J ADUs/DIT over the entire spectrum.

6.10.3 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 $\mathrm{NDIT}_{\mathrm{Sky}} = \mathrm{NDIT}_{\mathrm{Target}}$ (or $\mathrm{NDIT}_{\mathrm{Sky}} = 1/2\ \mathrm{NDIT}_{\mathrm{Target}}$).

6.10.4 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.

6.10.5 Modes that are not offered

Observations with the sky spider and spectral dithering are not offered in Period 91.

6.11 MIDI, MID-infrared Interferometric instrument

MIDI is the VLTI instrument for N-band ($8 - 13\,\mu$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 is offered in both Service and Visitor Modes 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**.

Important note: Given the arrival of the second generation VLTI instruments, ESO cannot guarantee the availability of MIDI beyond Period 91. Proposals for Large Programme using MIDI beyond Period 91 will not be accepted.

Since Period 88 a correlated flux mode has been offered. In the MIDI fringe exposures the background can be subtracted without residuals because it is fully uncorrelated. This is not possible for the photometry, and for this reason good fringe data can be obtained for fainter magnitudes than good photometry data. The correlated flux mode is suited for observations for which visibilities are not needed, *i.e.* when it is intended to compare them to correlated flux observations of the same object at other projected baselines.

Starting from Period 91 the Fringe Sensor Unit FSU-A can be used as an external K-band fringe-tracker for MIDI. The fringe-tracker is only offered on-axis, i.e. fringe tracking on the science target itself. There are two immediate advantages in using the FSU-A with MIDI. A sensitivity gain during the observations themselves because of the OPD correction applied, which is more precise than the standard MIDI self-coherencing. As a consequence the fringes are stable on the detector. An advantage in the reduction and calibration process of the MIDI data where the measurements of K-band group and phase delay constitute valuable information. Users can only benefit optimally from this new mode if they are expert in MIDI data processing. For $K = 7.5$ and for seeing $0\farcs6$, MIDI with FSU-A reaches a sensitivity with the ATs comparable to that reached by stand-alone MIDI observations with the UTs. Thus, fainter objects can now profit from the extended uv-coverage provided by the AT array. **Note:**, because of the faintness of the sources targeted in this mode, the MIDI photometry exposures will be worthless and are therefore not taken. The mode thus allows only to get information on the morphology of a target via an extended uv-coverage, but not on its absolute angular size, like in correlated flux mode.

The MIDI + FSU-A mode is offered in VM only and the data produced is not supported by the ESO pipeline. The execution time is expected to be conservatively 50% longer than normal OBs.

Table 13: MIDI limiting uncorrelated flux (LUF).

Telescopes	Beam combiner	Spectrograph	Limit (N mag)	Limit (Jy@12μm)
UTs	CORR_FLUX	PRISM	5.7	0.2
UTs	HIGH_SENS	PRISM	4	1
UTs	HIGH_SENS	GRISM	2.8	3
UTs	SCI_PHOT	PRISM	3.2	2
UTs	SCI_PHOT	GRISM	2	6
ATs	HIGH_SENS	PRISM	0.74	20
ATs	HIGH_SENS	GRISM	0.31	30
ATs	SCI_PHOT	PRISM	0.0	40
ATs	SCI_PHOT	GRISM	-0.44	60

The main features of MIDI for Period 91 are:

- Interference fringes recorded in "dispersed-Fourier" mode (long slow scan with coherencing at 1-Hz rate).
- Spectrograph optics: either NaCl PRISM mode ($R = 30$), or KRS5 GRISM mode ($R = 230$). In correlated flux mode the PRISM is used.
- Beam combiner optics: either "HIGH_SENS" (no simultaneous photometric measurement of beams before combination), or "SCI_PHOT" (simultaneous photometric measurement). In correlated flux mode the HIGH_SENS optics is used.
- Limiting uncorrelated magnitudes are given in Table 13.
- For MIDI, the correlated flux is defined by the uncorrelated flux (in Jy@12μm) multiplied by the estimated visibility. Except for the correlated flux mode, where the MIDI limiting correlated flux (LCF) limit is equal to the MIDI limiting uncorrelated flux (LUF) limit, the LCF can be obtained for each mode from the LUF of this mode using: LCF$= 0.5 \times$ LUF (see Table 13).
- 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 SCI_PHOT 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. Two calibration modes are offered: Science-Calibration (SCI-CAL) for normal accuracy requirements, or Calibration-Science-Calibration (CAL-SCI-CAL) for high accuracy requirements.

For the correlated flux mode, a CAL-SCI-CAL sequence is mandatory with the additional restriction that the same calibrator star should be used before and after the science target observations. Since correlated fluxes are not normalized like visibilities, they must be compared to other correlated fluxes of the same object taken at different baseline vectors in order to infer the source geometry. A single correlated flux measurement is not useful. As correlated flux measurements are obtained in Visitor Mode, source photometry is taken at the user's discretion. ESO does not guarantee this photometry to be useful, in particular for visibility calibration.

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 16. Time-constrained observations (*e.g.* variable objects) can be requested.