Setup Using LABAOs

with useful tips line-by-line

INTRODUCTION/ABSTRACT

As of now all 6 lab wave-front sensors are ready to use for aligning the dichroics on the beam samplers. At this stage AUTO ALIGN (or lately LAB-ALIGN) in general should not be used yet. This only works reliably on S2 for now.

Until further notice use Pico1 to move beam sampler dichroics, while watching the display of the corresponding lab wave-front sensor (WFS).

The following is an update of Theo's technical report No 98. Some of the instructions in that document have not changed, those were repeated here. The following instructions meant to be complete, and should be followed.

ALIGNMENT PROCEDURE

I.   Begin with <u>adjusting the green laser beam</u> as usual. Check and adjust the relevant beam <u>to the target at the E-table</u> in the beam sampler area. You will need the following controllers and servers: BS1, BS2, VIS-Beams (That is on BC2 controller.), Shutters, Laser Filter Wheel, and Pico3.

1. Move the beam sampler out of the way using BS1 or BS2 GUI.
2. Ensure you have the VIS-Beams system on the right beam, for example you might use 1&2 for beam 2. During the night the operator might also use 2&3 for beam 2, make sure you also check the alignment both paths.
3. Open the necessary shutters, select ND 0 on the Laser Filter Wheel.
4. Select the correct mirror using Pico3. Select VIS Beams1&2 for beam 2, and move 1&2-2 using Pico3, then select VIS Beams 2&3, and move 2&3-2.
5. Center the laser beam on the target on each path.
6. Check this by sending the Iris to BEAM so it closes and opens.
7. Move the beam sampler back into position for that telescope and that beam.

II.   Next <u>use the WFS for aligning the beam sampler dichroic</u>. For example we are aligning E1. You will need the following controllers and servers: E1 Labao Server, Shutters, Laser Filter Wheel, and Pico1.

8. Close the Laser shutter and set the Laser Filter Wheel to ND 3.0.
9. Remove the cover from the WFS, and best to go out of the lab and turn off the lights in the lab.
10. Start the LABAO server, if it isn't already running, and start the LABAO GTK. Start from the pull down menu or use the command: labaogtk E1 &

11. In the WFS menu, start the camera (START WFS) and the camera display (START DISPLAY).
12. Create a dark frame (MAKE DARK)
13. Use the Ref boxes (TOGGLE REF), verify in the server window [2nd ? column], that Ref is selected.
14. Select "Beam" in the Iris GUI.
15. Open the Laser shutter. Open E1WFS shutter.
16. You should see a spot pattern that nearly matches the pattern of green boxes.

    May be not for S1 !! See **tips below**.

17. Use Pico1 GUI to move the corresponding dichroic to achieve a perfect match as decided by the WFS. Look at the X (red) and Y (green) numbers in the GUI, and move E1DICH until the both numbers are near 0. Adjust step size as necessary. In the end as you watch, the varying X,Y numbers should be closer to 0 than 0.015.

At this point things could go a little differently for each line. See **tips for each line** below on how to get to the good alignment quickly. The tips will eventually go away. Once a good balance of picomotors, spring plungers and flex mounts is found for each line, the AUTO ALIGN routine can be used then for all lines.

18. Once the spot pattern is well adjusted to the boxes, turn off the display, then turn off the WFS, and close E1WFS shutter.

III.   Continue the alignment toward the lab side

19. Before placing the small corner cube in, it is important to cover the WFS with the cover you removed in step 9. Put the cover gently back onto the WFS camera.
20. Put the small corner cube in place.
21. Select ND 0 on the Laser Filter Wheel, and proceed as usual to check/align what is necessary

IV.   Verify the BRT alignment with the rail target.

22. You can now go to 0 ND and check the alignment on the rails with the standard target. There may be a small beam shift on the front of the target, but the return beam on the back should be very close, if not exactly on, the target. A small error is OK (1mm or so).
23. If you think the BRT primary needs to be moved, it means something has gone wrong. Please resist the temptation to move the BRT primary, unless you have double checked everything and the beam is many mm away on the rear of the target. If this happens **please do not forget to report the fact that you have found a problem.**

PLEASE

Under no circumstances should you ever move the BRT secondary, or any optics in the LABAO system. Report any problem instead.

If you have questions or comments while following these instructions, contact Judit.

Labao wfs tips for each line:

S1

When moving S1 to a different beam, the alignment laser spot pattern could be outside the green boxes.

- Watch the spots on the display, ignore the X,Y numbers in the GUI, and move S1DICH on Pico1 to get the spots inside the boxes.
- Once all spots are inside the boxes follow procedure from step 17. Start with step size >100, decrease step size to ~ 25 or less near zero.

Pico 1 S1_Dichr   Move UP   →   X increases
Pico 1 S1_Dichr   Move LEFT →   Y increases

S2

The spots routinely land in the boxes. In step 17, start with step size >70, decrease step size to ~ 50 near zero.

Pico 1 S2_Dichr   Move UP   →   X increases
Pico 1 S2_Dichr   Move LEFT →   Y increases

W1

The spots routinely land in the boxes. In step 17, start with step size >100, decrease step size to ~ 25 near zero.

Pico 1 W1_Dichr   Move RIGHT →   X increases
Pico 1 W1_Dichr   Move DOWN →   Y increases

W2

The spots routinely land in the boxes. In step 17, start with step size >100, decrease step size to ~ 25 near zero.

Pico 1 W2_Dichr   Move RIGHT →   X increases
Pico 1 W2_Dichr   Move DOWN →   Y increases

E2

The spots routinely land in the boxes. In step 17, start with step size >100, decrease step size to ~ 25 or less near zero. E2 dichroic has a big backlash! It could start moving the opposite direction from what is indicated below, but keep stepping according to the chart and the mount will eventually move as expected. You probably have to change steps sizes quite often to get near zero with X, and Y.

Pico 1 E2_Dichr   Move UP   →   X increases
Pico 1 E2_Dichr   Move LEFT →   Y increases

E1

The spots routinely land in the boxes. In step 17, start with step size >100, decrease step size to ~ 25 or less near zero.

Pico 1 E1_Dichr   Move UP   →   X increases
Pico 1 E1_Dichr   Move LEFT →   Y increases