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SDSS-IV MaNGA: Testing the Metallicity Distribution across the Merging Sequence

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Abstract. Interactions and mergers have been known as key scenarios to enhance global star formation rates and to lower the metal content of galaxies. However, little is known on how interactions affect the spatial distribution of gas metallicities. Thanks to the SDSS-IV MaNGA survey we are able to statistically constrain the impact of interactions across the optical distributions of galaxies. In this study, we compare the radial distribution of the ionized gas metallicity from a sample of 329 interacting objects – covering different interaction stages – with a statistical robust control sample. Our results suggest that galaxies close to coalesce tend to have flat, lower metallicities than non-interacting star-forming galaxies.

Keywords. Galaxy: evolution, galaxies: interactions, galaxies: abundances

Large surveys have shown that interactions dilute the central metallicity in comparison to normal star-forming galaxies (Ellison *et al.*, 2008). Here we use 329 interacting galaxies included in the IFU SDSS-IV MaNGA survey (>4600 observed targets, see an example in panel (a) of Fig. 1). It allows us to derived a sample of non-interacting galaxies with similar stellar mass for each of these galaxies. We measure the metallicity gradient for each of these galaxies and compare it with the average gradient from its corresponding control sample. In Fig. 1 (b) we show the residuals of this comparison. We find that pairs of galaxies tend to have similar or slightly larger metallicity gradients compare to normal galaxies. On the other hand, galaxies near to coalesce tend to have lower, flat metallicity

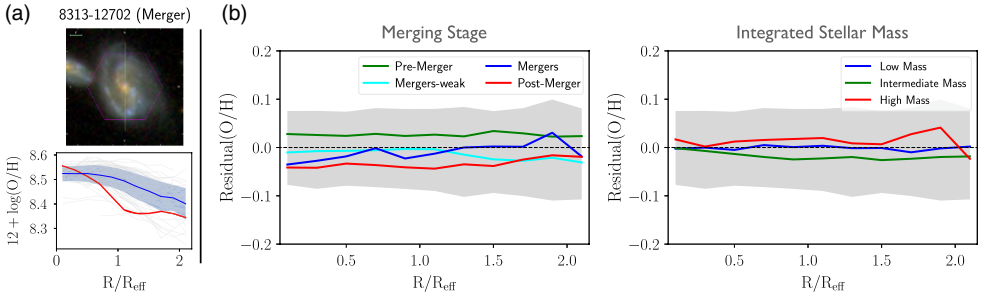

Figure 1. (a) Interacting galaxy (top) metallicity gradient (bottom, red line) with its corresponding control sample (blue line). (b) Distribution of gradients residuals (between interacting and control samples) binned in different interacting stages (left) and stellar masses (right).

gradient residuals. These results indicate that interactions affect the distribution of metals across the entire galaxy, not only at its central region.

Reference

Ellison, S., Patton D., Simmard, L., & McConnachie W. 2008, *ApJ*, 135, 1877

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