GALACTIC ARCHÆOLOGY OF THE ESO 533-4 THICK DISC WITH VIMOS

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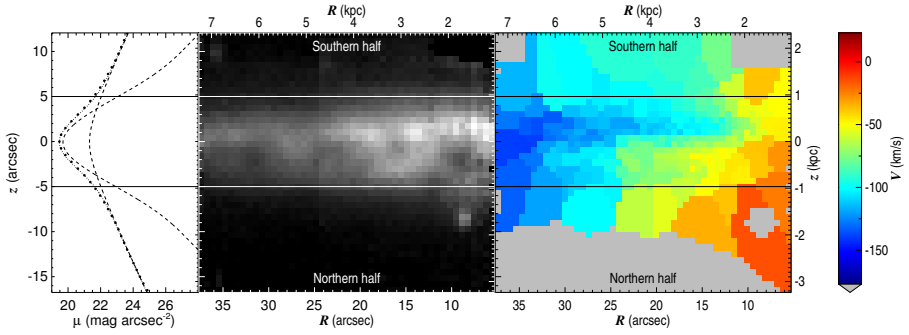
The disc of galaxies is made of the superposition of a thin and a thick disc. Thick discs are seen in edge-on galaxies as excesses of light a few thin disc scale-heights above the mid-plane. Star formation occurs in the thin discs whereas thick discs are made of old stars. The formation mechanisms of thick discs are under debate. Thick discs might have formed either at high redshift on a short timescale or might have been built slowly over the cosmic time. They may have an internal or an external origin. To solve the issue of the thick disc origin we studied the kinematics and the stellar populations of the nearby edge-on galaxy ESO 533-4. We present the first Integral Field Unit (IFU) spectroscopy work with enough depth and quality to study the thick disc. This was done with VIMOS@VLT.

We find that the thick disc of ESO 533-4 contains no counter-rotating material. This suggests an internal origin for the thick disc (as opposite to accreted in mergers, which would cause some amount of retrograde stars). The stellar population map indicates that the populations of the thin and the thick discs of ESO 533-4 are separated in the $\mathrm{Age} - \log\left(Z/Z_{\odot}\right)$ plane. This implies that thin and thick discs are made of two distinct populations. If the thick disc had a secular origin, we would observe a continuity in the $\mathrm{Age} - \log\left(Z/Z_{\odot}\right)$ plane. Hence, we suggest that the thick disc of ESO 533-4 formed in a relatively short event at high redshift and that the thin disc has formed afterwards within it. We suggest that this formation mechanism is the standard one for massive disc galaxies. This work has recently been published in [1].

Left: Symmetrized 3.6μm luminosity profile and thin/thick disc decomposition of the $0.08\,r_{25} - 0.69\,r_{25}$ axial range of ESO 533-4. The horizontal lines indicate the height above which 90% of the light comes from the thick disc. *Middle*: image of the observed field. *Right*: velocity field of ESO 533-4. The horizontal axis indicates the axial distance to the galaxy centre and the vertical axis indicates the distance from the mid-plane



[1] S. Comerón, H. Salo, J. Janz, E. Laurikainen, and P. Yoachim, A&A **584**, 34 (2015).