

Pre-Imaging runs can also be proposed with SINFONI. Such observations are typically dedicated to test the feasibility of a specific science programme (e.g. faint target, difficult acquisition).

6.11.1 Instrument Performance

Table 15 gives the limiting magnitudes (S/N of 5) for continuum sources integrated over the typical size of the point-spread function in one hour of integration time.

Table 15: SINFONI fields of view and limiting magnitudes

Field of View	Spatial Scale	Mode	Limiting Magnitudes (continuum)
$8'' \times 8''$	125×250 mas	noAO	J=20.2, H=19.9, K=17.9, H+K=19.6
$3'' \times 3''$	50×100 mas	NGS	J=19.4, H=19.6, K=18.8, H+K=19.8
$0.8'' \times 0.8''$	12.5×25 mas	NGS	J=17.8, H=18.7, K=18.3, H+K=19.2

These values were calculated for a visual seeing of $0.8''$ which would provide infrared seeing values of $0.67''$, $0.63''$, $0.59''$ and $0.61''$ at the central wavelength of the J, H, K and H+K gratings, respectively. For the closed loop adaptive optics observations with natural guide stars (NGS) we have assumed a guide star at a distance of $10''$ with a photometric brightness of $R = 12$ and $B-R = 1.5$ magnitudes. We encourage the use of the exposure time calculator for more detailed estimates (<http://www.eso.org/observing/etc>).

6.11.2 Brightness Limits

To avoid saturation of the detector and detector persistence, which affects subsequent observations of faint sources, no objects with J, H, K magnitudes < 6 mag must be visible in a field of view of $15''$ around the AO guide star and/or the science target. However, if `fast_acquisition` is used, the limits are brighter by 1 and 2 magnitudes for $0''.1/\text{pix}$ and $0''.025/\text{pix}$ respectively.

6.11.3 Sky Subtraction

The user should note that sky offset fields are mandatory for observations in the 25 and 100 mas scales. The corresponding overheads have to be taken into account when estimating the required time for an observing run. Typically, 50% (or 33%) of the observing time is spent on sky if $\text{NDIT}_{\text{Sky}} = \text{NDIT}_{\text{Target}}$ (or $\text{NDIT}_{\text{Sky}} = 1/2 \text{NDIT}_{\text{Target}}$).

6.11.4 Calibrations

Observations of telluric standard stars at an airmass within ± 0.1 of the science observation will be offered as part of the SINFONI calibration plan for all modes available (*i.e.*, for all combinations of image scales and gratings). Darks, internal flat-fields, and wavelength calibrations are also part of the SINFONI calibration plan and are taken during daytime. Time to obtain special calibrations, such as observations of PSF reference stars, must be requested in the proposal.

6.11.5 Modes that are not offered

Observations with the sky spider and spectral dithering are not offered in Period 84.

6.12 MIDI, MID-infrared Interferometric instrument

MIDI is the VLTI instrument for N-band ($8 - 13 \mu\text{m}$) interferometry. It is a two-beam recombiner giving values of moduli of fringe visibility (samples in the (u,v) plane) depending on the wavelength (spectral resolution: $R = 30$ or $R = 230$). MIDI has been offered in both Service and Visitor Modes

Table 16: MIDI uncorrelated magnitudes

Telescopes	Beam combiner	Spectrograph	Limit (N mag)	Limit (Jy@12 μ m)
UTs	HIGH_SENS	PRISM	4	1
UTs	HIGH_SENS	GRISM	2.8	3
UTs	SCLPHOT	PRISM	3.2	2
UTs	SCLPHOT	GRISM	2	6
ATs	HIGH_SENS	PRISM	0.74	20
ATs	HIGH_SENS	GRISM	0.31	30
ATs	SCLPHOT	PRISM	0.0	40
ATs	SCLPHOT	GRISM	-0.44	60

since Period 73 and can be used with either the UTs or the ATs. For a list of the offered telescope configurations, please refer to [the VLTI baseline page](#).

The main features of MIDI for Period 84 are:

- Interference fringes recorded in “dispersed-Fourier” mode (long slow scan with coherencing at 1-Hz rate), or “field-astrometry” (undispersed fringes on several targets in the field-of-view by very long scans. In Visitor Mode only).
- Spectrograph optics: either NaCl PRISM mode ($R = 30$), or KRS5 GRISM mode ($R = 230$).
- Beam combiner optics: either “HIGH_SENS” (no simultaneous photometric measurement of beams before combination), or “SCLPHOT” (simultaneous photometric measurement).
- Limiting uncorrelated magnitudes are given in Table 16.
- For MIDI, the correlated flux is defined by the uncorrelated flux (in Jy@12 μ m) multiplied by the estimated visibility. The limiting correlated flux (CF) can be obtained, for each mode, from the uncorrelated flux (UF) of this mode (see Table 16), using the formulae :
 - Without FINITO: $CF = 0.5 \times UF$
 - With FINITO $CF = 0.1 \times UF$
- Various spectral filters for acquisition images.

Details on MIDI and its instrumental modes can be found on the [MIDI web page](#).

The raw accuracy of the visibility measurements is typically better than 20%. The highest accuracy for calibrated visibilities can be obtained in SCLPHOT mode, provided target and calibrator are both brighter than 15Jy for UTs and 200Jy for ATs. The visibility of the Science source is absolutely calibrated by observing a Calibration Source. We offer two calibration modes, either Science-Calibration for normal accuracy requirements, or Calibration-Science-Calibration, for high accuracy requirements.

A proposal can consist of different observations of the same target with different baselines and/or hour angles in which case the observing time to be requested is simply computed as the number of required time-slots multiplied by the duration of one slot as given in Table 17. Time constrained observations (*e.g.* variable objects) can further be requested in the appropriate section of the proposal.

FINITO (the VLTI fringe-tracker) is available with MIDI on both the ATs and UTs in Visitor Mode only (since there is no pipeline to process MIDI data by blind coherent integration). It provides cophasing in N-band with an accuracy close to 0.12 rad RMS at 10 μ m. Users must be aware that the limiting uncorrelated flux of the target for MIDI remains unchanged and, to be observable by FINITO, the target should have:

- H_mag < 5 (ATs) < 7 (UTs)
- Visibility in H > 15 % (ATs) > 10% (UTs)