

Palomar Adaptive Optics Test Plan

Title	AO Platescale Measurement
Version	1.0
Date released	5/18/2008
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Time requested	1 hr.
Required conditions	< 4 mags. extinction (able to close HO loop on V=6 stars)

Purpose

Measure the plate scale at the PHARO, AO acquisition camera (ACAM), and LOWFS.

Previous analysis

The nominal values before the winter 07/08 AO refurbishment were:

Focus	Plate Scale	Reference
PHARO (25" field)	25.09 +/- 0.04 mas/pixel	Metchev Ph.D.
PHARO (40" field)	40.0 mas/pixel	design
ACAM	[0.163, 0.182] arcsec/pixel	4/2/07 engineering test
LOWFS	373 nm/arcsec	design

PHARO cass ring orientation for N up: 334.92 +/- 0.12 degrees (Metchev Ph.D.)

Test procedure

A. PHARO platescale and field orientation.

1. Choose a binary from the list on the TWiki page. These are "calibration binaries" with well-known orbits, separation 2.5-15.0". Acquire the brighter component in the HOWFS.
2. Close the TT and DM loops and very roughly optimize framerates and gain.
3. Set PHARO up to image bright stars (25" field, StdX, Ks, 0.1%, 1.4s integ.) and set in continuous acquisition. Adjust filter an integration to get ~10k counts peak.
4. Adjust SSM pointing such that both components are well centered in PHARO's field.
5. Record 1 image in each of 4 dither positions, 5" box.
6. Open loops and offset telescope 10" north or south, to move brighter star off the reflective spot.
7. Adjust ACAM integration time to get ~100 cts on brighter star.
8. Record 1 images in each of 2 dither positions in ACAM (10" above and below spot).
9. Offset 60" and record both PHARO and ACAM sky frames.
10. Return to the stars and acquire each in turn with the HOWFS. With TT and DM loops locked on the HOWFS, acquire the other star with the LOWFS by offloading centroids to LOWFS position. Record the final LOWFS positions which zero the centroids (the difference between these positions will be twice the star separation.)
11. Repeat steps 1-11 on two more binary stars, if possible with different PA.
12. Acquire a very bright star (V~3), center on PHARO near left (East) edge of field.
13. Begin a 5s integration and immediately stop telescope tracking. The star will drift across PHARO's field at a rate of 15"/s, marking the East-West axis.
14. Repeat steps 12-13 in the 40" field of view.

Results and conclusions