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Investigating the extraplanar components in isolated late-type edge-on galaxies

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Some spiral galaxies featuring high star formation rates (SFR), show a major interstellar medium (ISM) phase extending kiloparsecs above/below the disc called extraplanar diffuse ionized gas (eDIG). Although several studies of this ISM phase have been conducted, there is still no consensus about the nature of its ionization source. We present scanning Fabry-Perot interferometer (FP) data from a sample of 14 nearby highly inclined late-type galaxies from the Catalogue of Isolated Galaxies (CIG, Karachentseva, 1973), which aims to serve as a baseline for comparison with interacting galaxies, providing insights into the formation and properties of eDIG.

Spiral galaxies viewed edge-on ($i \geq 80°$) unveil the vertical disc structure, exposing eDIG commonly found in galaxies with high SFR. Some studies have found as the primary driver of eDIG ionization regions mixed OB-shock and hot low-mass evolved stars (HOLMES) (e.g. Flores-Fajardo et al., 2011). While, recent integral field spectroscopy studies have agreed in that the eDIG may rather be a result of the circum-galactic medium (CGM) accretion (e.g. Levy et al., 2019; Tomičić et al., 2021; Bizyaev et al., 2022). FP data of a sample of isolated galaxies, key to studying structure with minimal environmental impact, would help to clarify the eDIG ionization source controversy.

We depicted the stellar disc structure by comparing the FP Hα monochromatic images with near-infrared (NIR) and ultraviolet (UV) images available in the literature. We detected eDIG in 11 galaxies of our sample which also presented extraplanar UV emission tracing an halo. In contrast to the general sample of highly inclined galaxies studied by Rossa & Dettmar (2003) (RD03), we do not observe indications that the environment influences the occurrence of eDIG (see Figure 1).

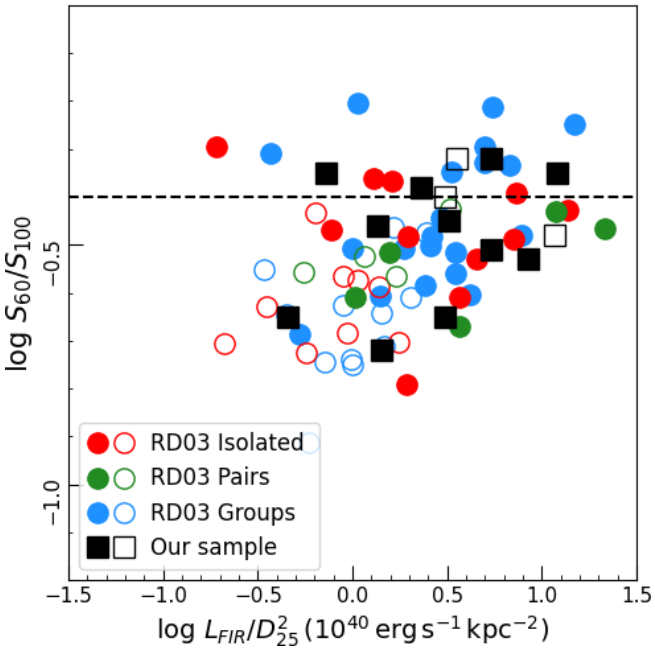

Figure 1. Comparison of RD03's sample with ours on the DIG Diagnostic Diagram (see RD03), distinguishing warm galaxies above the threshold at $S_{60}/S_{100} \geq 0.4$ (dashed line) tipically showing eDIG, considering the hierarchy and indicating the presence (filled markers) or absence (empty markers) of eDIG of both samples.

We analysed the FP Hα radial velocity and velocity dispersion maps, and we computed the rotation curves of galaxies in our sample. We also studied the rotation

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of the extraplanar component and the relation of the eDIG kinematical properties with several galactic integral properties such as stellar mass, SFR, maximum rotation velocity, dispersion velocity, etc. Preliminary kinematical results show that in isolated galaxies the amplitude of the rotational lagging increases with the SFR (see Sardaneta, 2021).

References

Bizyaev, D., Walterbos, R. A. M., Chen, Y.-M., et al. 2022, MNRAS, 515, 1598, doi: 10.1093/mnras/stac1806

Flores-Fajardo, N., Morisset, C., Stasińska, G., & Binette, L. 2011, MNRAS, 415, 2182, doi: 10.1111/j.1365-2966.2011.18848.x

Karachentseva, V. E. 1973, Soobshcheniya Spetsial'noj Astrofizicheskoj Observatorii, 8, 3

Levy, R. C., Bolatto, A. D., Sánchez, S. F., et al. 2019, ApJ, 882, 84, doi: 10.3847/1538-4357/ab2ed4

Rossa, J., & Dettmar, R.-J. 2003, A&A, 406, 505, doi: 10.1051/0004-6361:20030698

Sardaneta, M. M. 2021, Theses, Aix-Marseille Université, Marseille, France. https://hal.science/tel-03718493

Tomičić, N., Vulcani, B., Poggianti, B. M., et al. 2021, ApJ, 922, 131, doi: 10.3847/1538-4357/ac230e

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