 

**SPICA-VIS**

**Template Manual**

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**CHANGE RECORD**

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| --- | --- | --- | --- |
| **ISSUE** | **DATE** | **SECTION** | **COMMENTS** |
| 1 | 13/01/2020 | All | Creation PB |
| 1.1 | 9/03/2020 | All | Small additions in Blue (DM) |
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# Scope

The scope of this document is to describe the SPICA-VIS templates (Technical Template, Day time Calibration, Night Calibration and Observation).

# Technical Template

## Birefringence Calibration

We use the STS and the sequence is:

* Initialize STS
* Visible STS mirrors ON
* Initialize SPICA-VIS (spectral resolution)
* Align each beam on the image and pupil reference pixels by acting on IMG/PUP
* Optimise flux on SPICA\_VIS (Fiber Explorer)
* Record Dark frames (Detector Shutter close)
* Shutter 1 open
* For each beam (2-6):
  + Shutter open
  + For each position of PDC (stroke and step TBD)
    - Record Frames
* Process the data with the pipeline, determine the position of the PDC
* Send the PDC to their optimal position



## SPICA-VIS/SPICA-FT Cophasing

We use the STS and the sequence is:

* Initialize STS and check the cophasing of STS with CHARA
* Visible STS mirrors ON
* IR STS mirrors ON
* Initialize SPICA-FT
* Optimise flux on SPICA\_FT (Fiber Explorer)
* Start Fringe Tracking
* Initialize SPICA-VIS (low spectral resolution)
* Align each beam on the image and pupil reference pixels by acting on IMG/PUP
* Optimise flux on SPICA\_VIS (Fiber Explorer)
* Open all shutters
* Search for fringes with SPICA-VIS internal DL

## Reference Pixels

This template aims at defining the reference pixels of the 6 beams on the image and pupil cameras. The sequence is:

* Initialize the Back-illuminating Source
* Close all shutters
* Determine the reference pixels on the image and pupil cameras
* Save the reference pixels in the Control Software

## M2/M3 Command Matrix

This template aims at defining the command matrix (4x4) of the M2/M3 mirrors for the images and the pupils. The sequence is:

* Initialize STS
* Visible STS mirrors ON
* Initialize SPICA-VIS
* For each beam (1-6):
  + Shutter open
  + Determine the photocenter of the image and pupil
  + Move IMG-x
  + Determine the photocenter of the image and pupil
  + Go back to the initial position of IMG -x
  + Move IMG -y
  + Determine the photocenter of the image and pupil
  + Go back to the initial position of IMG -y
  + Move PUP-x
  + Determine the photocenter of the image and pupil
  + Go back to the initial position of PUP -x
  + Move PUP -y
  + Determine the photocenter of the image and pupil
  + Go back to the initial position of PUP -y
  + Determine the image and pupil command matrix
* Save the command matrix in the Control Software

## Fast TipTilt Command Matrix

This template aims at defining the command matrix (2x2) of the Fast TipTilt (TTT) mirrors. The sequence is:

* Initialize STS
* Visible STS mirrors ON
* Initialize SPICA-VIS
* For each beam (1-6):
  + Shutter open
  + Determine the photocenter of the image and pupil
  + Move TTT-x
  + Determine the photocenter of the image
  + Go back to the initial position of TTT-x
  + Move TTT-y
  + Determine the photocenter of the image
  + Go back to the initial position of TTT-y
  + Determine the image command matrix
* Save the command matrix in the Control Software



# Day Time Calibration

## Detector Calibration

The sequence is very simple:

* Close the shutter of the Science Detector
* Record frames

## Spectral Calibration

We use spectral calibration sources and the sequence is:

* Initialize the spectral calibration sources
* Record Frames



## Kappa Matrix Calibration

We use the STS and the sequence is:

* Initialize STS
* Visible STS mirrors ON
* Initialize SPICA-VIS (spectral resolution)
* Align each beam on the image and pupil reference pixels by acting on IMG/PUP
* Optimise flux on SPICA\_VIS (Fiber Explorer)
* Record Dark frames (Detector Shutter close)
* For all beam (6)
  + Open Shutter
  + Start injection control loop by acting on TTT
  + Record Frames

## Transfer Function

We use the STS and the sequence is:

* Initialize STS
* Visible STS mirrors ON
* Initialize SPICA-VIS (spectral resolution)
* Align each beam on the image and pupil reference pixels by acting on IMG/PUP
* Optimise flux on SPICA\_VIS (Fiber Explorer)
* Record Dark frames (Detector Shutter close)
* Open all shutters
* Start injection control loop by acting on TTT
* Search fringes with SPICA-VIS internal DL
* Record Frames

# Night Calibration

# Observation

The sequence is:

* Initialize CHARA (AO, DL, LDC, …). The correct sequence may depend on the brightness of the sources.
* Initialize SPICA-FT
* Initialize SPICA-VIS
* Set ADC (refraction and field rotation)
* Close All shutters
* Record a DARK frames
* Open all Shutters
* Acquisition of the star on Image and Pupil Cameras (Acting on IMG/PUP)
* Optimizing flux injection (fiber explorer) by acting on TTT
* Start injection control loop by acting on TTT
* Move CHARA DLs far from zero OPD
* Record NOFRINGES frames
* Go back CHARA DLs to zero OPD
* Start fringe Tracking with SPICA-FT
* Record FRINGES frames