

Evolving perspectives on the formation and evolution of Giant Low Surface Brightness galaxies

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Giant Low Surface Brightness galaxies (GLSBs) are considered to be extreme late-type spiral galaxies with a prominent bulge and very faint but extended disk. The extended disks are sometimes associated with a prominent ring structure around the galaxy. We have photometrically studied a sample of GLSBs to address their issue of formation and evolution. Using Galfit, we decompose these galaxies into a Sersic bulge and an extended exponential disk. The Sersic bulge component is massive, compact and their stellar velocity dispersion is high for their luminosities. These properties puts them at the extreme end of the Kormendy and Fundamental plane scaling relations obeyed by local early-type galaxies. The sizes of the bulges have an effective radii ~ 2 kpc with stellar masses $M^* > 10^{10.5}$ Msun. The bulge component of GLSBs lie on the stellar mass-size relation followed by compact red nuggets at redshift, $z \sim 2$. Their disks are faint, having sizes in excess of ~ 10 kpc and obey the mass-size relation of local late-type galaxies. We hence hypothesize that the bulge component in GLSBs might have formed dissipatively and were already in place at $z \approx 2$ while the extended disk has assembled later from $z \approx 1 - 0$ in many minor merger episodes.