

## Palomar Adaptive Optics Test Plan

<b>Title</b>	<b>Laser, BTO, and safety system checkout</b>
Version	2.1
Date released	4/24/07
Lead	A. Bouchez
Time requested	30 min.
Required conditions	Dome closed

### Purpose

1. Align 589nm laser to BTO bench in Coude lab.
2. Verify that 589nm laser is aligned to BTO in dome.
3. Measure transmission of BTO, optimize laser focus (first night of run only).
4. Test BTO servo loop and Q3 safety interlock

### Test procedure

Personnel required: Data room coordinator (lead), laser engineer, BTO operator, 2x dome personnel (first night only)

#### Setup:

1. Dome closed.
2. LLT primary mirror cover removed and LLT ready for high power laser (visually check diagnostics bench, cables).
3. Coude block installed.
4. Zone 8 of safety system jumpered out for in-dome propagation.
5. BTO motors in default zenith position for 660nm stimulus laser.
6. Switch BTO to 589nm laser position.

#### In Coude lab:

7. Adjust laser for **Very low power** (~50 mw)
8. Partially close both polar axis alignment irises.
9. Cautiously open shutter.
10. Adjust final laser mirror to center beam on first iris.
11. Adjust M1a to center beam on second iris.
12. Insert stimulus laser and verify that alignment to irises appears identical. Repeat previous steps if necessary.
13. Close shutter.
14. Open both irises.
15. Adjust laser for **Moderate power** (~500 mw)

#### In dome:

16. Remove coude block.
17. Close servo loop on stimulus laser.
18. Set BTO trigger to laser.
19. At low laser power with personnel in dome, open shutter and verify that laser is coming through LLT (check pattern on the ceiling).
  - 19.1. Set min flux levels to just below values recorded by quad cells.

- 19.2. Close BTO loops on Q1, then Q1+Q3.
- 19.3. If still not aligned, restart procedure at step 7.
- 19.4. Turn servo off.
20. Shutter beam.
21. Adjust laser to **High power** (>5W). Record laser power below.
22. Open the shutter. If laser does not fall on Q3, block beam immediately!
23. Set threshold values to allow Q3 servo lock. (set good\_flux = 0.5)
24. Close servo on all quad cells.
25. Reset threshold values (set good\_flux = 0.5)
26. Set Zenith and save BTO DEFAULT positions.
27. Shutter beam and bring personnel back into data room.
28. Enable Q3 safety system.
29. Test-fire laser at zenith in dome.
30. Install Coude block.
31. Test-fire laser to demonstrate Q3 interlock functionality.
32. Reset alarm on BTO.

## Results and conclusions