

# Minutes of SHARK-NIR ComRun3 Post-run Meeting

May 17, 2023

*Attendees:* Doug, Jacopo, Luca, Alessandro L., Daniele, Christian, Gabriele, Davide G., Davide R., James, John, Elena, Fulvio, Glenn, Jenny, Joe, Al, Matthieu, Xianyu

## 1. ComRun3:

### a. General Summary

- i. Weather impact was severe.
- ii. One good test observation was conducted with the shaped pupil mask (50 minutes), but it was not possible to characterize the other masks on sky, which was a goal for this run.
- iii. The PSF drift over the 50 minutes<sup>1</sup> was not bad.
- iv. Using phase diversity to measure NCPA was not possible in the poor seeing conditions experienced during the run.
- v. The LUCI method (trial and error by sweeping through value ranges for each mode) was used successfully as a fallback to measure NCPA.
- vi. That method is performed closed loop; so, while it is slower and may not give as good a measurement as PD, it is more robust in poor seeing conditions (PD is open loop).
- vii. More information will be provided in the ComRun3 summary email from Jacopo.

### b. Fourier mode (aka, waffle mode) tests

- i. The tests went well.
- ii. Seeing was again a factor.<sup>2</sup>
- iii. The realized amplitude fell short of the commanded amplitude.
- iv. Both 20nm and 25nm were attempted (e.g., 25nm commanded was needed to achieve 20nm effective).
- v. For the automated command (which is planned for the next run in the fall), several amplitude choices may be needed.
- vi. Further details on automating the command (which will reduce the level of AO support needed) will be worked out in email.
- vii. How often will it be used? When it is required<sup>3</sup> it will probably be applied 3 times per one hour observation (before, after, and once in the middle).

### c. Rotator polynomial issue

- i. This was tracked down to the rotator mode specified in the preset.
- ii. *Parallactic* mode was being specified (which is the default for LBTI).
- iii. For standard imaging, *position angle* mode should be used.<sup>4</sup>

### d. Z offset for NCPA/PD

- i. The new command for offsetting in Z is working well.

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<sup>1</sup> Over 15 degrees of elevation change, which is much greater than the typical expected observation (which will be near zenith to maximize sky rotation for ADI).

<sup>2</sup> A preliminary estimate is that seeing of one arcsecond or better is needed for using this mode.

<sup>3</sup> The low drift measured during this run (see 1a-iii above) suggests that waffle mode may not be needed so much at H-band, but at z and J it is still likely needed.

<sup>4</sup> For ADI the rotator is simply turned off.

- ii. However, the existing command for offsetting in XY was problematic.
    - iii. The Z offset command (recently developed by LBT) correctly handles offloads to the hexapod (i.e., it waits until the hexapod motion has completed before applying the next increment).
    - iv. The XY command (original code delivered to LBT) does not properly wait for offloaded hexapod motion to complete before proceeding to the next incremental move.
    - v. The XY command will be modified to correct the logic.
  - e. Other
    - i. Some time is lost due to manual selection of the integration time on the technical camera.
    - ii. The SN team is working with Jenny to see if the magnitude seen by the AO WFS can be obtained by the SN software to compute an exposure time automatically.
- 2. ComRun4 scheduling
  - a. ComRun4 will take place after the SX AdSec has been reinstalled and calibrated in the fall.
  - b. Exact dates depend on several variables and are not known currently.
  - c. Coordination with SV installation on the telescope is also a factor. In addition to competition for bedrooms and support, the SV team will likely want to observe during ComRun4.
  - d. ComRun4 is short (3 nights) which will make the scheduling easier.
- 3. ComRuns 5 and 6:
  - a. Are both slated for science verification.
  - b. Due to weather delays, ComRun5 will need to include commissioning (e.g., the other 3 coronagraphic masks).
- 4. User Interface
  - a. Davide will update the documentation<sup>5</sup>, but needs more input from the team before completing that.
  - b. The final design and implementation require input from LBT.
  - c. A dedicated meeting will be scheduled to coordinate the desires of LBT with the possible approaches being considered by the SN team.
- 5. Next meeting(s)
  - a. User interface discussion. Approx. 1-2 months TBD.<sup>6</sup>
  - b. ComRun4 pre-run meeting: Approx. late August or early September.

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<sup>5</sup> SHARK-NIR-INAFP-DES-004

<sup>6</sup> AO4ELT7 and the August vacation period could put this during the second half of July (?)