Formation and Evolution of Galaxy Outskirts
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Kinematics of the outskirts of S0 galaxies from PNe and GCs

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Abstract. The stellar kinematics of the discs of S0 galaxies (as obtained using planetary nebulae, PNe, and integrated stellar light data) is comparable to that of spiral galaxies, with similar flat rotation curves and falling velocity dispersion profiles, but they present a larger amount of random motions. The only other tracer available to probe the kinematics of individual early-type galaxies are globular clusters (GCs). GCs' formation is intimately connected to a galaxy major star forming event(s) and GCs are, therefore, good proofs of galaxy formation histories. We directly compare a sample of PNe, GCs, and stellar velocities out to 4 effective radii, in the S0 galaxies NGC 2768 and NGC 1023. In particular, we test a new method for studying GC properties and we find that these two lenticular galaxies are consistent with being formed through different formation mechanisms.

Keywords. galaxies: elliptical and lenticular, cD

1. Overview

We decompose the galaxy light into its spheroid (assumed to represent the bulge + halo components) and disk components and use it to assign to each GC a probability of belonging to one of the two components. Then, we model the galaxy kinematics, assuming a disk and spheroidal component, using planetary nebulae (PNe) and integrated stellar light. We use this kinematic model and the probability previously obtained from the photometry to recalculate for each GC its likelihood of being associated with the disk, the spheroid, or neither. We find that, in NGC 1023, the reddest GCs are likely to be associated with the disk, suggesting that the disk of this S0 galaxy originated at $z \simeq 2$ (Fig. 1). In NGC 2768, the red GCs share the same kinematics and density profile as spheroid stars. This suggests that S0 galaxies are an heterogeneous class and that GCs are powerful probes of galaxy evolution (Cortesi *et al.* 2016).

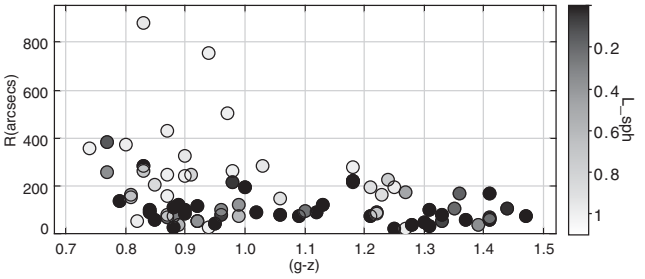

Figure 1. GC colour versus distance from the galaxy centre. The GCs are colour coded according to their probability of belonging to the spheroid.

Reference

Cortesi, A., Chies-Santos, A. L., Pota, V., *et al.* 2016, *MNRAS*, 456, 2611