



Al Conrad &lt;aconrad@lbto.org&gt;

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**TN of SOUL during SHARK-NIR operations**

9 messages

**Maria Bergomi** <maria.bergomi@inaf.it>

Sat, Jan 21, 2023 at 1:31 AM

To: Jennifer Power &lt;jpower@lbto.org&gt;

Cc: Luca Marafatto &lt;luca.marafatto@inaf.it&gt;, Al Conrad &lt;aconrad@lbto.org&gt;, Jacopo Farinato &lt;jacopo.farinato@inaf.it&gt;, Daniele Vassallo &lt;daniele.vassallo@inaf.it&gt;, Elena Carolo &lt;elenacarolo80@gmail.com&gt;

Hi Jenny,

we are trying to understand together with the Arcetri colleagues some strange effects we noticed in some out-of-focus images for PD. s there might be a correlation to SOUL correction, can you please recall me where we could find the SOUL log for the Com-1 nights and know at which time the TN where taken?

Thanks a lot,

Maria

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Dr. Maria Bergomie-mail: [maria.bergomi@inaf.it](mailto:maria.bergomi@inaf.it)

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**Jennifer Power** <jpower@lbto.org>

Mon, Jan 23, 2023 at 7:39 AM

To: Maria Bergomi &lt;maria.bergomi@inaf.it&gt;

Cc: Luca Marafatto &lt;luca.marafatto@inaf.it&gt;, Al Conrad &lt;aconrad@lbto.org&gt;, Jacopo Farinato &lt;jacopo.farinato@inaf.it&gt;, Daniele Vassallo &lt;daniele.vassallo@inaf.it&gt;, Elena Carolo &lt;elenacarolo80@gmail.com&gt;

Hi Maria,

The log for the for SHARKNIR nights on sky can be found here:

[https://wiki.lbto.org/AdaptiveOptics/20230107\\_SX\\_Night](https://wiki.lbto.org/AdaptiveOptics/20230107_SX_Night)[https://wiki.lbto.org/AdaptiveOptics/20230108\\_SX\\_Night](https://wiki.lbto.org/AdaptiveOptics/20230108_SX_Night)[https://wiki.lbto.org/AdaptiveOptics/20230109\\_SX\\_Night](https://wiki.lbto.org/AdaptiveOptics/20230109_SX_Night)[https://wiki.lbto.org/AdaptiveOptics/20230110\\_SX\\_Night](https://wiki.lbto.org/AdaptiveOptics/20230110_SX_Night)[https://wiki.lbto.org/AdaptiveOptics/20230111\\_SX\\_Night](https://wiki.lbto.org/AdaptiveOptics/20230111_SX_Night)[https://wiki.lbto.org/AdaptiveOptics/20230112\\_SX\\_Night](https://wiki.lbto.org/AdaptiveOptics/20230112_SX_Night)

Some secondary information such as TN's and AO information was recorded in the LBTI Spreadsheet log which are linked. The AO information is on the AO tab of those logs. Let me know if you need any other information.

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**Jenny Power**

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**Bergomi, Maria** <maria.bergomi@inaf.it>

Mon, Jan 23, 2023 at 2:37 PM

To: Jennifer Power <jpower@lbto.org>

Cc: Luca Marafatto <luca.marafatto@inaf.it>, Al Conrad <aconrad@lbto.org>, Jacopo Farinato <jacopo.farinato@inaf.it>, Daniele Vassallo <daniele.vassallo@inaf.it>, Elena Carolo <elenacarolo80@gmail.com>

Thanks a lot for the moment!

Maria

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**Maria Bergomi** <maria.bergomi@inaf.it>

Tue, Jan 24, 2023 at 9:44 AM

To: Jennifer Power <jpower@lbto.org>

Cc: Luca Marafatto <luca.marafatto@inaf.it>, Al Conrad <aconrad@lbto.org>, Jacopo Farinato <jacopo.farinato@inaf.it>, Daniele Vassallo <daniele.vassallo@inaf.it>, Elena Carolo <elenacarolo80@gmail.com>

Hi Jenny,

we are asking this info because we noticed a strange effect, a triangular hole in the out-of-focus images oriented as the LBT arm (which we named pacman) in 3 occasions when doing our PD calibrations. More details throughout our log/report of Com-1!

Jan 8th around 4:40

Jan 8th around 13:50

Jan 12th from 11:35 to 11:54

As after some chats with Arcetri colleagues it might be connected to SOUL, we wanted to see if at the same dates/times/ something was recorded, but Daniele checked in the links you sent and apparently we have not been lucky.

On next run, if we happen to see this effect we will certainly ask the AO operator to save a TN.

Thanks again for the support,

Maria

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**Jennifer Power** <jpower@lbto.org>

Tue, Jan 24, 2023 at 10:18 AM

To: Maria Bergomi <maria.bergomi@inaf.it>

Cc: Luca Marafatto <luca.marafatto@inaf.it>, Al Conrad <aconrad@lbto.org>, Jacopo Farinato <jacopo.farinato@inaf.it>, Daniele Vassallo <daniele.vassallo@inaf.it>, Elena Carolo <elenacarolo80@gmail.com>

Hi Maria,

I'm looking into logs but I'm not sure I have anything to help:

Jan 8th around 4:40

- 03:21UT OCAM failure, loop open  
03:24UT loop closed

05:22UT ACE\_TRACK preset RA 03:47:29.1 DEC +24:06:18.5 AZ 250.3 EL 69.8  
06:12UT Tam=-0.2 Tch=0.6 Tgl(ref):SX=0.5(0.5),DX=-0.2(0.2) Hum=19.9% Wind=5.8@184°  
06:12UT SEEING: DIMM 1.47"@74.2°, 1.44"@90° (LBT@59.4°)

- No incidents of note in the AO log at that time, no tracking numbers  
2:50
  - 20230108\_024807
- 8:38
  - Everything is going fairly smoothly.
  - 20230108\_084114
- Reviewing OCAM bad Frames log though, I do see an error code at 04:24:22  
20230108 04:24:22 Alarm Code: 2
- This code indicates a slopes zero issue with the OCAM2K that is typically resolved with a reoptimization, or reset of GOpt. Occasionally it resolves on its own. This error is shown from 04:24:22-04:24:41 and again at 04:43:32-04:44:13

- There was a power bump at 20230109 at 09:00 which caused an uncontrolled warming of the OCAM and recovery of the adsec.

Jan 8th around 13:50

- 13:08UT ACE\_TRACK preset RA 12:16:30.1 DEC +33:03:41.4 AZ 274.3 EL 81.0
- No alarm code in OCAM bad frames or any indicators on the AO log that anything occurred court of the norm at this time. I will look further into other logs but no abnormalities indicated in the wfsarb.
- At 13:58 the stopLoop command was executed and a shutdown of the WFS
- 14:07UT TRACK preset RA 12:21:00.0 DEC +54:12:00.0 AZ 328.2 EL 62.5 Flats

Jan 12th from 11:35 to 11:54

- 11:13UT ACE\_TRACK preset RA 11:01:50.5 DEC +56:22:56.7 AZ 353.8 EL 66.3 Science

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11:58UT ACE\_TRACK preset RA 11:49:03.6 DEC +14:34:19.4 AZ 191.7 EL 71.4 Science

- At 11:06 we had issues with the WFS being unpingable, and the overall recovery required a stop and start of the wfs software. We have a single tracking number during that time: 20230112\_112437 syncWFS for GOpt did not apply at first requiring a second preset with this enabled to get GOpt to be functional. To enable GOpt a new presetAO was sent from the AOS I believe.

Hope this helps.

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**Vassallo, Daniele** <daniele.vassallo@inaf.it>

Thu, Jan 26, 2023 at 2:56 AM

To: Jennifer Power <jpower@lbto.org>

Cc: Maria Bergomi <maria.bergomi@inaf.it>, Luca Marafatto <luca.marafatto@inaf.it>, Al Conrad <aconrad@lbto.org>, Jacopo Farinato <jacopo.farinato@inaf.it>, Elena Carolo <elenacarolo80@gmail.com>, Enrico Pinna <enrico.pinna@inaf.it>, "Agapito, Guido" <guido.agapito@inaf.it>

Ciao Jenny,

thank you for the info! The most interesting thing I see in your notes is that the second "slope zero issue" of the OCAM2K on Jan 8th started at 04:43:32, exactly one minute after we ended the acquisition of the phase diversity dataset affected by pacman. However, no abnormalities in the wfs showed up around 13:50, when we saw pacman for the second time. Finally, not even on Jan 12th you noticed anything strange in the wfs from 11.30 to 11.54, which is when pacman showed up for the third time and with its maximum strength. So probably there is no connection between pacman and the OCAM slope issue, but who knows.. we need more data.

Thank you,  
Daniele

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Daniele Vassallo

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[dani.vassallo90@gmail.com](mailto:dani.vassallo90@gmail.com)  
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**Jennifer Power** <jpower@lbto.org>

Thu, Jan 26, 2023 at 6:49 AM

To: "Vassallo, Daniele" <daniele.vassallo@inaf.it>  
Cc: Maria Bergomi <maria.bergomi@inaf.it>, Luca Marafatto <luca.marafatto@inaf.it>, Al Conrad <aconrad@lbto.org>, Jacopo Farinato <jacopo.farinato@inaf.it>, Elena Carolo <elenacarolo80@gmail.com>, Enrico Pinna <enrico.pinna@inaf.it>, "Agapito, Guido" <guido.agapito@inaf.it>

Hi Daniele and Maria,

This triangular hole or Paxman is very interesting. I will continue to comb logs, particularly those pertaining to the adaptive secondary. Would you be able to send along an image of this with some additional info (rotator angle). It would be helpful to see where this effect is seen. Thanks!

Jenny

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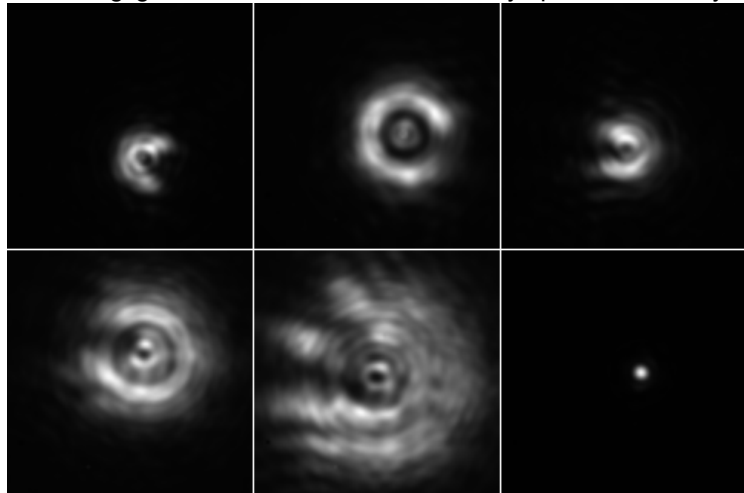
**Vassallo, Daniele** <daniele.vassallo@inaf.it>

Thu, Jan 26, 2023 at 7:55 AM

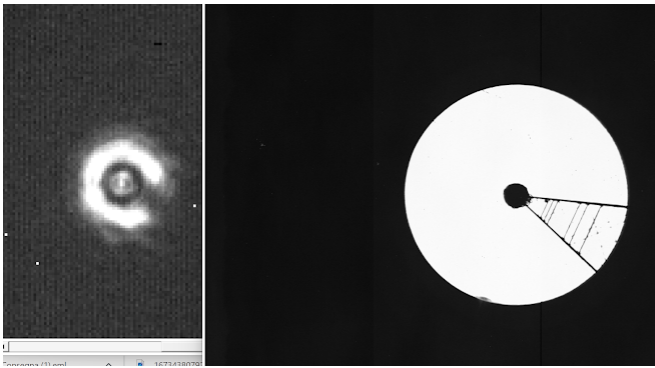
To: Jennifer Power <jpower@lbto.org>  
Cc: Maria Bergomi <maria.bergomi@inaf.it>, Luca Marafatto <luca.marafatto@inaf.it>, Al Conrad <aconrad@lbto.org>, Jacopo Farinato <jacopo.farinato@inaf.it>, Elena Carolo <elenacarolo80@gmail.com>, Enrico Pinna <enrico.pinna@inaf.it>, "Agapito, Guido" <guido.agapito@inaf.it>

Ciao Jenny,

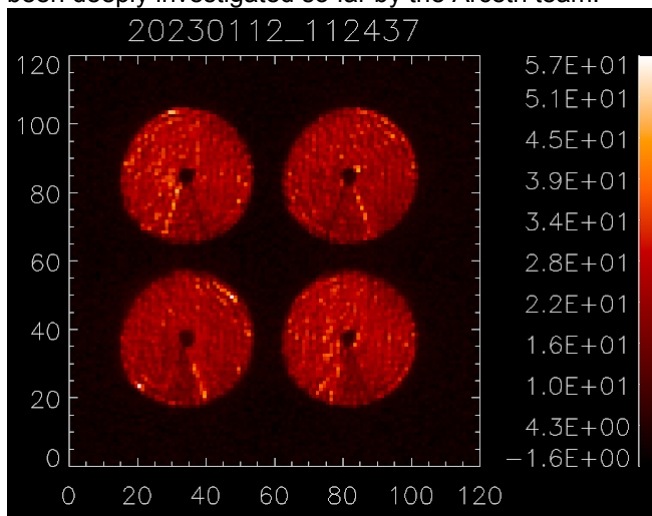
sure! Below you can see the mosaic of phase diversity images taken on Jan 12th from 11.35 to 11.54. The triangular shadow in the out-of-focus PSFs is clearly visible. Apparently there is no impact on the image at focus (bottom right): a non-negligible defocus is needed to clearly spot the effect by eye (here we range from 500nm to 1500nm RMS):



The shadow is oriented in the same direction as the swing arm in extra-focal images, while it is flipped by 180° in the intra-focal ones:



Guido did some simulations and discovered that pacman-like features appear if we introduce a local piston or tip/tilt in the pupil. Similarly to the low-wind effect discovered at VLT. This is the only valid explanation we found so far. But how could this happen? We looked at the TN closest in time to the PD dataset, which is 20230112\_112437. In the average OCAM frame the shadow of the swing arm is clearly visible. Enrico says it happens in very good AO conditions and that there might be a correlation with pacman, although the impact of the swing arm shadow on the WFS has not been deeply investigated so far by the Arcetri team.



From the (few) data at our disposal we confirm the correlation between pacman and good AO correction: in fact, all PSFs at focus belonging to pacman-affected Phase Diversity datasets feature quite high SRs. Moreover, if the explanation is indeed a local aberration, this would also explain why Phase Diversity cannot converge, since it is not possible to reproduce a local aberration using only a limited number of Zernikes.

This is more or less all we know so far. We definitely need to monitor this effect further and take TNs when it shows up. If you have further questions do not hesitate to ask :-)

Daniele

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**Jennifer Power** <jpower@lbto.org>  
To: AO Operations <aoops@lbto.org>

Thu, Jan 26, 2023 at 10:15 AM

Something interesting from the shark team.

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