

A 3D analysis of the metal distribution in the compact group of galaxies HCG 31

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Abstract. We present new Gemini/GMOS integral field unit observations of the central region of the merging compact group of galaxies HCG 31. Using this data set, we derive the oxygen abundances for the merging galaxies HCG 31A and HCG 31C. We found a smooth metallicity gradient between the nuclei of these galaxies, suggesting a mixing of metals between these objects. These results are confirmed by high-resolution Fabry-Perot data, from which we infer that gas is flowing between HCG 31A and HCG 31C.

1. Main results

We obtained GMOS/IFU spectra covering the central region of HCG 31A and HCG 31C. We then used the N2 metallicity calibrator defined by Marino *et al.* (2013) to derive the oxygen abundance between the merging galaxies HCG 31A and HCG 31C. We found that HCG 31A and HCG 31C display values of $12+\log(\text{O}/\text{H})=8.44\pm 0.03$ and $12+\log(\text{O}/\text{H})=8.22\pm 0.03$, respectively, with a smooth metallicity gradient between these galaxies. Using high-resolution archival Fabry-Perot data (Amram *et al.* 2007), we infer that there is gas flowing between these galaxies, detected by a shift in the radial velocities of the H α emission lines along the line that joins HCG 31A and HCG 31C. This fact suggests a gas mixing between HCG 31AC, which can be responsible in producing the observed metal distribution.

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