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STRUCTURES OF THE DWARF ELLIPTICAL GALAXIES NGC185 AND NGC205

SANG CHUL KIM AND MYUNG GYOON LEE
Department of Astronomy, Seoul National University, Seoul 151-742, Korea
E-mail: sckim@astro.snu.ac.kr and mglee@astrog.snu.ac.kr

I. INTRODUCTION

NGC 185 and NGC 205, companions of M31, are dwarf elliptical galaxies with peculiar features such as distinguishable dust clouds and bright blue stars. In this study we present a study of the structures of these galaxies based on *BVRI* CCD surface photometry of 6.′35 × 6.′35 area, supplementing the surface photometry of the small central regions given by Lee et al.(1993) and Lee (1996).

II. OBSERVATION AND DATA REDUCTION

BVRI CCD images(6.′35 × 6.′35) were obtained using the 1.5m telescope at the Palomar Observatory in 1991 and 1992. The surface photometry of the two galaxies were obtained using the ellipse fitting method and the aperture photometry.

III. THE RESULTS

NGC 185: Fig. 1(a) shows the surface brightness profiles of NGC 185. The profiles are flattened in the central region. The entire profiles are not fit well by a single King profile, but are fit well by two King profiles with the core radii r_c = 121.″00. The excess in the central region in comparison with the outer region appears to be due to young stellar populations in the central region.

The diffential color profiles of NGC 185 are given in Fig. 1(b). Fig. 1(b) shows that the colors get bluer inward in the central region, while the colors stay almost constant in the outer region. The trend that $(V-I)$ colors keep increasing outward shown in Lee et al.(1993) appear to be due to underestimate in their sky estimation. The fact that the colors get bluer inward in the central region is consistent with the presence of young stellar populations in the central region.

NGC 205: NGC 205 is much more elliptical than NGC 185. NGC 205 is much closer to M31(60 kpc) than NGC 185(180 kpc) so that it is expected that the tidal effect due to M31 is much larger for NGC 205 than NGC 185, which was shown early by Hodge (1973).

Fig. 2(a) shows the surface brightness profiles of NGC 205. The profiles keep becoming bright in the nucleus. The better structure of the nucleus is seen in Jones et al.(1996). The profiles except for the nucleus are fit well by two King profiles with the core radii r_c = 102.″24. The excess in the central region in comparison with the outer region appears to be due to young stellar populations in the central region, similarly to the case of NGC 185.

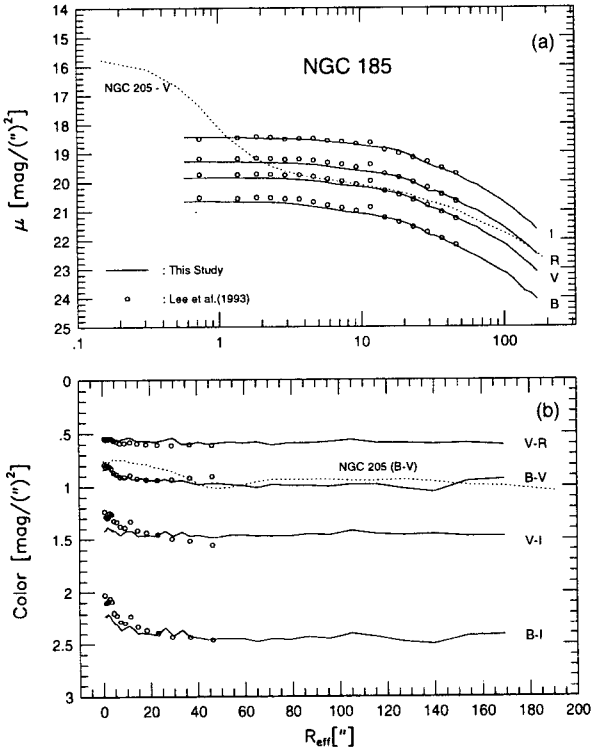

Fig. 1.— Surface photometry of NGC 185 at $R < 180''$. (a) Upper panel: Surface brightness profiles vs effective radius. *BVRI* photometry data within $R = 50''$ by Lee et al.(1993) are plotted as open circles. V photometry for NGC 205 is shown by a dashed line for comparison. (b) Lower panel: Differential colors vs effective radius. Results of Lee et al.(1993) are shown by open circles and $(B-V)$ color of NGC 205 by a dashed line for comparison.

The diffential color profiles of NGC 205 are given in Fig. 2(b). Fig. 2(b) shows that the colors get bluer inward in the central region larger than that of NGC 185, while the colors stay almost constant in the outer region. The fact that the colors get bluer inward in the central region is consistent with the presence of young stellar populations in the central region.

In addition, the ellipticites and position angles of these central regions in the two galaxies are much different from those of the outer regions, and change significantly as the radii increase.

These results show that the recent star formations in the central regions are limited in the central 20″ (= 60 pc) of NGC 185 and central 50″ (= 200 pc) of NGC 205.

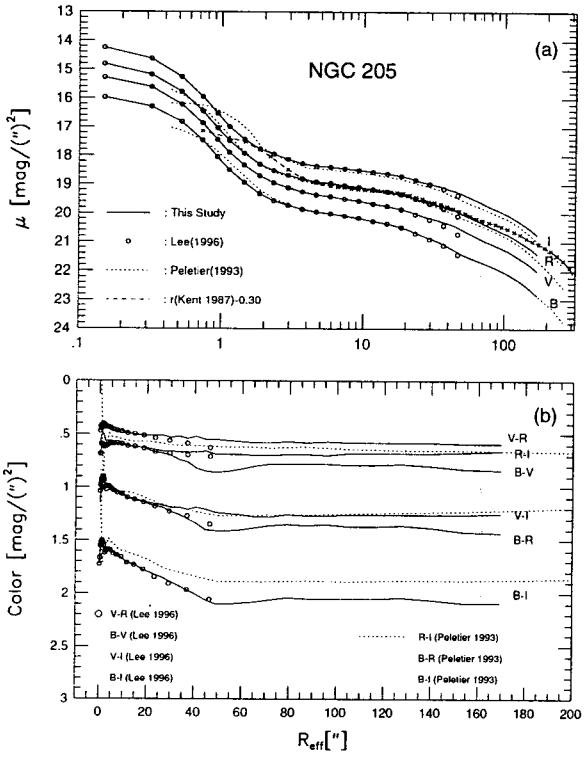

Fig. 2.— Surface photometry of NGC 205 at $R < 180''$. (a) Upper panel: Surface brightness profiles vs effective radius. $BVRI$ photometry data within $R = 50''$ by Lee(1996) are plotted as open circles. The photometry of Peletier(1993) and Kent(1987) are also plotted, respectively, by the dotted line and the dashed line. Gunn r photometry of Kent(1987) is transformed to Cousins R magnitude by using $R = r - 0.30$. (b) Lower panel: Differential colors vs effective radius. Results of Lee(1996) are shown by open circles($V-R$, $B-V$, $V-I$, & $B-I$, respectively, with the increasing colors) and $(R-I)$, $(B-R)$, & $(B-I)$ colors(as it gets redder) of Peletier(1993) by the dotted line.

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