

Pre-launch optical verification of the Euclid mission NISP Instrument

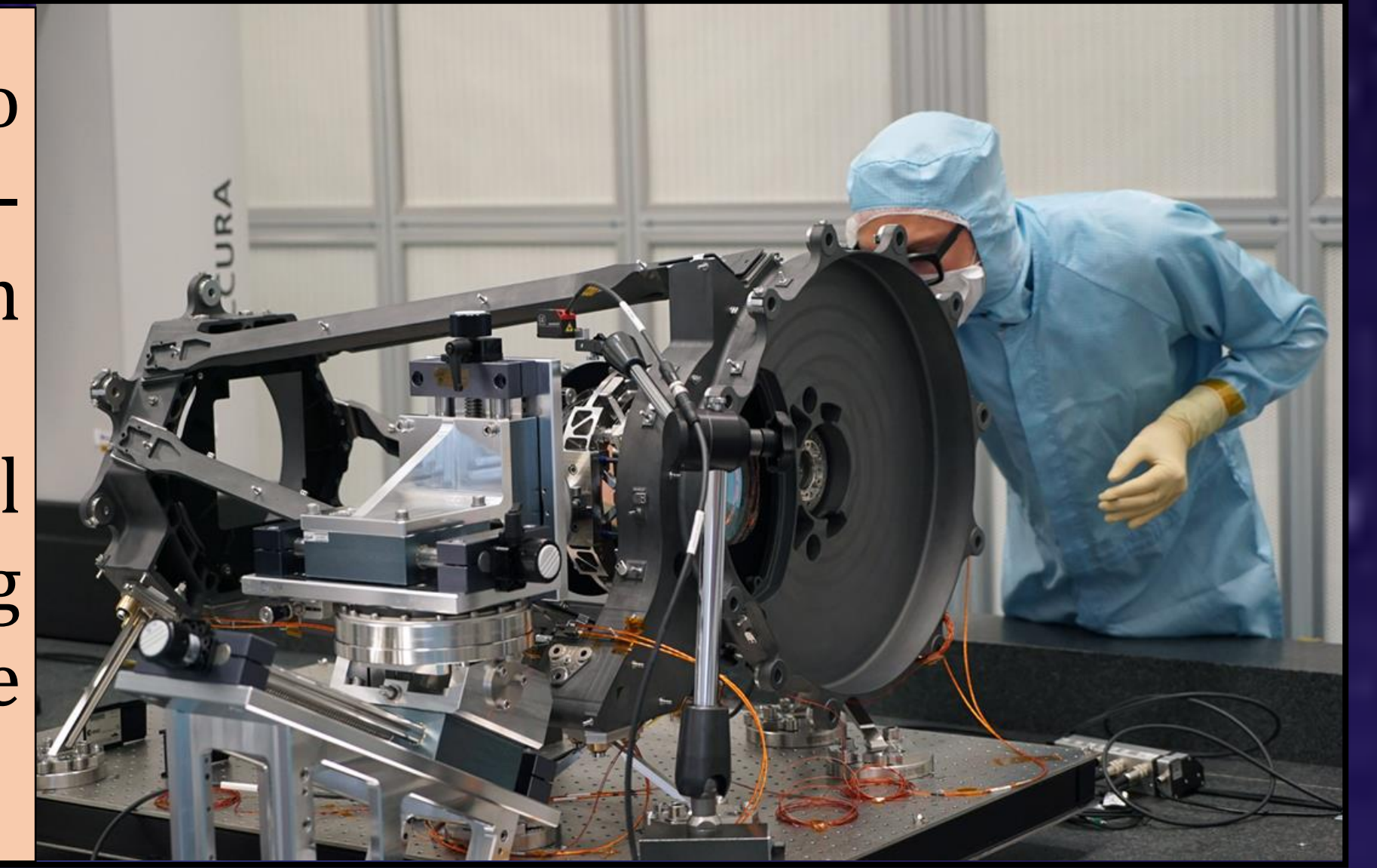
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We performed data analysis of NISP instrument ground-based test campaign data to characterize optical performances before the launch in orbit of the Euclid telescope. Pre-launch tests' data have been analyzed to assess the fulfillment of the mission specifications in terms of Point Spread Function (PSF) and spectral dispersion.

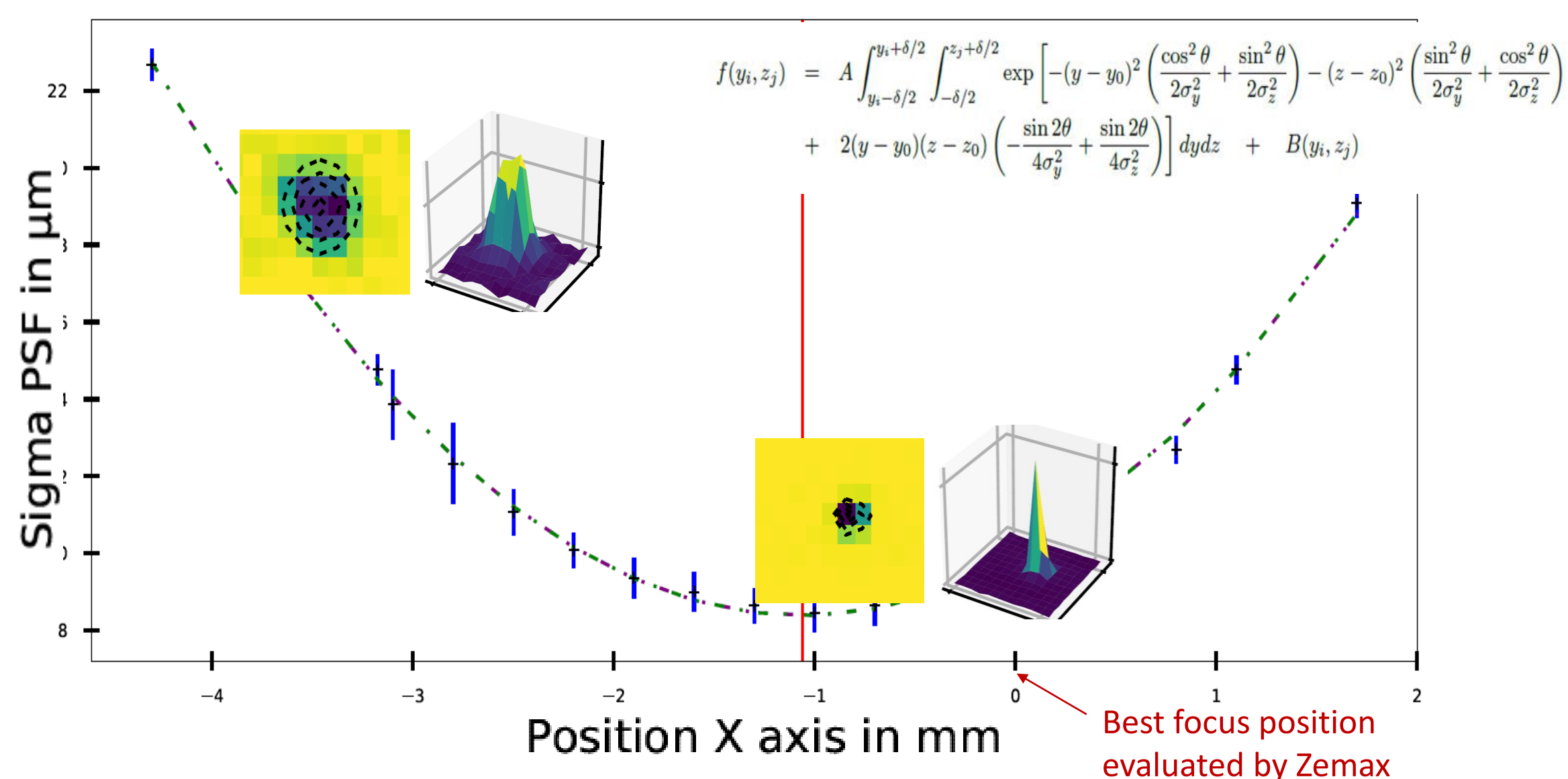
MC simulations were analyzed as well in order to provide a first comparison between real images and simulated ones; this study allows to predict instrumental systematics affecting light sources reconstruction in different positions on the Instrument Focal Plane and in the Observed Sky as well.



Ground test campaign & Optical quality assessment

Fine focus determination

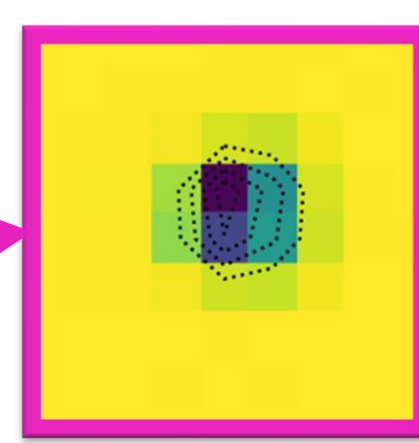
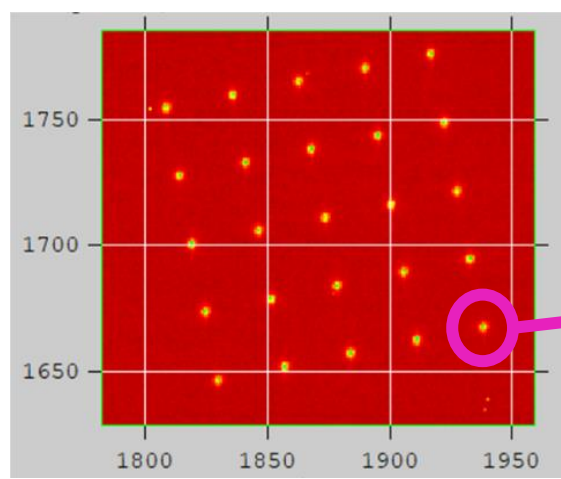
Measurement of the PSF moving the NISP optical plane



PSF characterization

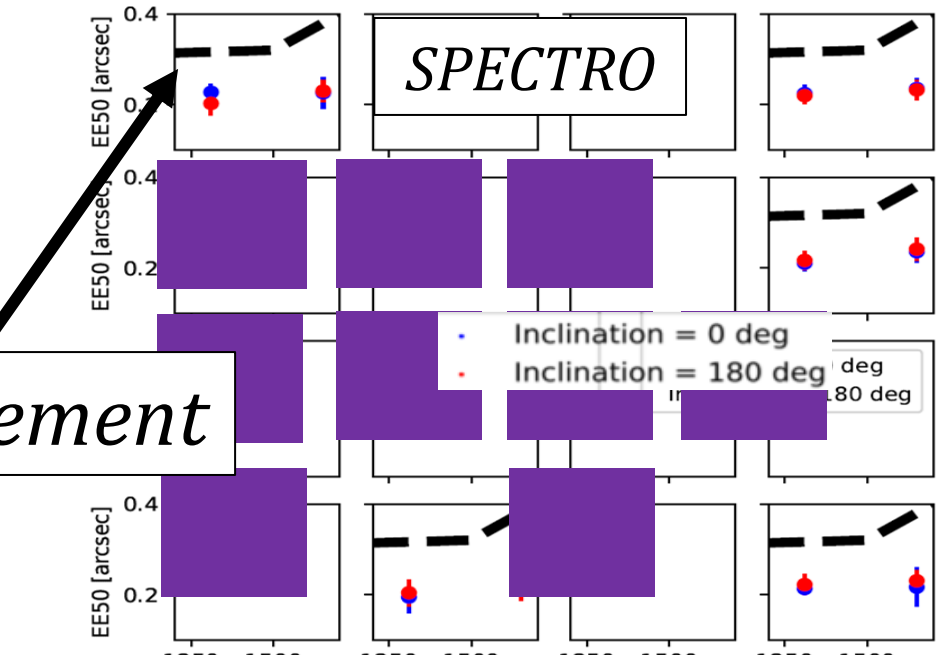
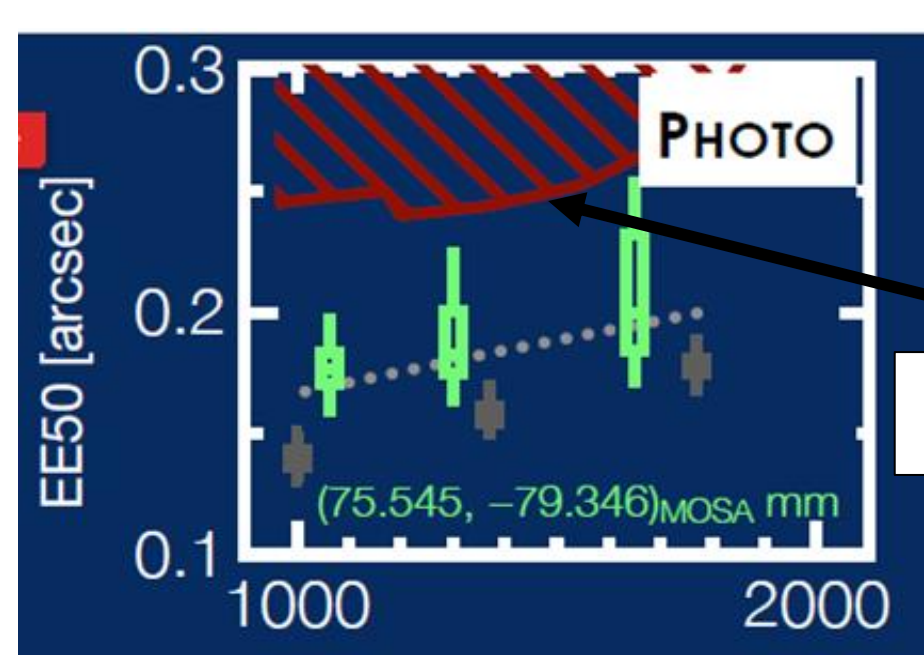
25 PSFs per exposure

Zoom on one PSF



Probing the Euclid NISP photometric channel

Probing the Euclid NISP spectroscopic channel



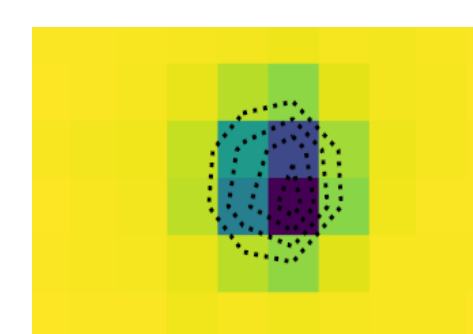
Requirement

PSFs well fulfill the Euclid requirement

Monte-Carlo simulations

- Validation of the Image Simulator
- Prediction of systematics:
 - The full Focal Plane (Detectors' features)
 - Different pointing coordinates → Zodiacal light effect
 - Galaxies' shapes and sizes

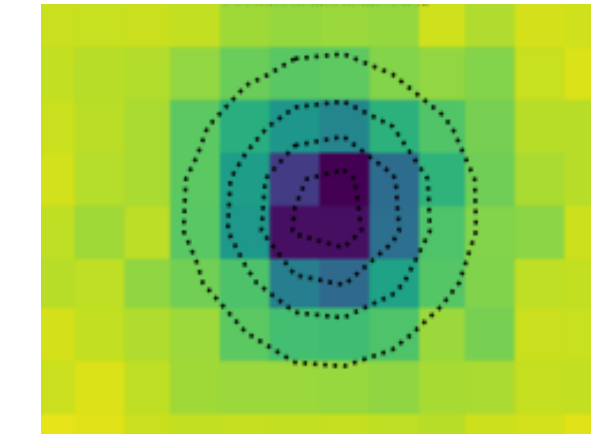
Simulated star PSF



Simulated Galaxy Bulge size = 0.5"



Simulated Galaxy Bulge size = 1.5"

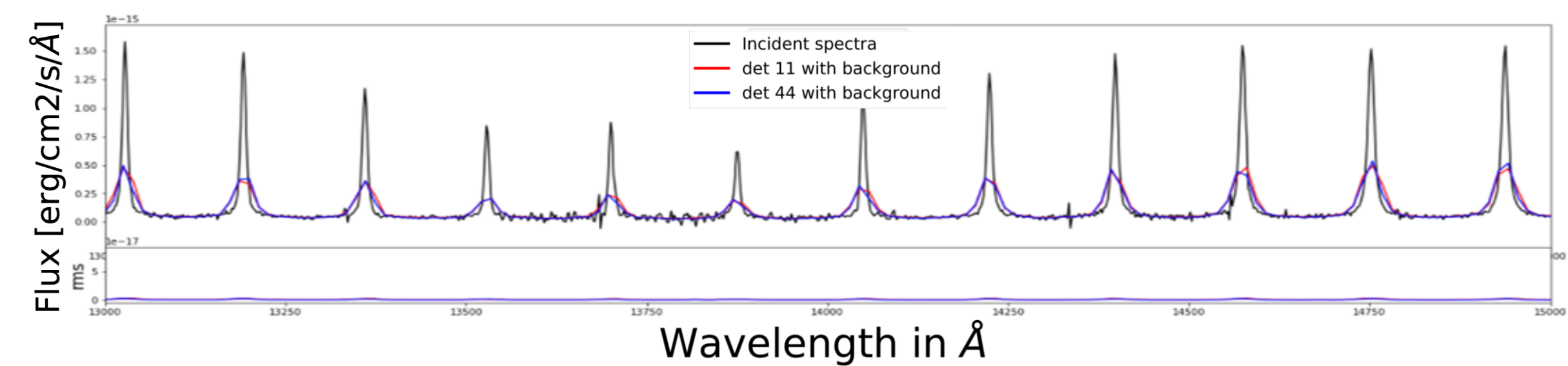


Simulating the Spectral dispersion test

Image

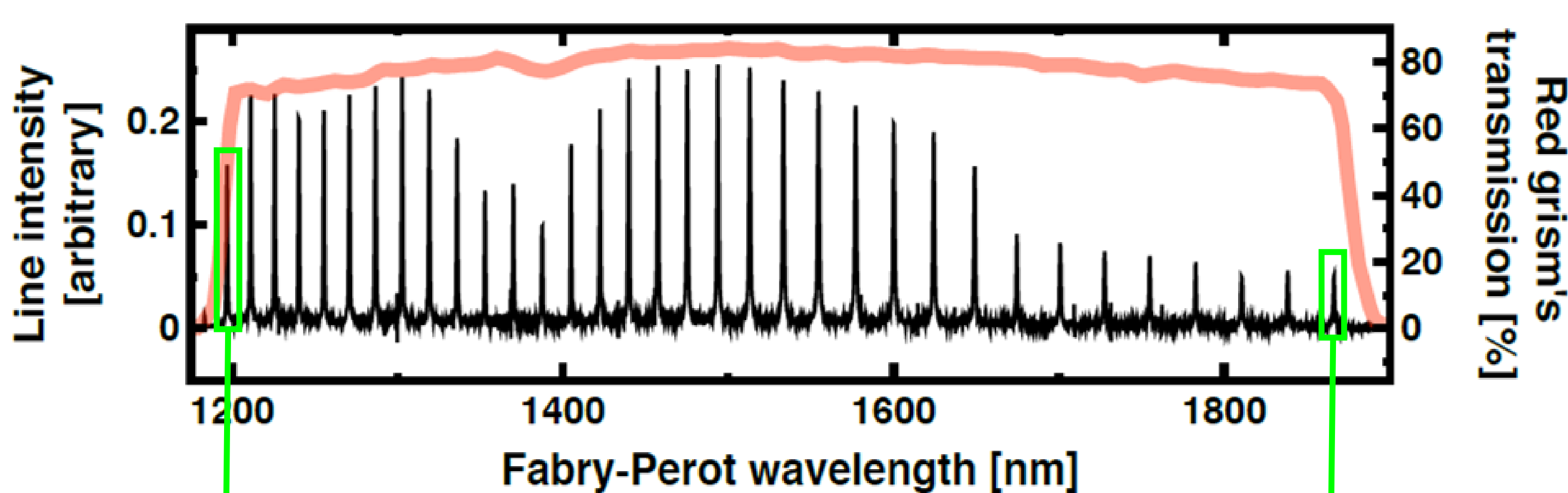


Extracted spectra



Consistent ground testing campaign of 13.7 Å/px

Spectral dispersion test



Spectral dispersion = 13.7 Å/px

$\lambda_{obs} = \lambda_{int} (z + 1)$ and $\Delta z/z \leq 0.002$ (Euclid requirement) $\Leftrightarrow \sigma(\lambda) < 1$ pixel!

Spectral resolution as a function of the galaxy size

The spectral resolution measured on the extracted H α -complex lines versus the object Disk R50 compared to the expectation.

