

Caltech Optical Observatories / NASA Jet Propulsion Laboratory  
 Palomar Adaptive Optics

Palomar LGSAO Engineering Summary 09/08/06 UT

Daytime results:

1. Optical isolator installed in 1.06 micron laser.
2. HOWFS, stimulus, and PHARO refocused to match LOWFS.

Night log:

1930 Slewing to WDS 52898 (V=7.0,12.0) for AO checkout  
 1944 Closed-loop Strehl~0.57, TT-only FWHM=13pix (V seeing 0.45")  
 1950 Checking LOWFS focus.  
 1955 Trouble aligning laser. Will probably be >1hr before ready.  
 2000 Locked in dual mode on V=7.0. TT gain=0.2.  
 2010 LOWFS focus look unstable with gains >0.05. Probably due to very small stellar spot size on LOWFS. 55% strehl in dual mode with focus loop closed! (ph0011-0013, 10s, Ks, 0.1%)  
 2020 Starting NGS low-light test.

Landolt 111-1965 (V=11.42)

Setup	DM	TT	pharo	strehl
20s sky			14	
LSE	0.30	0.50	15-17	19%
	0.15		18-20	37%
	0.15	0.40	21-23	40%
	0.08		24-26	45%
10S sky	-	-	27	
	0.08	0.40	33-	41%
	0.08	0.20	36-38	43%
	0.12	0.20	39-41	47%
m4			45-47	43%
			47-49	46%

Landolt 111-1925 (V=12.39)

sky			51	
			52-54	5%
	0.06		55-57	8%
			58-60	

2030 Starting laser alignment & testing.

Laser power at output: 5.5W  
 at PF entrance: 4.1W, fluctuating 30%.  
 at LLT focus: 3.5W, stable

2157 Opening dome for propagation at zenith.

2205 Propagating at zenith.

laser\_sky\_1: 5s

Acq: laser\_focus1; acq\_z = 12293, FWHM=20.4

LLT: laser\_focus2; llt\_foc = 11292, FWHM=21.1

Acq: laser\_focus3; acq\_z = 12290, FWHM=17.8

Looking at defocused LLT images: laser\_focus4 (-/+ 200),

laser\_focus5 (-400)

2218 Tuning 1.32 etalon

position peak FWHM

-130 detuned (laser\_sky2)

-100 10 n/a laser\_focus6\_...

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-80      19    21x15
-60      26    24x18
-40      41    25x19
-20      40    26x19
0         40    26x19
20       36    25x18
40       32    24x18
60       17    18x13
80       10    n/a
setting to -20: laser_focus7_-20.
-20      50    25x19
2232 Tuning 1.06 etalon
-20      10    n/a  laser_focus8_...
-15     42.5  13x10
-10     222   18x13
-5      184   15x12
0        46   26x17
5         10   n/a
setting to -9: laser_focus9_-9
-9      225   18x14
2235 Installing V filter in front of Acq.
2245 Detuned image: laser_sky3 (5s, with V filter)
      Tuned: laser_focus10 and laser_focus11 (~pk=81/74, 16x13)
2250 Moving to Landolt 112-595 (V=11.35)
      landolt-112-595_1, landolt-112-595_2. FWHM=10x9.
2300 Optimizing UTT.
      Starting at 200Hz, ~120oct per subap.
      Gain start      stop rms_a rms_b rms
      Open 1157695940 6000 .063 .052
      0.1 6007         6067 .058 .049 8.0
      0.05 6100        6160 .058 .058 11.0
      0.2 6173         6233 .050 .045 10.0
      0.4 6242         6302 .046 .051 10.0
      0.8 6319         6379 .037 .046 9.0
      1.6 6392         6452 .036 .038 8.0
2322 Shuttered for aircraft
      1.6 6684         6744 .036 .039 7.0
      3.2 6796         broke!
2330 Had to turn on 660nm beam to realign BTO. Locked on 660nm,
      then fired 589.
2330 Still see oscillations on WFS, apparently not due to laser.
      Turning off 660nm laser.
2345 Laser shut off due to lack of coolant water.
0002 Laser back up, power=5.5W.
0004 Propagating again. All seems well. 120cts @ 200Hz, stable.
0008 Moving to Tycho 2756-1720-1 (V=10 star)
0029 Acquiring...
      PHARO sky:      0097-0099 Sky, BrG, 10s
      TT gain = 0.2
      LLT gain = 1.6

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DM gains: 0.1  
 PHARO images: 100-...  
 Focus gain: 0.5

	TT	DMint	frame	Strehl
	0.2	0.4	123	0.12
	0.2	0.2	124-	0.29
	0.2	0.1	127-	0.29
	0.2	0.05	130-	0.18
	0.2	0.15	133-	0.33
	0.4	0.15	136-	unstable

0055 Shuttered due to IRCAM. Jumpered it out.

	0.2	0.15	139-	0.36
	0.1	0.15	142-	0.34
	0.05	0.15	145-	0.37
	0.15	0.15	148-	0.35
CO_def_4	0.15	0.15	151-	0.32
CO_def_2	0.15	0.15	154-	0.30
CO_0	0.15	0.15	157-	0.37
TT only			160-	
All loops open			163-	

0115 Celebrating!

0125 Moving to Arp278, interacting galaxy with V=13.3 TTref.

0130 Taking flatmap on nearby v=6.7 star. Tel focus = 57.46

0150 Having a lot of trouble acquiring TTref.

0215 Taking images of Arp278!

Arp278	0172-0175	25mas	30s	Ks
Arp278	0176-0179	40mas	30s	Ks
sky	0180-0181	40mas	30s	Ks
sky	0182-0183	25mas	30s	Ks
Arp278	0184-	25mas	30s	Ks
Arp278	0186-	25mas	30s	H
Arp278	0188-	25mas	30s	J
Arp278	0190-	40mas	30s	J
Arp278	0192-0195	40mas	30s	H
sky	0196-0197	40mas	30s	H
sky	0198-0199	40mas	30s	J
sky	0200-0201	25mas	30s	J
sky	0202-0203	25mas	30s	H

0247 Starting LOWFS performance test.

0247 Moving to Tycho 2297-0726-1 (V=12.22, B-V=0.41)

204	sky	30s	BrG
211	sky	30s	BrG

...

0415 Moving to LkHa101 for science observations.

0420 Starting acquisition procedure.

0440 Acquisition done!

HOWFS 90 cts @ 100Hz, LOWFS:

230	targ	10s	Ks	1%	25mas
231	"	10s	H	1%	

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232-243	"	10s	H	-	
244-249		10s	Ks	0.1%	
250-261	"	10s	H	-	
262=267	"	10s	Ks	0.1%	
268-276	"	10s	H	-	
280-285	sky	10s	H	-	
286-288	sky	10s	Ks	0.1%	
289-294	Targ	10s	Ks	0.1%	
295-306	"	10s	Ks	-	
307-318	"	10s	H	-	
319-324	"	10s	Ks	0.1%	
325-336	"	10s	H	0.1%	
337-348	"	10s	Ks	-	
349-360	"	10s	H	-	
361-372	"	10s	H	-	40mas
373-381	"	10s	Ks	-	"
384-386	sky	10s	Ks	-	"
387-	"	10s	H	-	"
390-	"	10s	H	-	25mas
393-	"	10s	Ks	-	"
396-	"	10s	Ks	0.1%	"
399-	"	10s	H	0.1%	"
402-	"	10s	H	-	"
405-	"	10s	H	-	40mas
408-	"	10s	Ks	-	"
411-	"	10s	Ks	-	"
414-	"	10s	H	-	"
417-	"	10s	H	-	25mas
420-	"	10s	Ks	-	"
0535 Seeing measurement on V=6 star near zenith:					
ph0423	30s	Ks	TT loop	FWHM=0.5" in K	
0550 Taking twilight flats					
436-447	H	40	20s	5500-14000	
448-459	H	25	20s	7000-12000	
460-471	Ks	40	20s	10000-15000	
472-483	Ks	25	20s	6000-13000	
484-496	dark	-	20s		