

A key tool to probe Euclid spectroscopy: Spectro-Photometric simulations of galaxies to unravel NISP's capabilities



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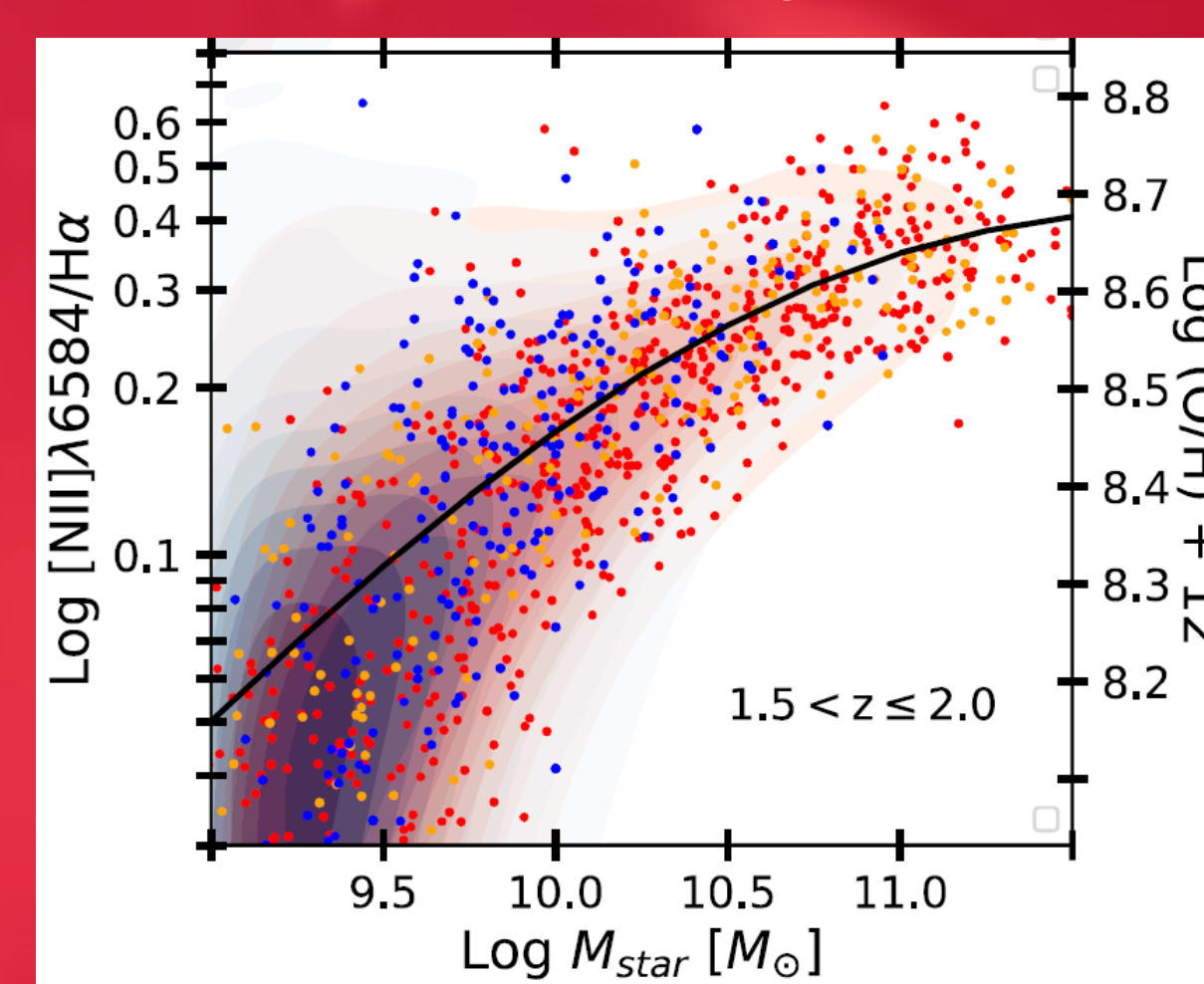
Context. We investigate the Euclid Near Infrared Spectrometer and Photometer (NISP) Red-Grism slitless spectroscopy capabilities in terms of continuum and emission lines detection by constructing, emulating and analyzing Spectral Energy Distribution (SED) models of Star Forming Galaxies (SFGs) located at $0.3 \leq z \leq 2.5$ using the Euclid Red-Grism simulator.

Aims. This work focuses on the PILOT RUN of a simulation campaign aimed at evaluating the spectroscopic capabilities of the Euclid Wide and Deep Surveys for galaxy evolutionary studies.

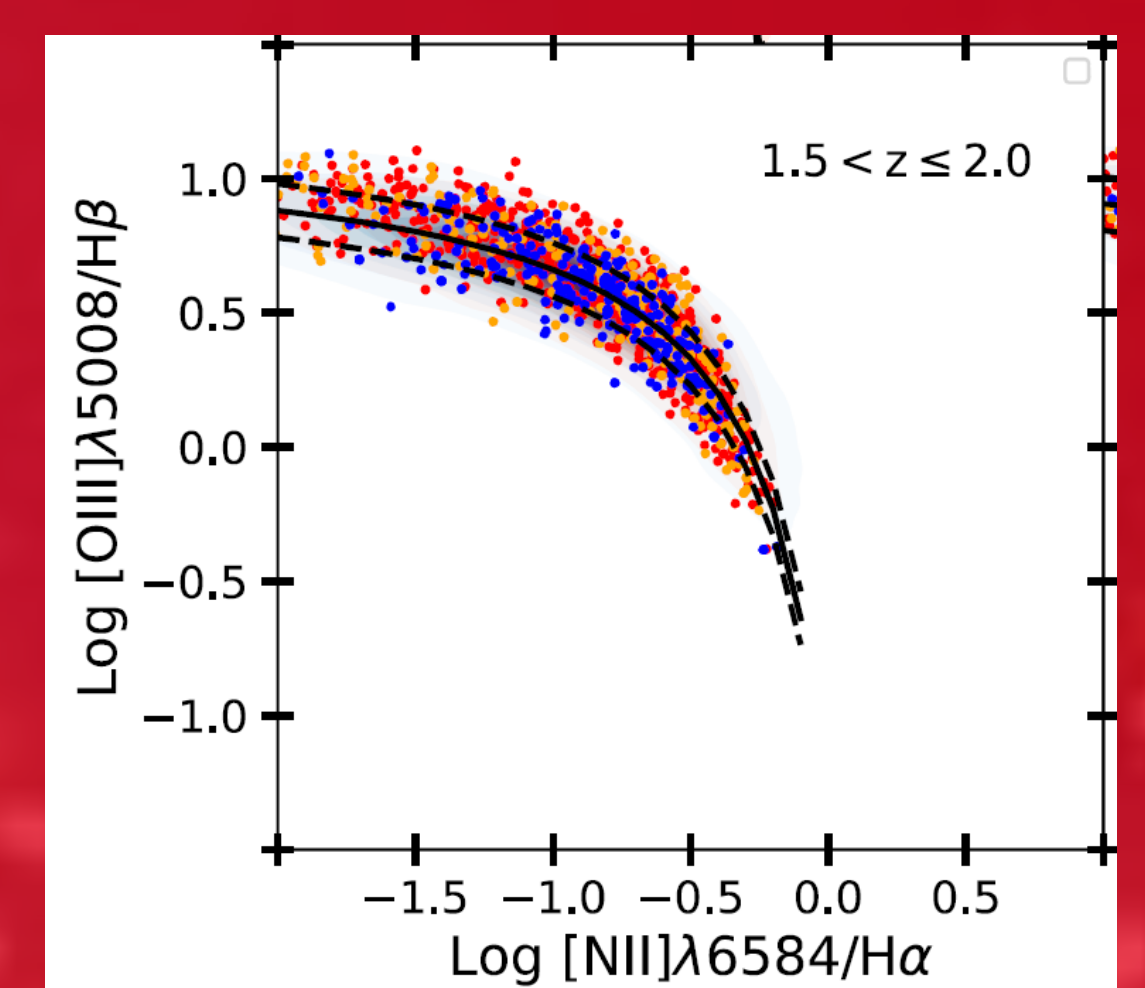
Construction of a spectral library of Star Forming Galaxies at $0.3 \leq z \leq 2.5$

From SED-fitting parameters (Total Mass, Star Formation Rate, redshift ...) available in publicly released catalogs (Laigle2016 and Barro2019), we built the continuum using templates (Bruzual and Charlot, 2003) and add nebular emission lines using calibrations available in literature referring to SFR \rightarrow H α relation, BPT- diagram, Mass metallicities relation ...

Mass-Metallicity relation

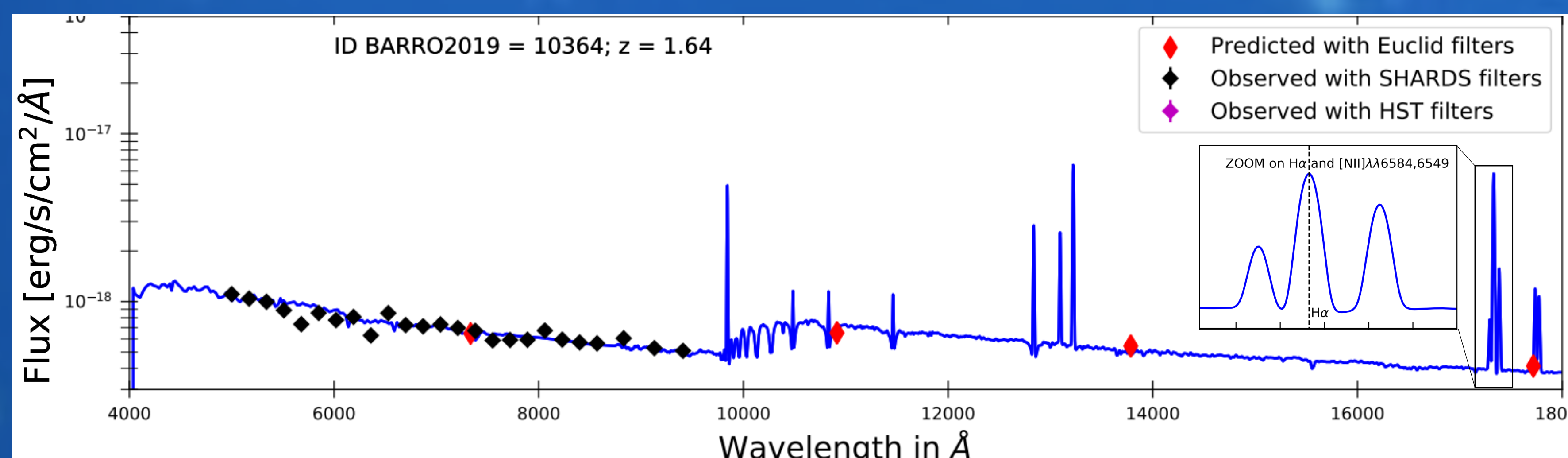


BPT- diagram

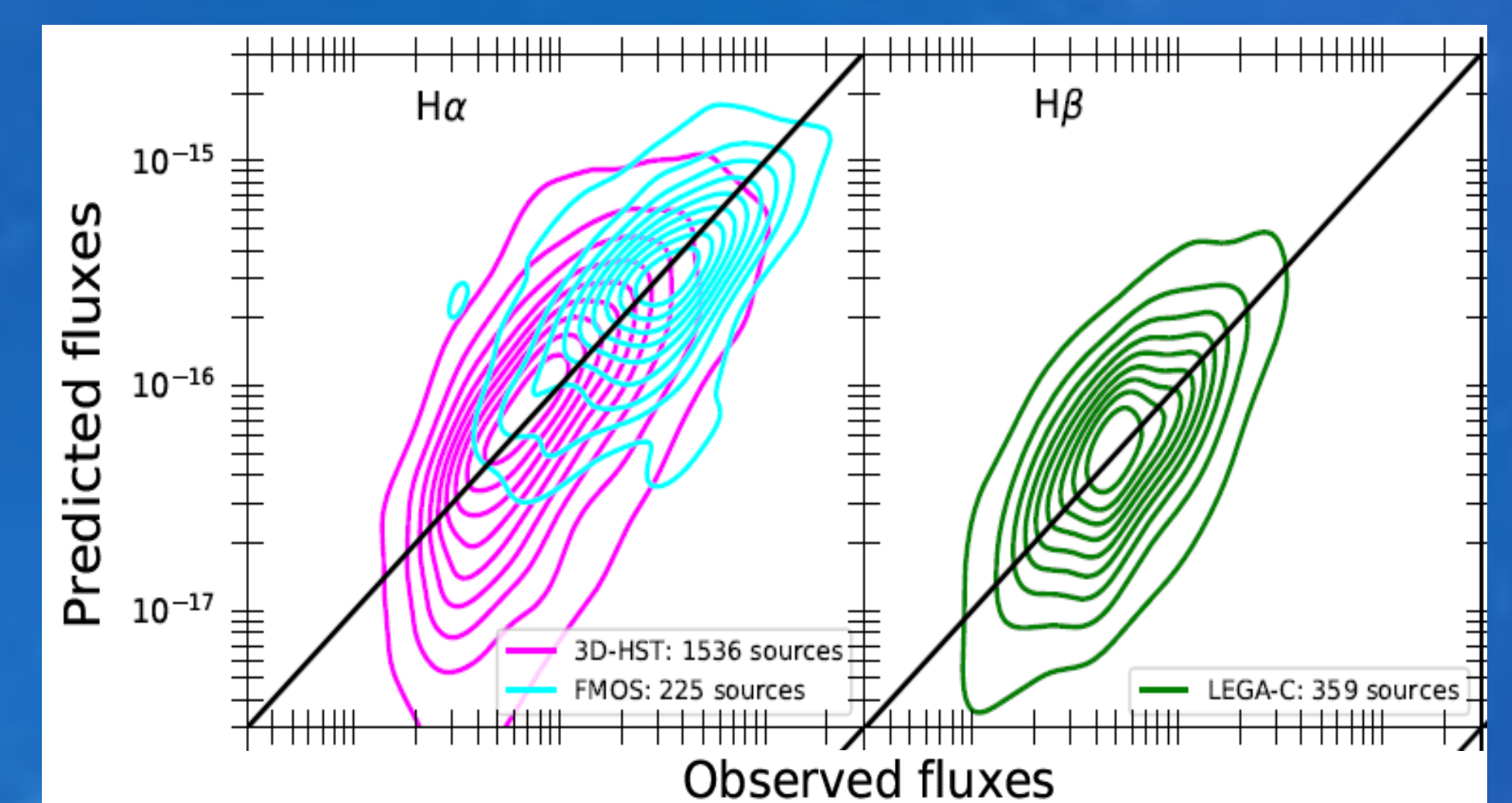


Evaluation of the constructed spectra using observation data

Photometric evaluation

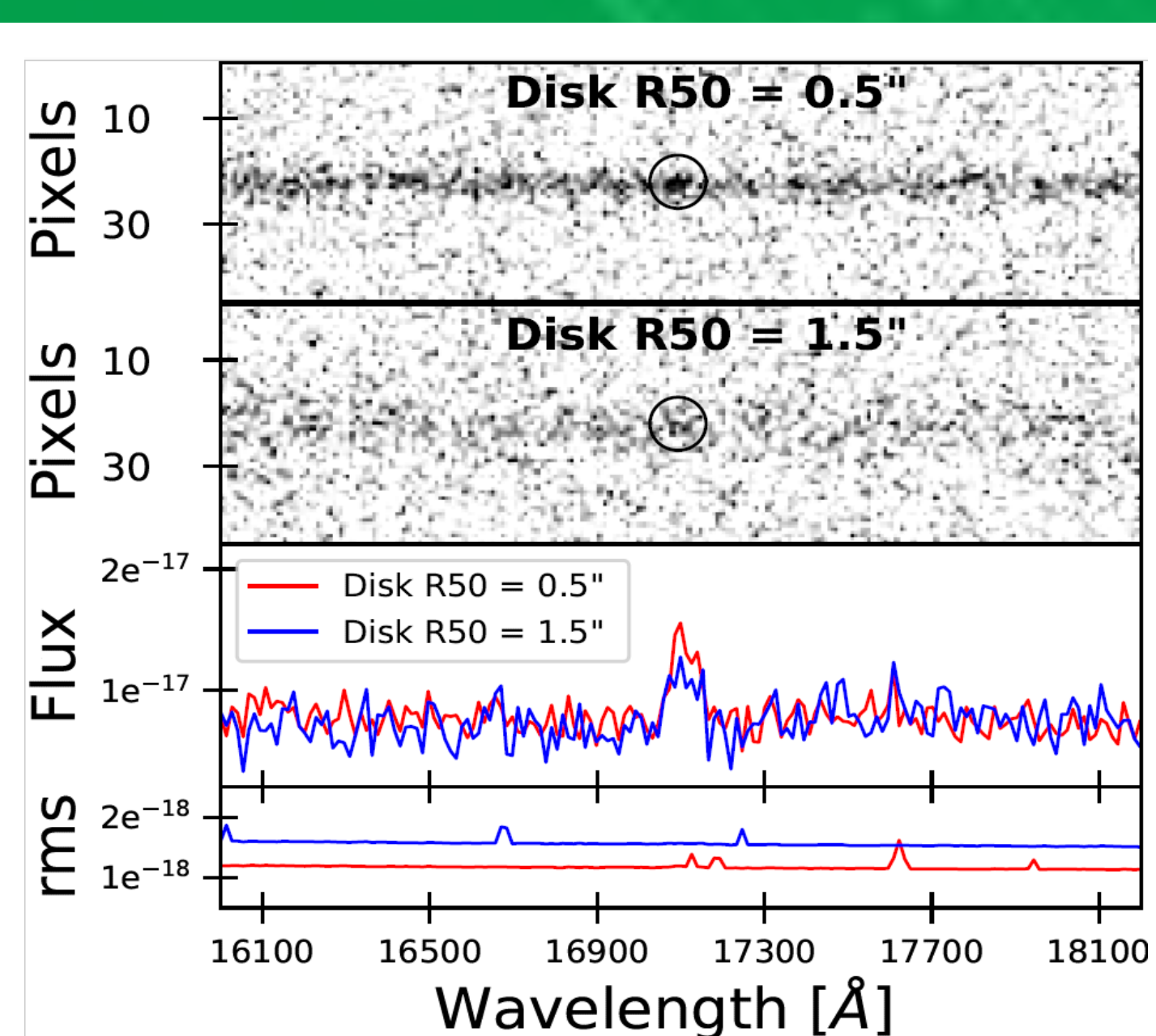


Spectroscopic evaluation

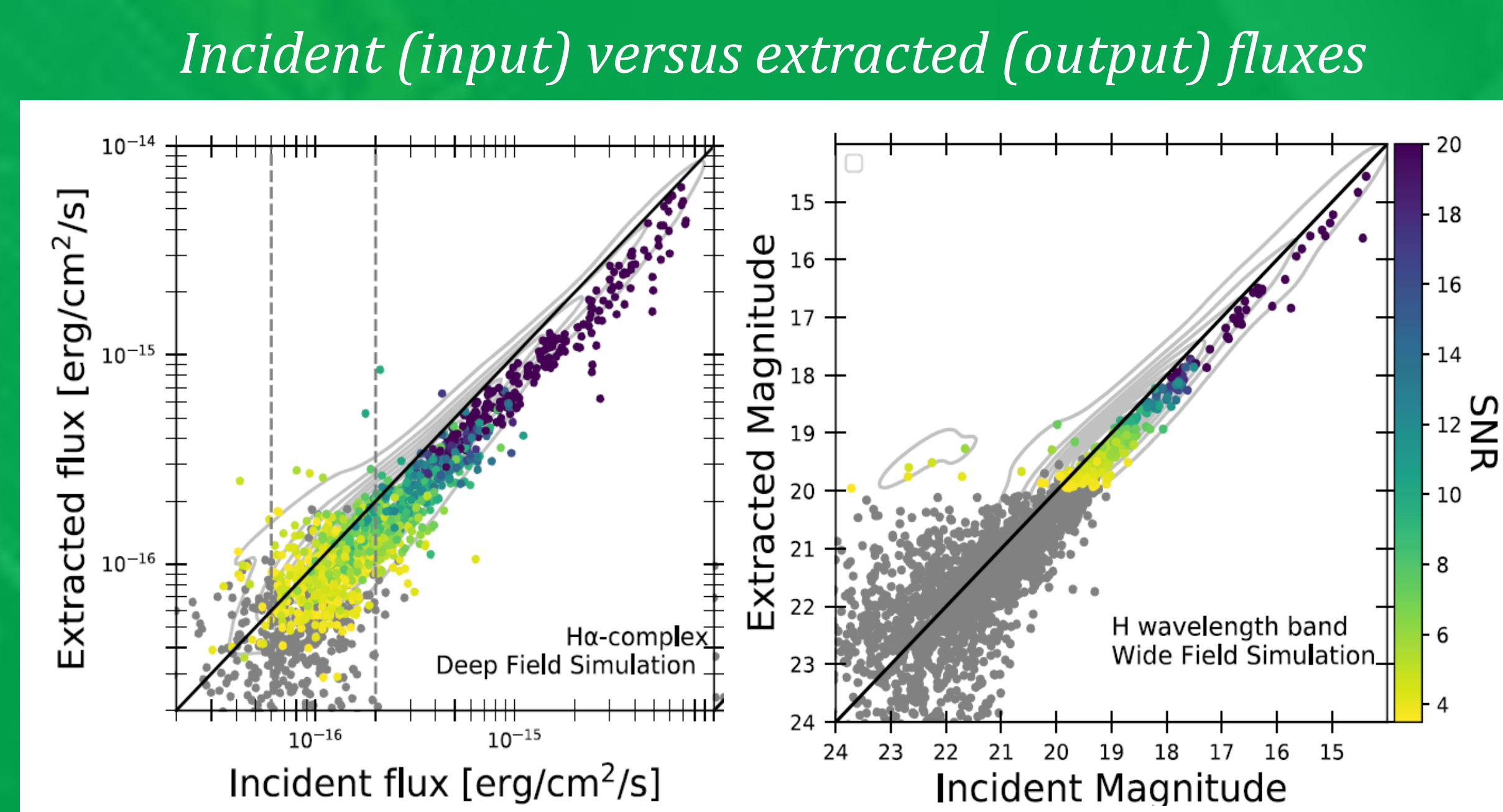


Analysis of the extracted spectra

The morphological effects on slitless spectroscopy



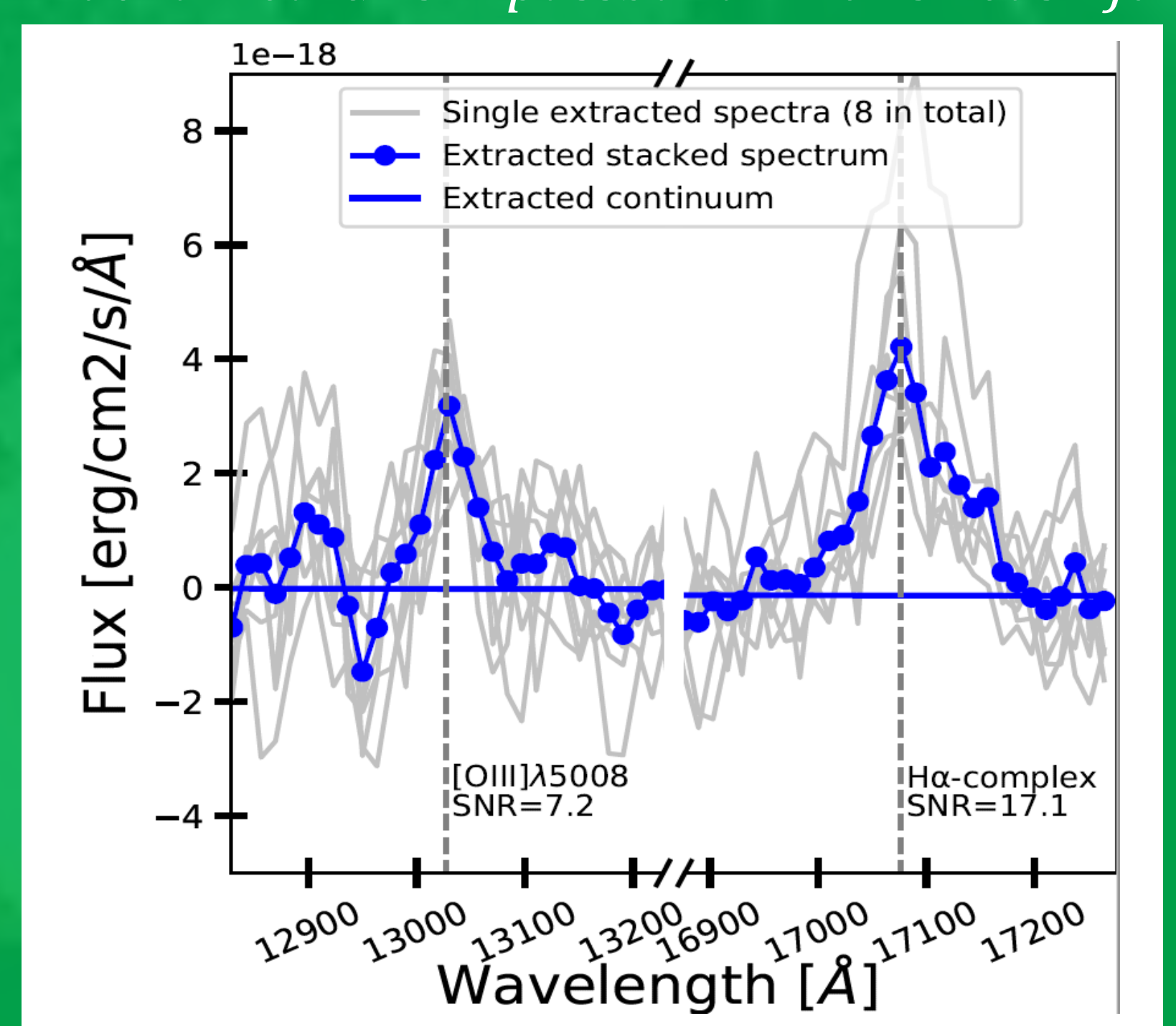
The Euclid Wide and Deep Surveys (Sub-samples median Disk Size = 0.4'')



The stacking analysis

Stacking analysis on eight extracted spectra obtained in the Euclid Wide Survey simulation for sources at $1.5 \leq z \leq 1.8^*$ to unveil the [OIII]λ5008 emission line otherwise too faint (i.e. SNR < 3.5), starting from sources with the H α line detected with a SNR ≥ 3.5 .

*Both H α and [OIII]λ5008 fall in the Euclid Red-Grism passband in this redshift



Continuum and Emission lines detection limits

