

# Are “U-shape” age profiles a universal feature in spiral galaxies?

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In this work we study the effect of satellite accretion on the building-up of the radial stellar age distribution in the discs of spiral galaxies. In addition, we analyse its effect on other chemical and dynamical properties of these systems up to their outskirts.

With such aim, we made use of the simulated Milky Way mass, fully-cosmological discs from Ramses Disc Environment Study (RaDES, Few *et al.* 2012). We analysed their assembly histories by examining the proximity of satellites to the galactic disc to gauge which satellites impact the disc.

They can be divided into **three stages** affecting the stellar age-velocity dispersion (AVR) and age-metallicity relations (AMR): i) a merger dominated phase; ii) a quieter phase ending with a final merger event marking the onset of important radial differences in the AMR and AVR; and iii) a secular phase with few mergers not affecting the disc properties. Stars born during the first two phases display high velocity dispersions and a high degree of chemical mixing, in contrast to those born during phase iii (low velocity dispersion and low degree of chemical mixing). As a **consequence** of such assembly history we find:

- **Inverted AMR trends** in the outer parts of discs for phase iii stars.
- **U-shaped stellar age profiles** followed by an old plateau ( $\sim 10$  Gyr) in the outer discs for the entire RaDES sample (regardless of their Surface Brightness profiles). This shape is recovered even in the absence of radial migration (the minimum in age is “older” in this case).

These recovered age profiles agree with a possible scenario in which star formation proceeds inside-out (inner negative gradient), there was an early build-up of the entire disc (outer old plateau), and radial motions smoothen the shape of the age profiles.

All these results have been already published in Ruiz-Lara *et al.* 2016. We strongly encourage the reader to check such paper to expand the information given in this proceeding and to check the whole extent of such work on the effect of the cosmological assembly history on the chemical and dynamical properties of the discs of spiral galaxies.

## References

- Few, C. G., Gibson, B. K., Courty, S., Michel-Dansac, L., Brook, C. B., & Stinson, G. S. 2012, *A&A*, 547, A63
- Ruiz-Lara, T., Few, C. G., Gibson, B. K., Pérez, I., Florido, E., Minchev, I., & Sánchez-Blázquez, P. 2016, *A&A*, 586, A112