September 2008 LGS Science Observing Plan

9/18/08 v1.1, A. Bouchez

1. General Procedures

We should attempt to complete highest priority observing programs first, before proceeding to lower priority programs. Don't be too quick to leave a target due to clouds. Chasing holes is quite hopeless. Just stay on the target and take data when possible.

Please record time spent on each target (from start of slew to the target, to end of last integration) and estimated of data quality. If poor, then we will repeat the observation on a subsequent night before proceeding down the queue.

2. Observing Schedule

9/19/08 (Date & times are UT)

Start – 05:50	Target 400 IRS18555 (Sahai) H/Ks imaging as deep as possible until it sets. Alternate: 102 or 103 (Adams) J/H/Ks imaging mosaic.
05:50 – 08:20	Target 301 7709 (Djorgovski). Go as deep as possible in 2.5 hrs. Alternate: Targets 200-203 (Bernat)
08:20 – 12:40	Targets 204-207, 209, 211 (Bernat). Avoid others within 20º of moon.

9/20/08

Start – 05:50	Target 400 IRS18555 (Sahai) H imaging/spectroscopy until el=45º. Alternate: 102 or 103 (Adams) J/H/Ks imaging mosaic.
05:50 – 08:20	Target 301 7709 (Djorgovski). Go as deep as possible in 2.5 hrs. Alternate: Targets 200-203 (Bernat)
08:20 – 12:40	Targets 204-214 (Bernat). 215 too close to moon.

9/21/08 – 9/23/08 UT

TBD

Observing Programs

Sahai

Priority 1: 5 hrs

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Target List:
400 IR1855+0056 18 58 08.47  +01 00 42.1 2000
401 IR2019+3448 20 21 18.89  +34 57 50.9 2000
402 IR2032+4057 20 34 13.26  +41 08 14.1 2000
403 IR0004+6521 00 07 02.60  +65 38 38.2 2000
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Goal: Imaging and spectroscopy of stellar "interlopers" with surrounding ISM structure.

Acquisition
Target 400 has an R~14.0 star 30" to SE, within standard CR angle acquisition field.

Observations (H/Ks imaging only)
1. PHARO setup: 25" field, H filter, std. cross, endpt reads=1, integ.=1.4s, frames=1
2. Check signal level on target. Adjust integration to get ~20k peak counts on brightest stars. If integ.>10s, increase number of endpoint reads to reduce read noise.
3. Open loops and offset 60". Save 1 background integration.
4. Return and close loops. Save one object integration.
5. Center target in field if necessary.
6. Run "bxy5" macro, N frames in each position (where N*integ ~ 3min). If interrupted, complete manually (5" steps around a box, then move back to box center)
7. Open loops, offset 60" and repeat dither pattern on sky with N*integ ~ 1 min.
8. Switch to Ks filter, repeat steps 2 & 6-7.

Email Correspondence

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Hi antonin,

the 4 objects in the list i sent are in order of their priority.
i listed both imaging and spectroscopy in my proposal -- if limited by time, i would
proceed as follows (in order from least time to most time):
(A) carry out H-band imaging, and then grism spectroscopy on 18555 [if slit can be
aligned, it should be at PA=28 deg to cover tail],
(B) add J/K imaging of 18555
(C) add H-band imaging of 20193
(D) add grism spectroscopy of 20193 [slit aligned E-W if possible]
(E) add J/K imaging of 20193
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Antonin Bouchez wrote:
Since we are performing these observations in service observing mode  (a first for
Palomar Observatory, I believe), we will need some more  information from you about how
they are to be performed.  The list  below is a good start, but here are some questions:
- How much total integration time do you think you need in each case?

i think 10 minutes per band would be a reasonable average. however much depends on "what
you get" since i don't have any way of estimating the brightness of the nebulosities next
to the compact bright heads in each object, in the near-IR. The two-fold goal of the
imaging is to 1) determine structure of extended nebulosity trailing behind the bright
head, 2) determine the properties of the presumed near-IR point-source (only in 00044 is
a star visible in the HST images) -- star/binary, slightly tilted edge-on disk, or a
combination of both.

is there any way i can monitor what is happening in real time, remotely? alternatively, i
could come up to palomar if i knew in advance when my source(s) would be observed.

- What slit width to use for spectroscopy (0.1", 0.2", 0.5", 2.0")
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0.2"

- What calibrations do you need (photometric, spectroscopic, PSF?)

PSF for imaging and spectroscopic calibration most important

- Any preferred dither pattern to use for imaging? Or do you need off- target sky frames?

for 18555, 20324, 00044 need off-target sky frames
for 20193, can use on-chip dither

- I assume we should limit integration times to avoid saturation on the stars?

yes

Could you also provide a phone number for us to contact you at if we have any last-minute questions?

818 653 4996 (cell)

Bernat

Priority 2: 10 hrs + Priority 6: 5 hrs
Will be present on 9/18 to assist with observations.

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Target List:
200 2M2036+1051 20 36 03.1   +10 51 29.5 2000
201 2M2137+1450 21 37 10.4   +14 50 47.5 2000
202 2M2238+4353 22 38 07.4   +43 53 17.9 2000
203 2M2242+2542 22 42 53.1   +25 42 57.3 2000
204 2M0015+3516 00 15 44.7   +35 16 02.6 2000
205 2M0036+1821 00 36 16.1   +18 21 10.4 2000
206 2M0045+1634 00 45 21.4   +16 34 44.6 2000
207 2M0131+3801 01 31 18.3   +38 01 55.4 2000
208 2M0141+1804 01 41 03.2   +18 04 50.2 2000
209 2M0147+3453 01 47 33.4   +34 53 11.2 2000
210 2M0208+2542 02 08 18.3   +25 42 53.3 2000
211 2M0213+4444 02 13 28.8   +44 44 45.3 2000
212 2M0228+2537 02 28 11.0   +25 37 38.0 2000
213 2M0230+2704 02 30 15.5   +27 04 06.1 2000
214 2M0314+1603 03 14 03.4   +16 03 05.6 2000
215 2M0345+2540 03 45 43.1   +25 40 23.3 2000
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Djorgovski

Priority 3: 5 hrs

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Target List:
300 7707        01 04 59.71  -08 41 42.3 2000
301 7709        23 05 45.67  -00 36 08.6 2000
302 7711        01 32 56.33  +00 43 26.1 2000 (9/22,9/23 UT only)
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Goal: Deep single-band imaging of compact arcs (<2" radius) around faint galaxies.

Acquisition

Target 300 is hopeless: It's up for 1.5 hrs, and what I thought was a guidestar is a galaxy.
Target 301 has an R~15 guidestar 40" to the north.
Requires cass ring angle of 244.3 (=std.-90) for acquisition.
Target 302 will be added to the target lists for 9/22 and 9/23 UT. It has an R=13.3 guidestar 37" to the East. It can be acquired at the standard Cass ring angle.

Observations

1. PHARO setup: 25" field, Ks filter, std. cross, endpt reads=8, integ.=120s, frames=1
2. Open loops and offset 60". Save a single 120s background integration (sky for acquisition).
3. Return and close loops. Save a single 120s object integration.
4. Center galaxy in the PHARO FOV.
5. Run "bxy5" macro, 2 frames in each position. This will run for ~21min. If interrupted, complete manually (5" steps around a box, then move back to box center)
6. Move target 1" in a random direction, and run "bxy5" again.
7. Repeat until time is up.

Adams

Priority 4: 5 hrs

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Target List:
100 GGD12-15     06 10 51.00  -06 11 30.0 2000
101 SerpensS     18 30 03.00  -02 01 58.2 2000
102 IRAS+20500   20 07 04.00  +27 30 00.0 2000
103 W75          20 39 01.60  +42 22 37.0 2000
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Goal: Identify membership of young clusters in nearby star-forming regions.

Acquisition
Target 100 is hopeless; never up.
Target 101 has an R~14 guidestar 60" to the SW.
Requires cass ring angle of 90 or 148 for acquisition.
Targets 102-103 TBD

Observations
This is not precisely what Joe requests below, but it's the most reasonable approximation I could come up with for now!

1. PHARO setup: 40" field, Ks filter, std. cross, endpt reads=1, integ.=1.4s, frames=1
2. Check signal level on central field. Adjust integration up to 24s to get ~20k peak counts on brightest stars. If integ.>10s, increase number of endpoint reads to reduce read noise.
3. Run "adams1" macro, N frames in each position (where N*integ = 24s). If interrupted, recenter and start again. "adams1" will take 5 images in a 0.6" throw cross pattern, in each of J/H/Ks filters. It will take ~8 min to run.
4. Mosaic a 70"x70" area
    a. Offset (in 5" steps) 15" N and 15" E. Repeat step 3
    b. Offset (in 5" steps) 30" W. Repeat step 3
    c. Offset (in 5" steps) 30" S. Repeat step 3
    d. Offset (in 5" steps) 30" E. Repeat step 3

Email Correspondence

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Hi Antonin,

Attached are object coordinates for the run and dither
patterns (in PIXEL coordinates). The dither patterns
are large dithers for mosaiking with embedded small
dithers (5 per position in the mosaic). The small
dithers are 15 pixels moves in a "plus" sign.

The 5x8 pattern is large (many moves) you may
have to break it into pieces.

40 arcsec FOV.
JHKs bands for each pointing.
24 sec total integration time per dither position.
This gives 5 x 24 sec = 120 sec per position in the mosaic.

Notes:

SerpSmain   5x8 pointings mosaic (long way N-S)
SerpSsubm   2x2 pointings mosaic
SerpSIRAS   2x2 pointings mosaic
SerpSchain  single pointing
SerpStrio   single pointing
SerpSNIRsc  single pointing
SerpSIRACsc single pointing
IRAS20050   3x3 pointings mosaic (2x2 if time is short)
W75         single pointing
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GGD12-15    2x3 pointings mosaic (long way E-W)

Let me know if you have any questions.
Feel free to call me anytime of night.

607-255-6595 (W)
607-387-5568 (H)
607-280-7087 (cell)
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Roberts

Priority 7: 5 hrs

Target List:

500	1821+107	18 24 02.9	+10 44 24	2000
501	1937-101	19 39 57.3	-10 02 42	2000
502	2059+034	21 01 38.8	+03 41 31	2000
503	2216-038	22 18 52.0	-03 35 37	2000
504	2223-052	22 25 47.2	-04 57 01	2000
505	2227-088	22 29 40.1	-08 32 54	2000
506	1656+053	16 58 33.4	+05 15 16	2000
507	1830+285	18 32 50.2	+28 33 36	2000
508	2200+420	22 02 43.3	+42 16 40	2000
509	2201+315	22 03 15.0	+31 45 38	2000
510	0241+622	02 44 57.7	+62 28 07	2000
511	0552+398	05 55 30.8	+39 48 49	2000
512	0738+313	07 41 10.7	+31 12 00	2000
513	0754+100	07 57 06.6	+09 56 35	2000
514	0839+187	08 42 05.1	+18 35 41	2000
515	0851+202	08 54 48.9	+20 06 31	2000
516	1749+096	17 51 32.8	+09 39 02	2000
517	1848+283	18 50 27.6	+28 25 14	2000
518	1908-201	19 11 09.7	-20 06 55	2000
519	0235+164	02 38 38.9	+16 37 00	2000
520	0405-123	04 07 48.5	-12 11 36	2000
521	0605-085	06 07 59.7	-08 34 49	2000
522	1701+518	17 01 25.0	+51 49 20	2000
523	1818+537	18 18 10.4	+53 43 46	2000
524	1821+643	18 21 57.2	+64 20 36	2000
525	2304-087	23 04 43.5	-08 41 08	2000
526	2351-012	23 51 56.1	-01 09 13	2000
527	0006+437	00 06 36.6	+43 42 29	2000
528	0029+133	00 29 13.8	+13 16 05	2000
529	0707+646	07 07 13.1	+64 35 59	2000
530	0758+393	07 58 00.1	+39 20 29	2000
531	0827+097	08 27 40.1	+09 42 10	2000

Note: These targets are numbered 1000-1031 in Lewis's email below.

Here's a list of LGS objects. Before you had said it would be good to have an NGS list also, so I have included that too.

Objects 1000-1031 are the quasars that I listed in my recent proposal. We haven't compiled guide stars for all of these, so if you see a bright tip/tilt star nearby please use it. We want to be able to image the galaxy around the quasar.

Objects 1100-1107 are O-stars in Cyg OB2, which we would like to look for faint binary stars. I don't have V-magnitudes, for any of them. From the B and J magnitudes, they all look 12-14 magnitude. I thought they would be excellent tip/tilt stars. We'd like to be able to see stars with dynamic ranges of 8 magnitudes at several arcseconds from the primary.

Objects numbers less than 1000 are NGS objects. All are bright stars with known binary companions. We would like to see companions with a dynamic range of 8 magnitudes at several arcseconds from the primary.

Summary

NGS: 1-301	Binary stars	Observe in J &K
NGS: 302	Binary w/disk	Observe in Br-Gamma K-cont

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NGS: 303        P Cygni        Observe in Br-Gamma K-cont
LGS: 1000-1031  Quasars        Observe in J & K
LGS: 1100-1107  O stars        Observe in K

All observations will use the narrowest field of view.

For all objects, we need multiple exposures, and would like the images dithered around
the field.  I don't have a good feel for PHARO, so I am not sure what exposure times to
use. Can you set the exposure time, so that we are at ~75% full well status, and 5-10
minutes of data per filter.  If that's a dumb thing to do for some reason let me know.

Feel free to call me if you have questions:
     Home: 323-478-1078
     Cell: 808-280-3147

Thanks,

Lewis Roberts, Ph.D.
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