

## **The KLEVER Survey: Spatially resolved gas excitation properties and metallicity in high redshift galaxies**

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We will present the first results from KLEVER, an ESO Large Programme aimed at investigating dynamics, gas excitation properties and chemical abundances in high redshift galaxies, by means of near-IR spatially resolved spectroscopy. Exploiting KMOS multi-IFU observations in the J,H and K bands we aim to map multiple optical rest-frame nebular diagnostics in a sample of  $\sim 150$  galaxies between  $1.2 < z < 2.5$ , allowing a full, detailed characterisation of the properties and excitation mechanism of the ISM in these objects on a spatially resolved basis. Here we discuss the results of the analysis of the first available observations, mostly targeting lensed galaxies in HST-CLASH and HST-Frontier Fields clusters.

We investigate the processes responsible for the observed offset of high- $z$  galaxies in the classical BPT diagrams, trying to disentangle the different physical contributions at the origin of the evolution in the emission line ratios, exploiting the spatially resolved approach enabled by the KMOS data and the wealth of available nebular diagnostics provided by our observing strategy. We also assess the chemical evolution in our sample by inferring chemical abundances from the set of emission lines, exploiting a variety of different calibrations. This allows to study spatially resolved metallicity maps and evaluate shape, properties and evolution of metallicity gradients.