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Preparing to Observe with SAM

Advantages offered by SAM. It can reach exceptionally good resolution of 0.3" or 0.4" (if the atmospheric conditions allow it) at visible and near-infrared wavelengths in a 3-arcminute field, as though the 4-m SOAR telescope was lifted halfway into space (see SAM performance) [1]. SAM is ideally suited for imaging deep-space faint targets (or narrow-band imaging) where the 4-m aperture matters. It has complete sky coverage. Compared to SOI, SAM has no gaps between CCDs and does not need mosaicing to get the continuous image. Its guiders are more sensitive than the standard SOAR guiders. SAM can be also used in open loop, without laser.

Limitations of SAM. UV light is not transmitted to the science imager, so SAM is "blind" in the *U* band. The correction in the B band is not so good, while the sky background in *B* is contaminated by the faint UV leakage of the B-filter. The SAM imager has a distortion that might affect image recombination if large dithers are used. Targets for laser operation must be defined in advance, reducing the flexibility. SAM can deliver poor resolution under unfavorable conditions.

Planning your observations
The **list of targets** for SAM (name and J2000 coordinates) must be sent to soarnight@ctio.noao.edu [2] **no later than 2 weeks** before the scheduled night, so we can submit the laser propagation target file to the Space Command Laser Clearing House. Last-minute additions are not possible (better include extra "maybe" targets in the list, just in case). However, SAM can observe in open loop (without laser, at seeing-limited resolution) any target, e.g. photometric standards. It is a good idea to get in touch with the SAM support scientists *Andrei Tokovinin* (atokovinin@ctio.noao.edu [3]) and *Cesar Briceno* (cbriceno@ctio.noao.edu [4]) for planning your observations with SAM.

The instrument setup form [5] must be filled to define the filters, one week before the run. SAM+SAMI have a filter wheel with 7 slots for the 3-inch square filters (normally loaded with Bessell *B,V.R,I* filters) and can also use the SOI filter wheel that has 5 positions for 4-inch square filters (e.g. Sloan *g',r'*, *i'*, *z'* or narrow-band). Any filters used at SOI can be also used with SAM. However, SAM has only **one filter wheel**, filters can be **changed only during the day**.

Think about the **strategy.** Do you need dithers? There are pros, cons, and restrictions (contact the support scientists to learn more). What is the worst acceptable image quality needed to reach your science goals? Do you need photometric standards? They can be observed rapidly in open loop. What binning to use in SAMI (usually 2x2, pixel 0.091 arcsec)? Think about a **backup program** (using SAM or other SOAR instrument) for the case of poor seeing or technical problems. Fill the instrument setup forms for your backup program, too.

Observations

Like other SOAR instruments, SAM+SAMI can be used classically or remotely. During observations, the Adaptive Optics (AO) system is operated by the Support Scientist, while the observer is in charge of operating the imager SAMI (selection of the binning, filters, exposure time, dithering, and object name). The observer is also reponsible for taking the bias and flat-field calibrations before the observations. Sky flats are strongly preferred over dome flats, because the latter do not correct well the shadows of the dust particles. See   SAMI User Manual [6] and   SAMI Software manual [7]

Data reduction

Standard reduction of SAMI data (bias subtraction, division by the flat field, and combination of the multi-extension FITS file into a single image) can be done at CTIO using the pyraf pipeline developed by L.Fraga, provided that bias and flat-field calibrations are taken. In this page [8] you will find a step-by-step guide on how use the SAM PyRAF software to reduce your SAM data.

Think ‣ propose ‣ prepare ‣ observe ‣ reduce the data ‣ publish!

Links
[1] http://www.ctio.noirlab.edu/soar/content/performance
[2] mailto:soarnight@ctio.noao.edu
[3] mailto:atokovinin@ctio.noao.edu
[4] mailto:cbriceno@ctio.noao.edu
[5] http://www.ctio.noao.edu/SOAR/Forms/INST/setup.php
[6] http://www.ctio.noirlab.edu/soar/sites/default/files/SAM/archive/sami-manual.pdf
[7] http://www.ctio.noao.edu/new/Telescopes/SOAR/Instruments/SAM/archive/sami-sw.pdf
[8] http://www.ctio.noirlab.edu/soar/content/reducing-your-sam-images