. If there are no routing mirrors (inline pump laser) adjust the height of the two lasers to align making sure both lasers are level.
3. Using P1 and P2 adjustments make sure the beam is centered on M2 and cavity side of M3 (i.e. side facing the Ti:S crystal). If the pump beam is low on M3 after being centered on M2, use P1 to raise the beam on P2. Next use P2 to center on M2 and check the position on M3. Repeat if necessary.
4. If pump beam scattered light is observed on the M2 mounting bracket translate the Ti:S crystal until it is minimized.
5. Adjust M2 to center the pump beam spot on M1 (the High Reflector H/F). You should see a blue spot near the center of the blue glow from M1 on the laser bulkhead. Center the spot with M2.
6. Turn up the pump power and look for fluorescence on M4. There should be two spots: the vertical spot is from M3, the horizontal one from M1 (use a card to see if they're just missing the mirror, use M1 to move the horizontal one). If either or both are not present, carefully recheck steps 1 to 5.
7. Using M3 align the vertical spot so that the fluorescence is centered in M4. Put a card between M4 and M5 and center the horizontal spot on to the vertical spot using M1 to form a cross pattern.
8. Use M4 to center the spot on M5[‡].
9. Place a card after M10 (the output coupler or O/C) and there should be a rectangle-shaped fluorescence spot from the mode-locker aperture. Use M5 to center the bright fluorescent spot in the rectangle. Be sure the prisms are deep enough into the cavity so that the fluorescence is being routed through them. NOTE: NEVER ADJUST M6-M9 – ALL ALIGNMENT THROUGH THE PRISMS AND O/C SHOULD BE DONE WITH M5 AND M4. IF YOU CAN'T GET TO THIS POINT USING STEPS 1 TO 9 REFER TO MANUAL AND/OR CALL SPECTRA-PHYSICS SERVICE.
10. Put a card with a 1 mm wide by 3 cm long slit in it in between M4 and M5 and align it so that the beam from M4 passes through it. You should see the retro-reflection coming back from the O/C on the M5 side of the card. It will be a faint spot that moves as you adjust the O/C. If there is no retro-reflection found between M4 and M5, locate the retro-reflection on M9 (the lower horizontal mirror near the mode-locker) using a card with a small hole (or the slit card from 10). Use the O/C to overlap the spot. Repeat this procedure again on M6. Once the spot is found on a card between M4 and M5, use the O/C to overlap the retro-reflection with beam from M4 on the slit in the card. Remove the card and use **slight** adjustments of the O/C to get the laser to lase; watch the fluorescence spot that comes out of the O/C on a card placed outside of the Tsunami. Use the O/C and then the HR to peak the power. Walk the two for the best results (see manual for instructions on walking the beam).

[‡]If the laser doesn't have a “G” at the end of the serial number align the beam 2 mm above center on M5.

Oct. 1997 WZ, based on comments made by Pat Carden on Gary Eisenman's old alignment sheet.