SINFONI post upgrade update v1.0

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1. Scope and Purpose

This note details the improvements and changes to SINFONI following the recent upgrade, and serves as a supplement to the SINFONI Users Manual (v 97.0), to enable the user to prepare their proposals As the commissioning data are being analysed, the latest results will be reported in this document

2. The upgrade

SINFONI was successfully upgraded and commissioned during 28 Dec 2015 — 30 Jan 2016. Work done on SPIFFI includes:
- New Pre-Optics collimator
- New filters installed in the old filter wheel: the J, H and K band filters were replaced, and a spare H+K filter installed.
- The tubes of the pre-optics have been replaced.
- Replacement of baffle at entrance focal plane
- Replacement of M1, M2 and M3 collimator mirrors
- Replacement of the damaged grating drive
- The faulty pressure gauge on the cryostat has been replaced
- The broken warm-up control for the detector has been repaired in the ICE cabinets
- Cleaning of entire cold assembly from grating metallic dust, cleaning of dichroic by dry nitrogen

Work done on the MACAO AO system includes:
- Membrane mirror exchange
- Cleaning of the MACAO M1 mirror
- Exchange of the protection shutter (preventive maintenance)
- Re-aligment and calibration of AO optical train
- Exchange of calibration lamps and re-aligment of the point source fibre injection.

3. Performance and improvements

While at time of writing the performance of SINFONI is being assessed, at least the following improvements have been observed:

3.1 A significant improvement in the overall J-band throughput especially towards shorter wavelengths:

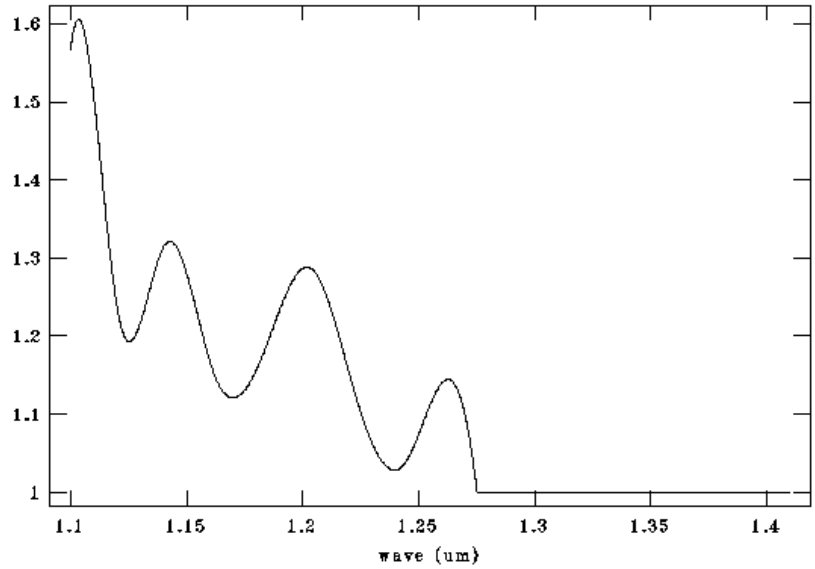

Fig.1: Relative throughput in J after the intervention

This improvement in efficiency has been incorporated into the SINFONI ETC v.6.0.1

3.2 Increased spectral resolution in all bands ranging from about 4 to 15%, with corresponding improvement in line-spread-function:

Band	Resolving power (old)	Resolving power (new)	Line FWHM (old)	Line FWHM (new)
J	1940	2020	4.5	4.3
H	2320	2570	3.2	2.9
K	4110	4700	2.3	2.0
H+K	1450	1790	2.5	2.1

3.3 A spot of dead pixels which previously affected the centre of the field of view are now shifted mostly out of the way:

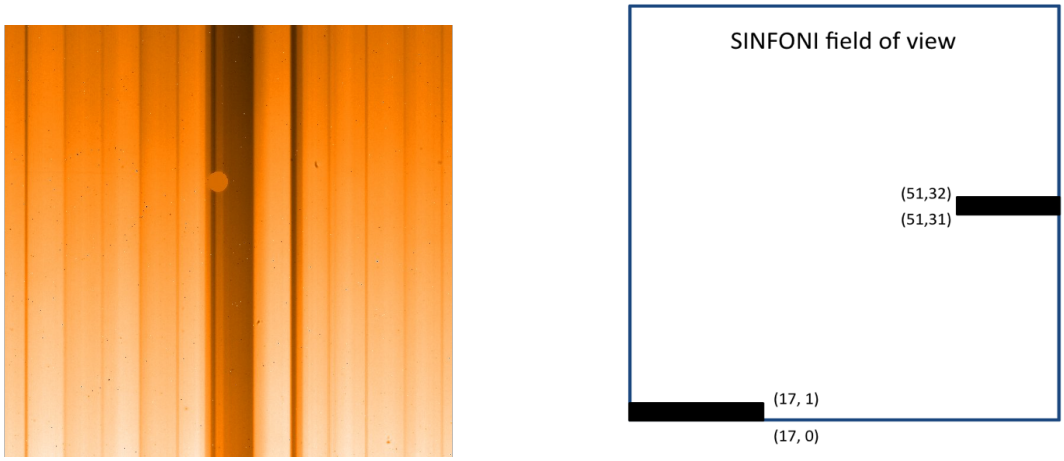

Fig. 2: Left: Appearance of the “blind spot” on the SINFONI detector. Right: The location of the blind spot with respect to the FOV.

3.4 The vignetting of slit 32 at the top of the field of view is now much reduced.

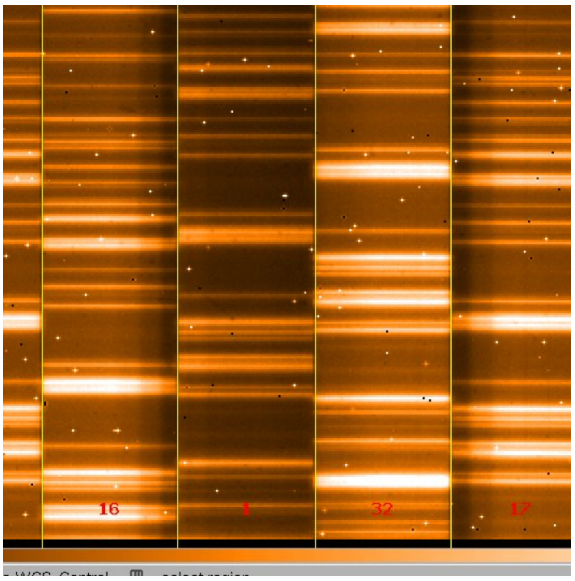

Fig. 3: Sky spectra showing the vignetting of slit#32 (labelled at the bottom) is much reduced. There is still significant vignetting in slit#1 (note however that the “blind spot” also lies partially on this slit).

3.5 An improved AO performance of ~10% in Strehl, as measured on the fibre calibration source.

3.6 No significant negative impact on the system performance. Dark current, linearity and gain remain unchanged, and there is no change in the operational overheads.