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Could magnetic fields produce outwards stellar migration?

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We propose a qualitative explanation for the light radial profile of a spiral galaxy based on the quantitative magnetic model of truncations (Battaner *et al.* 2002) in which when stars are born (hence the magnetic force acting on the progenitor gas cloud is no longer at work) migrate to larger orbits or escape.

In Figure 1 we show the surface brightness (SB) profiles of NGC 6504 as observed by Florido *et al.* (2007), in the optical (V) and near-IR (K_s) ranges. We divide these profiles in 5 zones: **(a)** Bulge; **(b)** Inner disk, where magnetic fields are ignorable and no migration should be expected; **(c)** Outer disk, where star *emigration* occurs. The transition between (b) and (c) would correspond to a type II break (downbending); **(d)** Outer disk with star *inmigration*. The transition between (c) and (d) would correspond to a type III break (upbending); **(e)** Truncation region of escaping stars. Further out the profile would eventually drop to zero.

Some regions could be absent in other galaxies with different velocity and magnetic profiles, etc. In (b) the age profile is decreasing. In (c) new born stars migrate and the age profile would increase. Therefore, an U-shape in the age profile should be expected around the transition (b)-(c), as observed (e.g. see Ruiz-Lara (2016) and references therein).

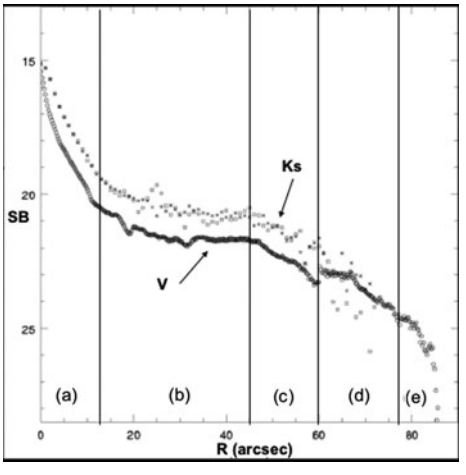

Figure 1.

References

Battaner, E., Florido, E., & Jiménez-Vicente, J. 2002, *A&A*, 388, 213
Florido, E., Battaner, E., Zurita, A., & Guijarro, A. 2007, *A&A*, 472, L39
Ruiz-Lara, T. 2016, *PhD. Univ. Granada*