DEVELOPMENT OF THE FIBRES OF MOONS

Isabelle Guinouard, David Lee, Hermine Schnetler, William Taylor, Jean-Philippe Amans, David Montgomery, Ernesto Oliva

l'Observatoire de Paris – GEPI
Galaxies Étoiles Physique et Instrumentation
STFC UK Astronomy Technology Centre
INAF

MOONS concept

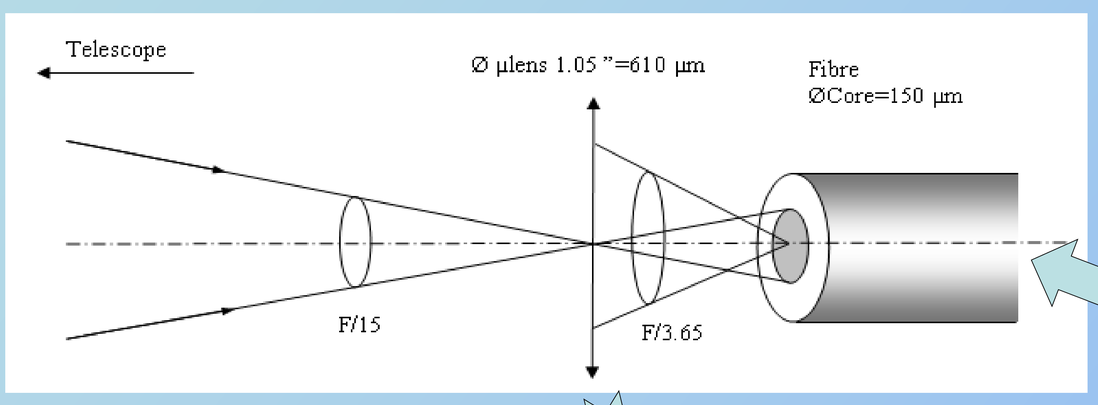
MOONS will exploit the full 500 square arcmin field of view offered by the Nasmyth focus of the Very Large Telescope and will be equipped with two identical triple arm cryogenic spectrographs covering the wavelength range 0.8 - 1.8 µm, with a multiplex capability of approximately 1000 fibres.
Each triple arm spectrograph will produce spectra for half of the targets simultaneously. The system will have both a medium resolution (R~4000-6000) mode and a high resolution (R~20000) mode.

Specifications of the fibres

Number of fibres	1024
Number of bundles	64 bundles of 16 fibres
Fibre length	10 m
Sky aperture	1.05 arcsec
Fibre diameter	150/180/210 µm
Wavelength range	0.8 – 1.8 µm
Input numerical aperture (conversion realized with coupling microlens)	Nasmyth: F/15 to F/3.65 into the fibres
Output numerical aperture	F/3.5
Interobject	5 dark pixels (2.66 x Ø fibre core)

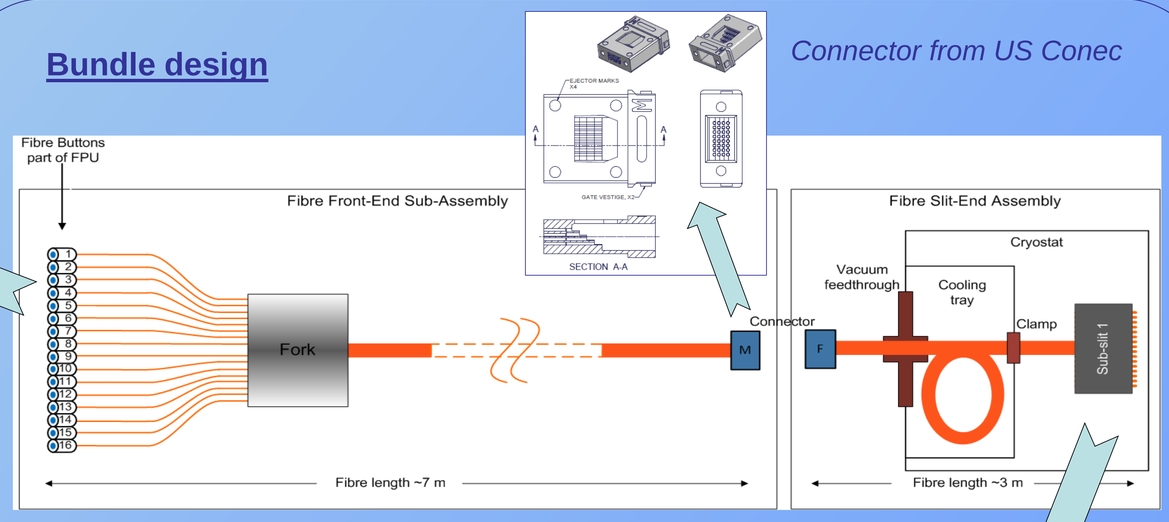
Fibre injection principle:

- Pupil image on the fibre core



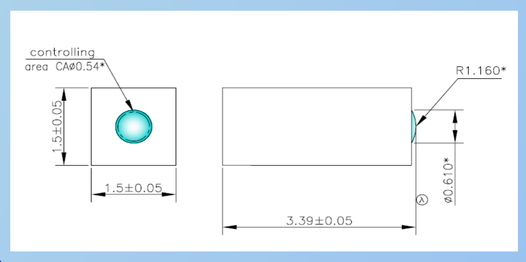
Bundle design

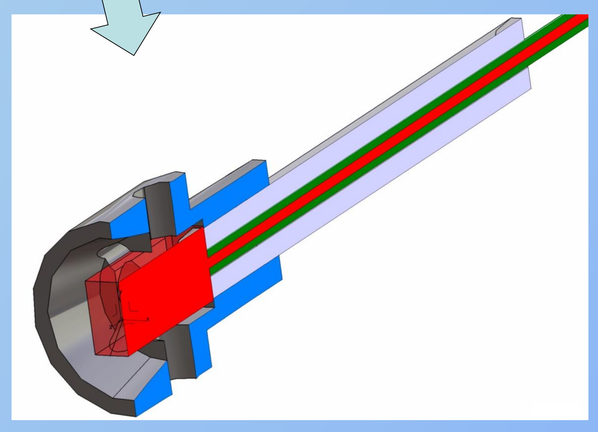
Connector from US Conec



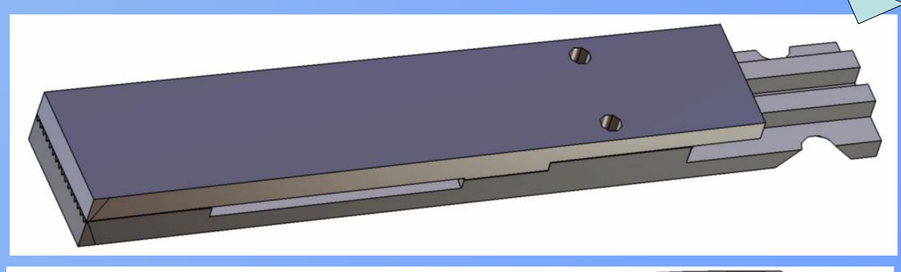
Micro-lens designed by AMS

-Test with using standard coloured glass (RG-630 or RG-695)
- The micro-lens plays the role of the filter
- Simplify the design of the spectrograph





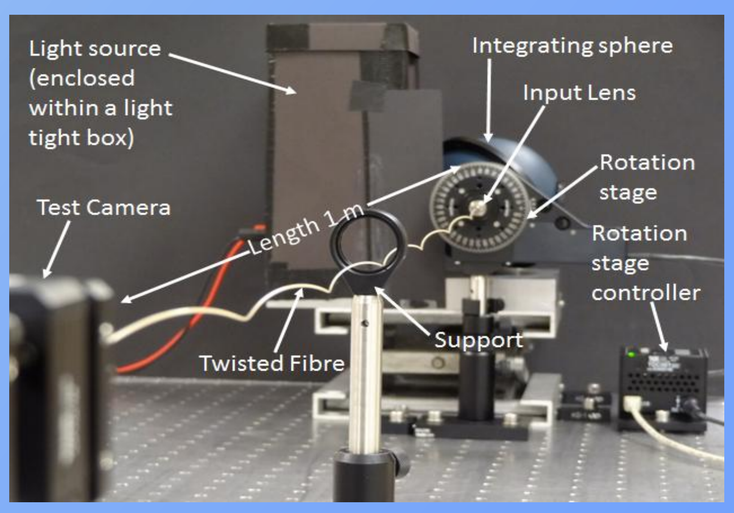
Sub-slit



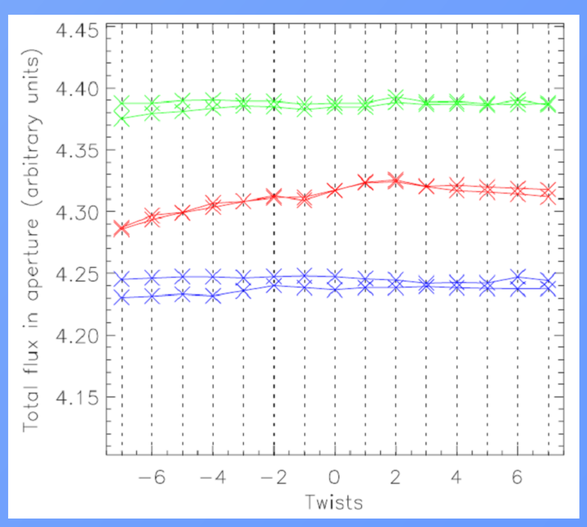
Slit

FRD tests

The result of the FRD twist test is that the output beam of the fibre is only slightly affected by applying 7 twists per metre with the measured flux within an F/3.16 output beam reducing by less than 1%. The fibre to fibre throughput variation was measured to be 4% for the 10 fibres tested. The conclusion of these preliminary tests is that twist induced FRD has a small effect on fibre throughput but it is significantly less than the fibre to fibre throughput variation.



Picture of the MOONS prototype fibre FRD test set up



Measured fibre output flux within F/3.16 aperture as function of fibre twist

CONTACT : Isabelle GUINOUARD isabelle.guinouard@obspm.fr Phone 33-1-45077983 Observatoire de Paris/GEPI F-92195 Meudon Cedex

Poster : *Paper :*