Slitless spectroscopy in Euclid / Fourier-based analysis of slitless spectra

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The Near Infrared Spectrometer and Photometer (NISP) instrument on board of the Euclid satellite includes a 3-band (YJH) photometer (NISP-P), and a 2-band low-resolution (R~400) slitless spectrograph (NISP-S). The spectrograph aims at providing redshifts of about 30 million emission line galaxies over 15000 deg² in the 0.7 to 2.0 redshift range. I will present the current status of the NISP-S instrument, and its associated ground-segment data reduction and analysis pipelines.

Slitless spectroscopy is a powerful technique with a high multiplexing capability, but is essentially hampered by cross- and self-confusion effects. Cross-confusion, i.e. the mixing of spectral information from different sources (possibly from different dispersion orders), is traditionally handled by dedicated decontamination procedures. Self-confusion, arising from the degeneracy between spectral and spatial information within a single resolved source, degrades the effective spectral resolution of a spectrum depending on the source and dispersion direction, and is usually not handled specifically. I will present a Fourier-based analysis of slitless 2D spectra, which can significantly attenuate self-confusion under the separability hypothesis (i.e. the spectrum is supposed to be constant over the extent of the source). Preliminary tests are performed on available observations from HST slitless surveys.