DESI

Measuring the spectrograph throughput :

Status report - 2016-06-18

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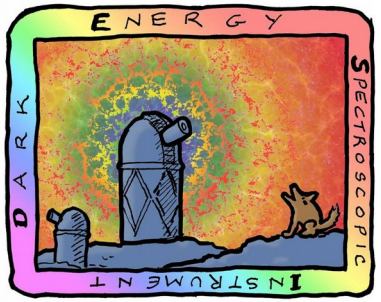
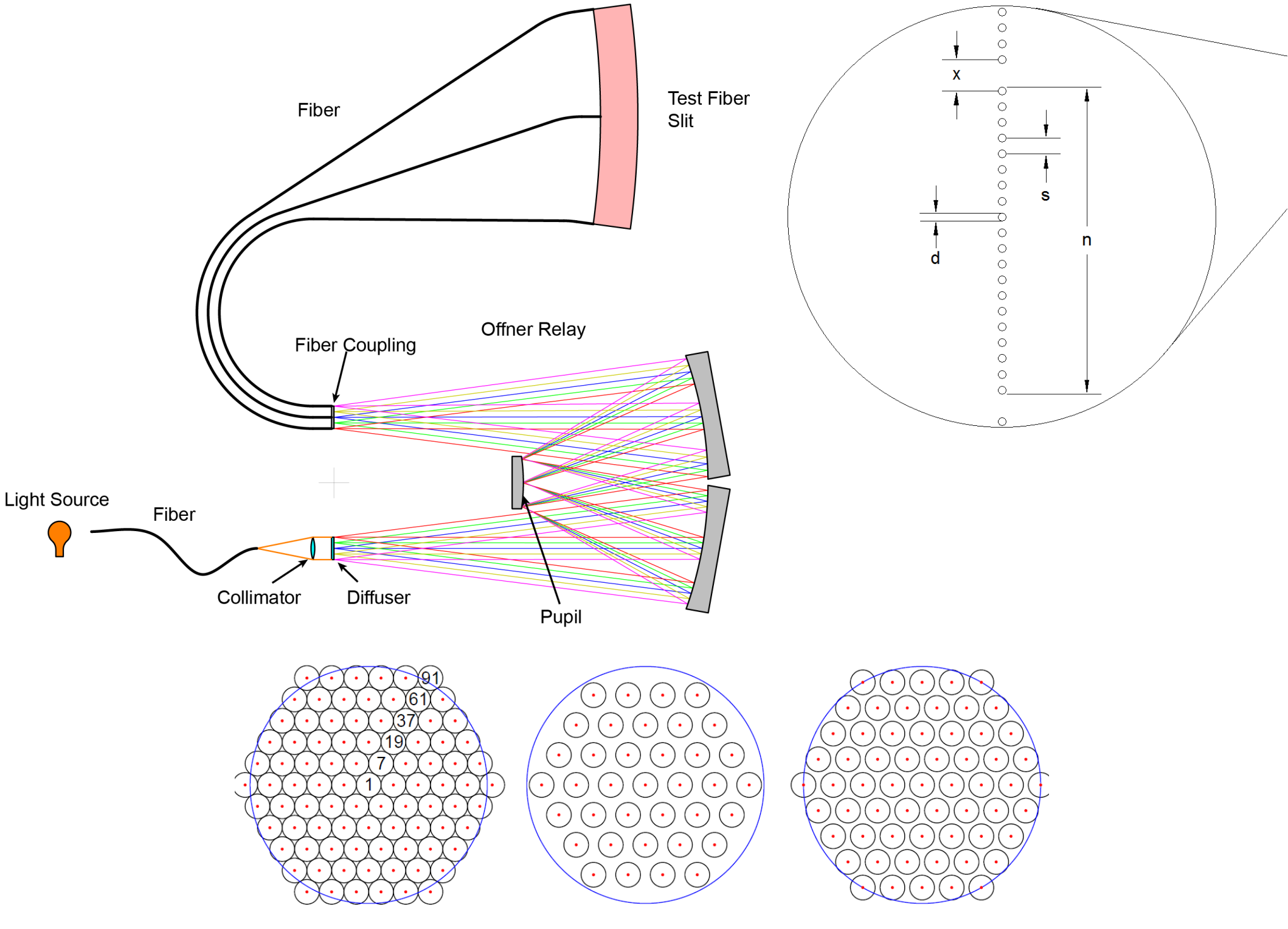


LPNHE
PARIS

Measuring the throughput

- Critical : misestimating the spectro. throughput may endanger the DESI science

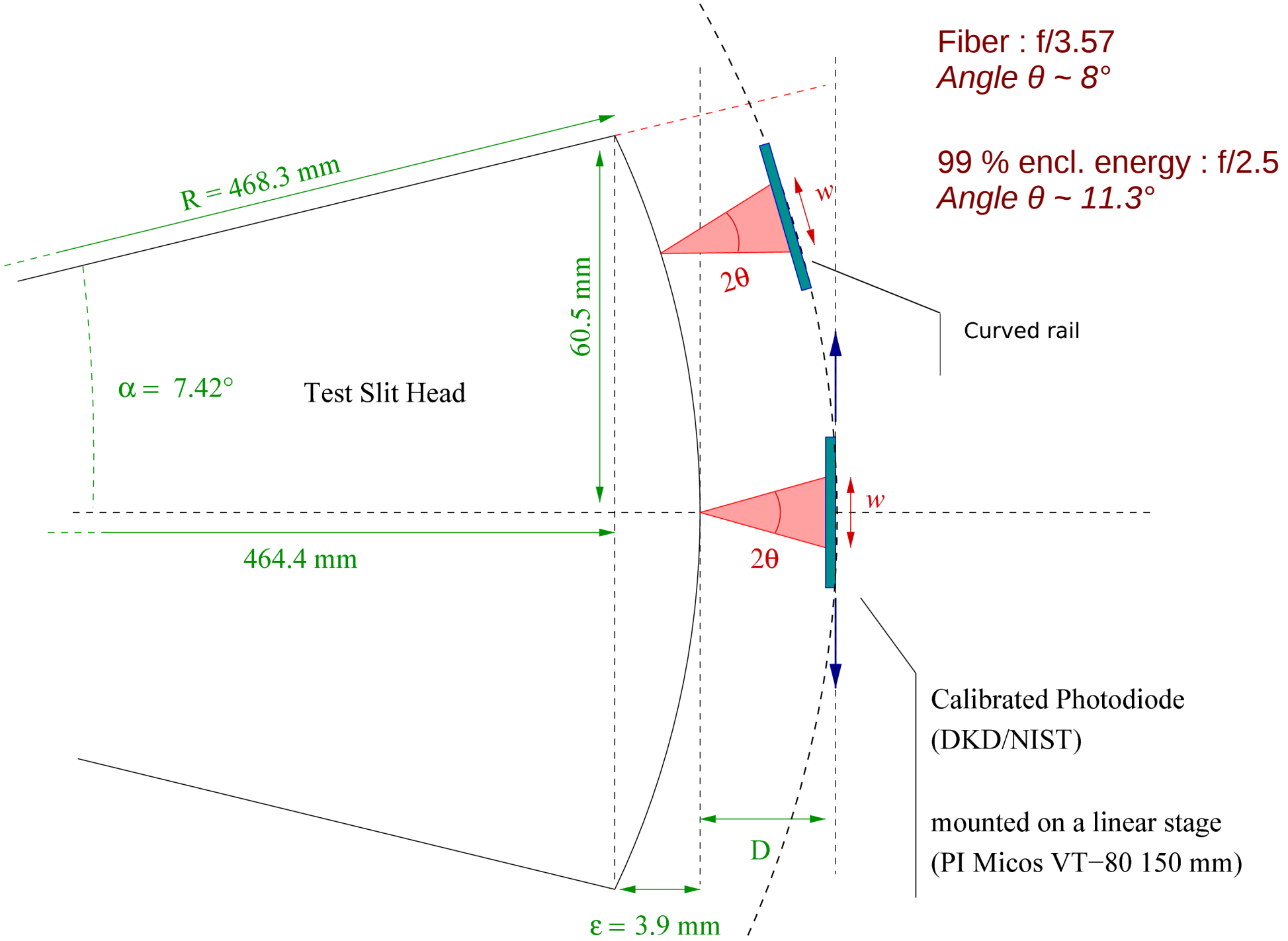
- Throughput measurement could be done during the acceptance tests in Marseille (AMU/Winlight)
  - During fiber sparse field test slit removal/reinstall repeatability tests (Test 7.15 Acceptance tests)
  - Limited time overhead
  - Our instrument will be used for other tests as well by AMU colleagues.

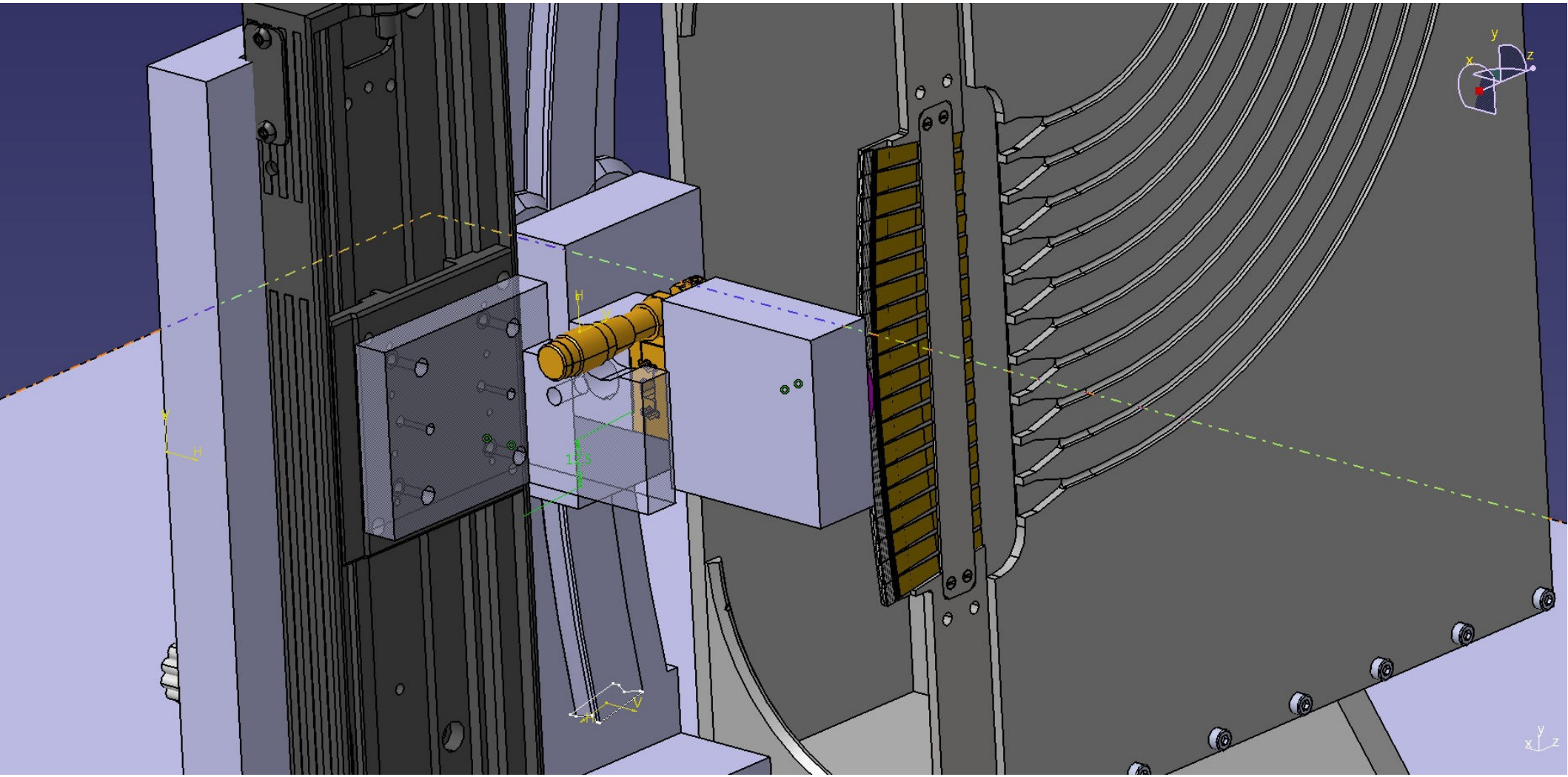

Fiber
Test Fiber
Slit
x
s
d
n
Offner Relay
Fiber Coupling
Light Source
Fiber
Collimator
Diffuser
Pupil
91
61
37
19
7
1

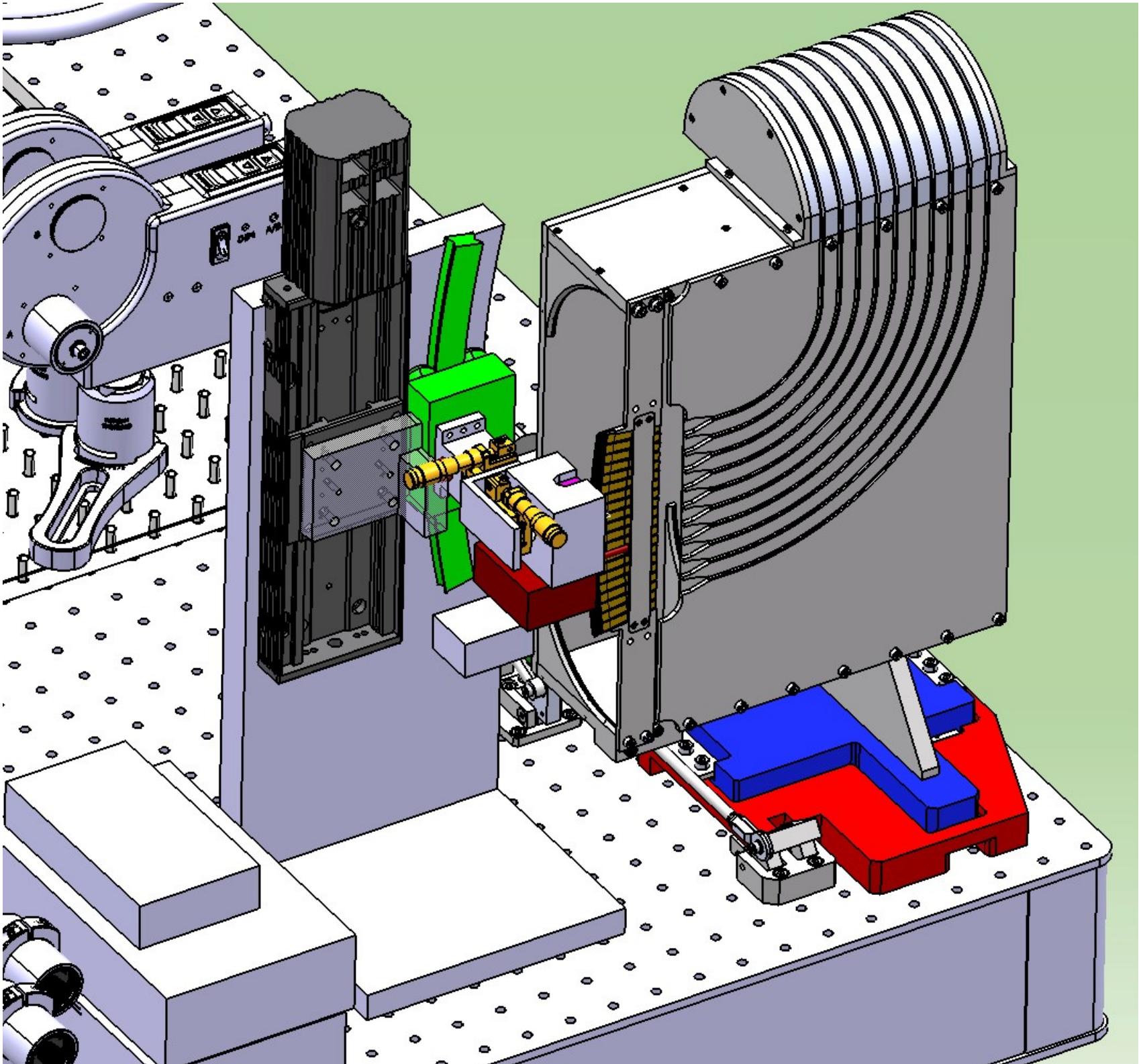
Measurement procedure

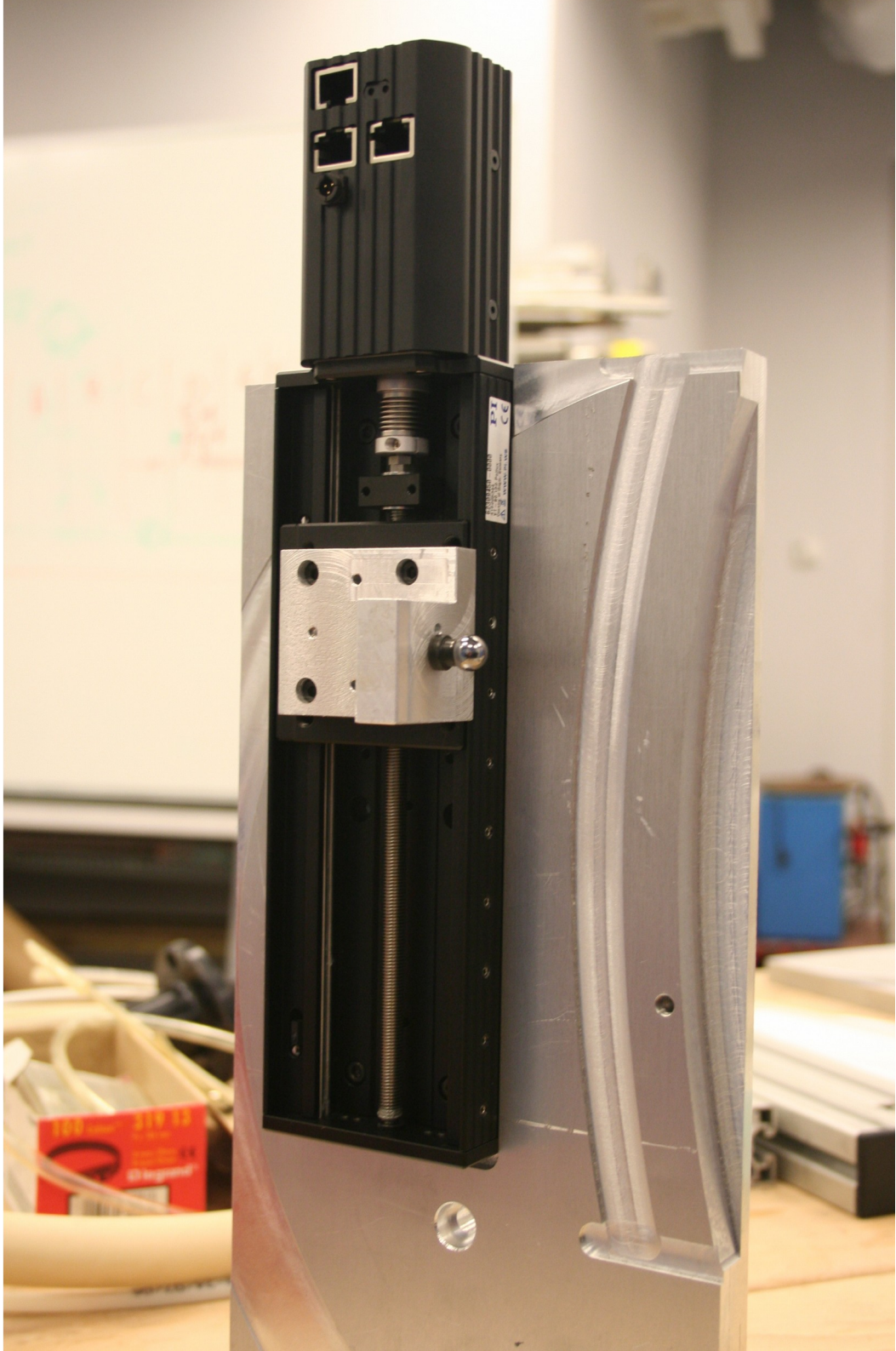
- Test fiber slit inside the spectro.
  - various illuminations (flux ramp, wavelength scans)
  - Light only through isolated fibers / fiber blocks
  - CCD spectra on the 3 branches
- Test fiber slit outside :
  - Fixed on the AMU optical table, in a dedicated dark box
  - same illuminations setups as before
  - measuring the total flux received by the photodiode

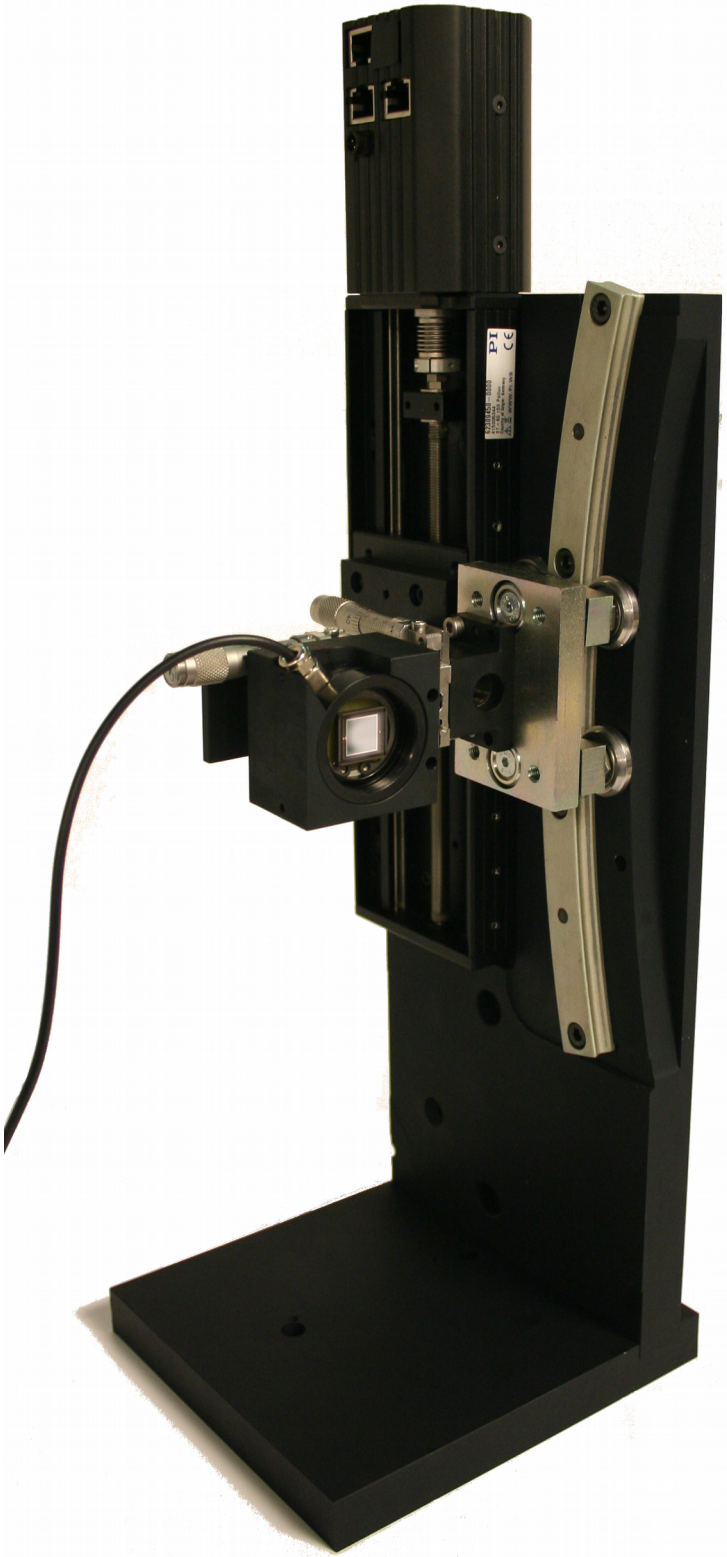
    in front of each fiber/fiber block.
- Test slit back inside : same illuminations (with a good control of the flux)
- Repeat…
- Level and stability of the illumination controlled by other photodiodes
- Ratio : flux on CCDs / flux measured by the photodiode

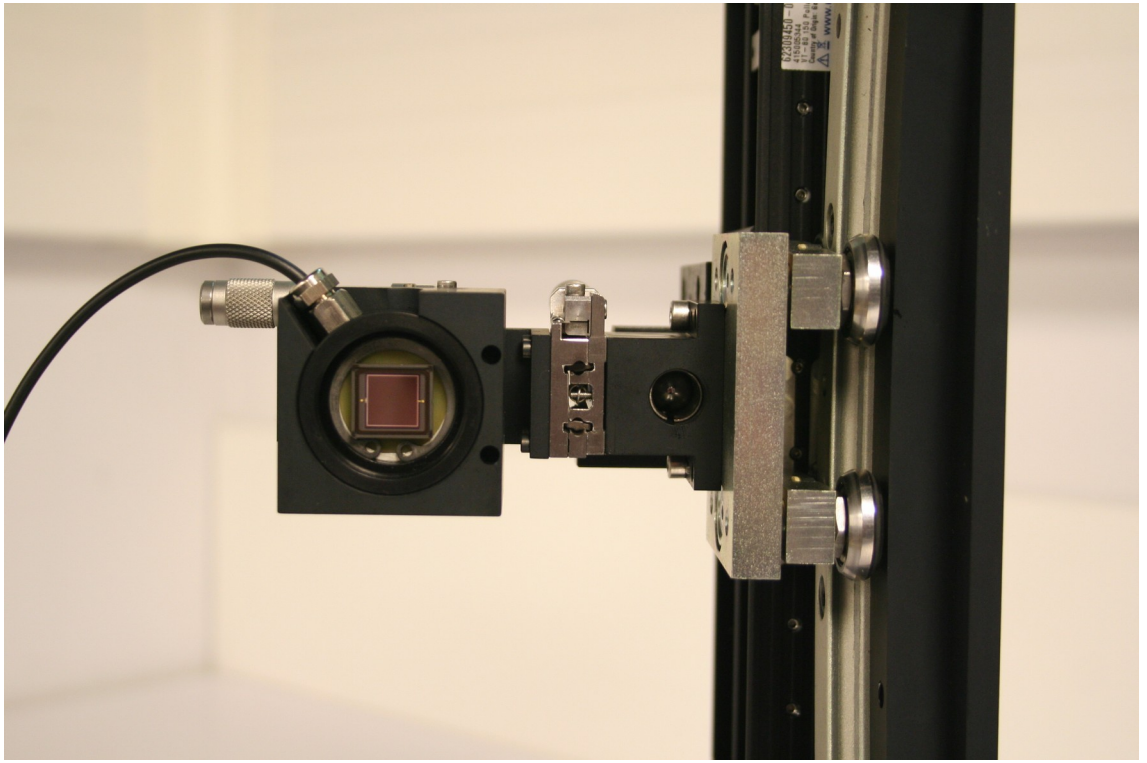

Fiber : f/3.57
Angle θ ~ 8°
99 % encl. energy : f/2.5
Angle θ ~ 11.3°
R = 468.3 mm
60.5 mm
α = 7.42°
Test Slit Head
w
2θ
Curved rail
w
2θ
464.4 mm
Calibrated Photodiode
(DKD/NIST)
mounted on a linear stage
(PI Micos VT−80 150 mm)
D
ε = 3.9 mm

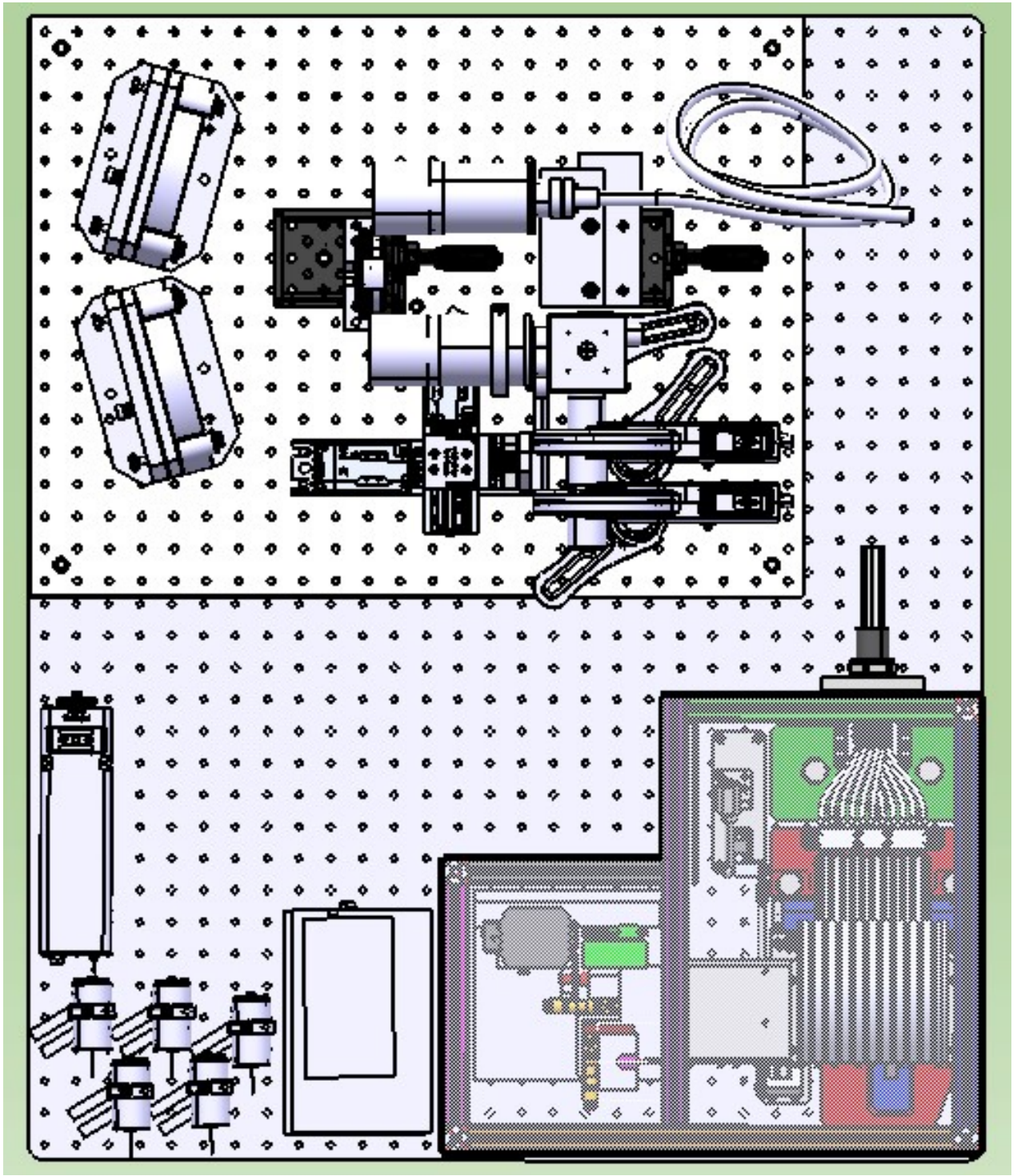

y
x
z
H
V
y
H
V
y
x
z

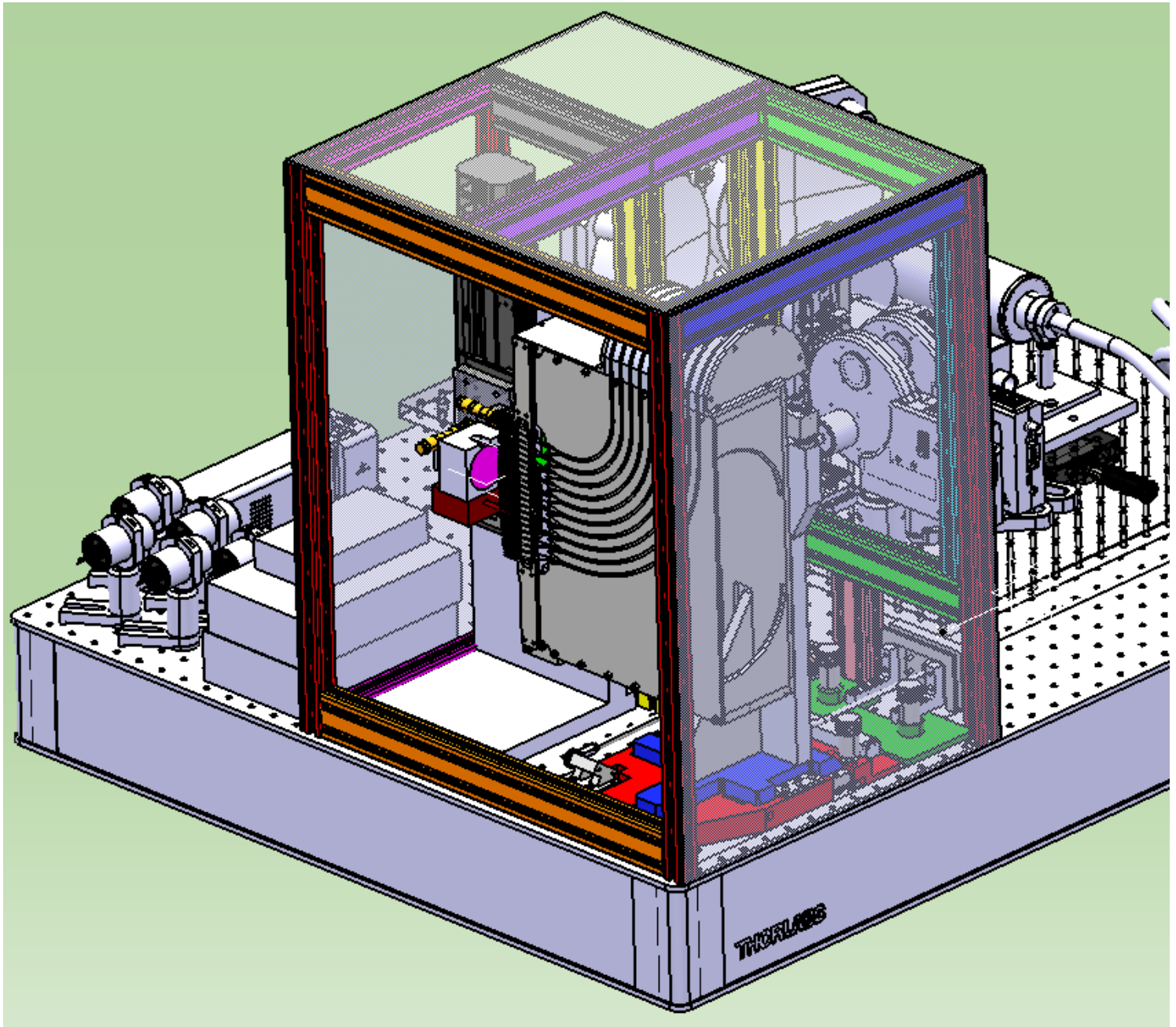


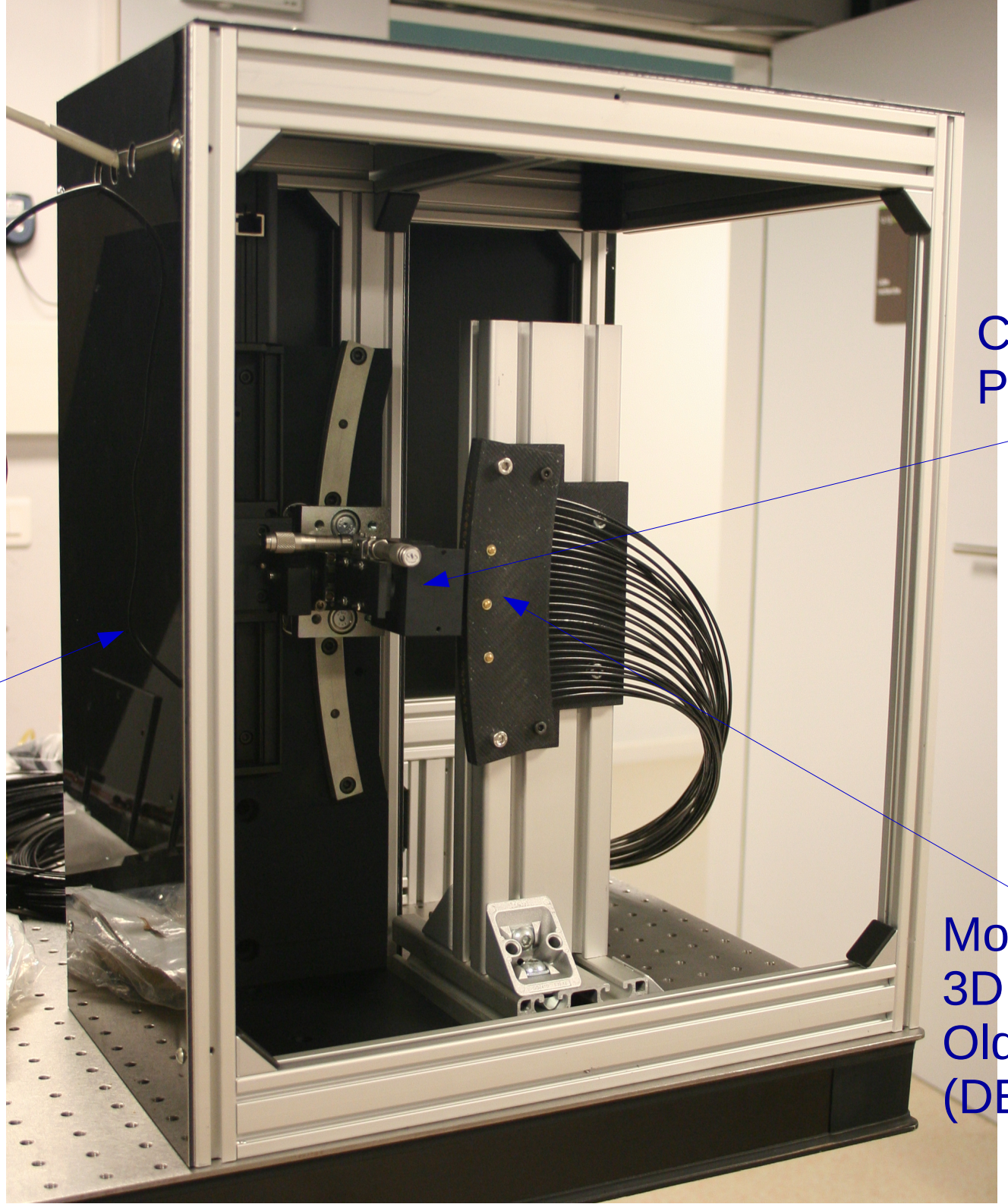









THORLABS


Calibrated
Photodiode
Special
Dark Box
Mock test slit
3D printed
Old fiber bundle
(DESY)

Progress Status

- Mechanical system has been built and tested √
- Calibrated photodiodes received, calibration checked (vs. NIST calib photodiode) √
- Dedicated dark box built √
- Validation with a mock test slit on going.
- Integration with AMU test bench on going.
- Installation on AMU optical bench at Winlight for July 2016 (once test slit received).
- Measurements scheduled during Fall 2016.